THE MANIPULATION of HUMAN BEHAVIOR

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to
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and
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for their leadership in this area

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. . . wollte nur forschen, Raetsel loesen, ein Stueckchen Wahrheit aufdecken. Dies mag vielen wehe, manchen wol getan haben, beides nicht meine Schuld und nicht mein Verdienst

Sigmund Freud in a letter to Romain Rolland, May 13 1926 [1]

[1] E. L. Freud, *Ausgewaehlte Briefe*, Berlin: S. Fischer, 1959.

Introduction — Manipulations of Human Behavior

In recent years, concern has been expressed, in both scholarly and popular literature, about the dangers of scientific developments that could be used to control and manipulate human behavior. The fear is frequently voiced that techniques have been developed to an extent which threatens fundamental values of Western civilization.

Anxious alarms and dramatic speculations have overshadowed reports of sober efforts to determine which dangers are real and which imagined.

This book represents a critical examination of some of the conjectures about the application of scientific knowledge to the manipulation of human behavior. The problem is explored within a particular frame of reference: the interrogation of an unwilling subject. A number of scientific areas have figured prominently in speculations regardirig the application of science to the manipulation of behavior in interrogation (69). For this work, scientists who had done research in each of these areas were asked to review the state of relevant knowledge in their fields, to consider whether and how it might be applied by interrogators, and to evaluate the recourse available to highly motivated persons for resisting the attempted influence. Their reports constitute the body of this book.

Attention has been focused on interrogation because of the central position this topic has had in recent public discussions of prisoner-of-war behavior — issues that made scientific methods of manipulating behavior a major public concern. Much of the work in this book was sponsored by the U. S. Air Force because of their interest in the problems which face the prisoner of war. Such aspects of prisoner exploitation as ideological conversion and the elicitation of false con-

fessions have received relatively more public and academic discussion than the attempts to elicit factual information through interrogation. Nonetheless, the editors believe that there are some major advantages to approaching the broader topic of the manipulation of human behavior by limiting attention initially to the latter type of situation. The background of recent concern with these problems may illuminate some of the considerations leading to the particular emphasis of this work.

Background

The notoriety that Communist exploitation of United Nations prisoners of war has received in the United States gave impetus to professional and lay concern with problems of the manipulation of behavior. Various writers have associated the compliance effected by Communist captors with phenomena observed in the laboratory; e.g., effects reported following experimental work in pharmacology, hypnosis, sleep deprivation, sensory deprivation, semi-starvation, electrical stimulation of the brain, as well as in social-psychological investigations of persuasion and group conformity pressures (3, 10, 13, 14, 16, 20, 23, 24, 28, 32, 39, 67).

The most radical expressions of concern have alleged that techniques for manipulating behavior are now capable, or are at least on the threshold of being capable, of eliminating the determination of the subject as a barrier to successful influence (21, 32, 33, 34, 35, 36, 37, 38, 39, 44, 52, 60). These claims have been challenged: other investigators have been impressed by the strength, stability, and resilience of long-established values and social controls, and by rational regard for self-interest, either as limiting the compliance of those subjected to coercive and persuasive influence attempts, or as enabling the subject to resist completely (2, 4, 7, 11, 15, 18, 50, 53, 54, 55, 65, 66, 68).

Certain other commentators have viewed the successful exploitation of captives in Korea and similar incidents as less indicative of increasing perfection in the arts of influence and coercion. They have attributed the successes of the captor to individual defects of background and stamina in the prisoners who collaborated, or to a general deterioration of the vitality of social values and controls in contemporary society (16, 25, 31, 61, 62, 63).

Scientific examination of the manipulation of behavior has been made difficult by the intensity of the recent controversy over national

prisoner-of-war policy. Concepts such as determinism vs. moral responsibility are among the philosophical and value considerations implicit in this debate which have added considerably to the problems already posed by existing biases. There has been dispute regarding the extent to which individual repatriated prisoners of war are legally or morally responsible for deviations from ideal standards of military conduct, especially in the matter of yielding information or making "confessions" to the captor (9, 25, 31, 39, 41, 47, 49, 54, 64).

A central question of fact has stood out in this controversy, quite apart from the moral and philosophical issues raised: whether all individuals, regardless of how strongly motivated to resist, could be made to comply with demands for information, "confessions," or other collaboration by methods employed by the Communists, provided that the intensity, duration, and quality of the pressures were sufficiently great. Popularly, this proposition was phrased: "Every man has his breaking point." It gained acceptance as a premise in policy formulation, although the question remained regarding which, if any, of the situations encountered by United States prisoners of war in Korea approached those extremes of "stress" that no individual could be expected to lesist (40, 48, 64, 68).

Critics of the policy evolved after the Korean War — "The Code of Conduct" — argued that the failure of the policy makers to consider imminent developments in scientific methods of human manipulation has been a more serious error than a lack of understanding of the practices actually encountered by prisoners in Korea. One scientist (39, page 54) has written: ". . . one thing is certain — our national policy concerning the conduct of our prisoners of war has not yet fully faced up to psychological developments which are appearing over the horizon of the future." His own conclusion was that armed forces could protect information from an enemy only by denying it to persons subject to capture or, where this was not feasible, by giving such persons means for destroying either themselves or their memories.

In the study leading to the present book, the U. S. Air Force through their sponsorship has sought an authoritative examination of publicized speculations regarding the possible use of scientific developments in the manipulation of behavior against future prisoners of war. A specific objective has been to examine an enemy's possible use of scientific techniques to elicit guarded information from captives, which is the form of prisoner exploitation having the most immediate and and direct military significance.

It is axiomatic that interrogation has become a highly overdramatized subject. Aside from treatments of its more sensational aspects,

very little information on the topic appears in open-source literature. The dearth of sober information on interrogation has had the unfortunate consequence of facilitating the exploitation of United States prisoners of war by Communist captors (64).

Our purpose here has been to bring together in one book authoritative information on methods of behavioral control that have been the subject of considerable speculation in discussions of interrogation. Scientists representing a variety of fields have examined a

number of hypothetical means that might occur to an interrogator for eliciting information against the will of his subject. Their attention has been more on what could be done than on what actually may have been done.

All the questions that are frequently raised about these methods cannot be answered by such an approach, however, since many of them are not translatable into scientific terms.

Origin of Nonrational Concern

Many scholars have observed that science replaces magic and witchcraft as societies secularize. The problems of living in the present age remain much as they have always been, however. They generate many of the same wishes and terrors. The aspirations and anxieties that not so long ago were projected onto conceptions of the wizard and witch are now directed to the scientist.

Two of the most basic of life's problems are linked to the individual's power position vis-à-vis his fellow men: the inability to make others fulfill one's wishes; and the reverse, the fear of being controlled by others, with the consequent loss of the autonomy that is believed to be fundamental to the conception of the self. These opposites are incongruously exaggerated in paranoid thinking, one of the most prevalent mental symptoms of Western man. They doubtless exist in the fantasy of most persons, to extents that differ from paranoia in intensity and pervasiveness.

The profound fascination of the topic under consideration may stem from the primitive, unconscious, and extreme responses to these problems, which gain expression in myth, dreams, drama, and literature. On the one hand, there is the dream-wish for omnipotence; on the other, the wish and fear of the loss of self through its capture by another. The current interest in problems of manipulation of behavior involves basic ambivalences over omnipotence and dependency, which, if projected, find a ready target in the "omniscient" scientist (30).

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Myth and Reality

The "mad scientist" of the horror movie and novel has been with us for many years. More recent fiction has enlisted him in the service of the great nation-state. With the perfection of mass-destruction weapons and the elaboration of totalitarian efforts to control human behavior, the myth has begun to converge with aspects of reality.

Conjectures concerning the prospects of "total annihilation of the human will" appear almost as frequently as those regarding the threat of mankind's total destruction by thermonuclear or similar weapons. Regarding weapons of physical destruction, responsible scientific evidence is offered along with uninformed and ill-informed surmises, both in support of forecasts of doom and in rebuttal. In the case of the threats science poses to human autonomy, however, sensationally speculative expressions, like those of the *Brave New World* that Aldous Huxley (21) recently revisited, have enjoyed a near monopoly. In professional journals and publications, as well as in statements for popular consumption, scientists have sometimes contributed to uncritical thinking regarding the potential application of scientific developments to the control of human behavior. Some scientists have done so in their zeal to make the public aware of the dangerous tool which the techniques for manipulating behavior could become in the hands of totalitarian and other irresponsible practitioners. A common error has been to assume that some scientific development, or some explicit scientific theory, was being applied by Communist "brainwashers" and other manipulators (2, 4, 5, 18). Other scientists, and interpreters of science, have also contributed to the identification of the behavioral scientist as a powerful and unscrupulous practitioner of the arts of influence, as in Vance Packard's *Hidden Persuaders* (45).

It has been pointed out that the ways in which the popular communication media define the problem are akin to those of prescientific times (56). Raymond Bauer (2) has noted the resemblance of the concept "brainwashing" to demonology: the idea of the "brainwashed" does not differ greatly from that of the "possessed" (6). "The battle for the mind" (52), sometimes fought against "the hidden persuader," has many elements of the occult.

Viewing the problem in magical or diabolical terms is not an altogetlier irrational analogy, given the existence of those who simultaneously practice and seek perfection of the means for controlling behavior and conceive of their efforts as directed toward "possessing the will" of their victims. As one of us has pointed out in discussing

Communist interrogation and indoctrination practices (6), the Western conception of "brainwashing," in terms akin to "possession," is matched by the Communists' view of what they seek and how to achieve it as exorcism. Thus, the Chinese Communist leaders not only find nothing to resent in charges that they "brainwash" their opponents (cf. 1), but regard the term as a quite apt and honorable description of what they wish to achieve. To take another example, the symbolic imagery of the medieval *Hexenhammer* (22) is reflected in the designation of the Soviet World War II inquisitorial apparatus as SMERSH ("Death to Spies") (57).

Scientific sobriety demands that the dry examination of experimental evidence replace the lively books on exorcism of ancient times. As in many contemporary works which are closer to the livelier lore of ancient times, however, the present review deals with human concerns antedating science that are at the root of the central question: "Can man really be made to behave contrary to his profoundest beliefs and his conscious self-interest?"

Symbols of science can be used in a magical way, as much of the "brainwashing" literature illustrates. Various writers have invested the techniques of interrogators with the magic of science by attaching technical labels to what actually have been traditional and pragmatic practices (2). In assuming the attitude of the "hard-headed" scientist toward the problem, there is a danger in falling into an equivalent misuse of science. This would be the case were one, in effect, to attempt to counter those who present a diabolical image of the "brainwasher" by invoking superior scientific deities to frighten this specter away. Thus, magical thinking and projections, as has been indicated, pervade prevalent judgments regarding the significance of the behavioral alterations that interrogators can effect. By substituting impassive scientific names for ordinary language with its intense connotations for human values, the impression may be given of eliminating not only these extravagant judgments but also almost all the human significance of these effects. In this way, for example, "treachery" can become mere "attitude change" or "a shift in the subject's frame of reference."

Is Control of Behavior Asymptotic?

Difficulties inhere in dealing scientifically with a problem that relates so immediately to basic human values. Assumptions in this work hold the person against whom the interrogation efforts are

directed — who is designated following common intelligence usage as "the source" — to be highly motivated to safeguard the information; and that, at least initially, the source regards denying information to his interrogator as "more important than life itself." It apparently has not been a rarity for individuals undergoing interrogation to say "go ahead and shoot" in the face of a convincing threat of death, and yet to reveal the information thus guarded under seemingly mild pressure later (8). Similarly, Western jurisprudence recognizes that lengthy interrogation, even without physical coercion, can produce "unwilling" confessions, true or false, of capital crimes. Divergent interpretations have been placed on reported cases of individuals who have resisted very intensive interrogations without divulging information. Some use it to demonstrate the existence of an unconquerable, inextinguishable human will. Others regard the instances

of successful resistance to interrogation as mere illustrations of remediable deficiencies in interrogation technique.

Neither this nor any other scientific volume, in the opinion of the editors, can resolve the differences implicit in these two orientations, or yet other interpretations. On the basis of scientific tests alone, they are difficult to resolve even with a completely deterministic set of assumptions. As the approach of this review illustrates, for any given set of motivations of the source, however powerful, one can at least speculate about possible manipulations to overcome them. On the other hand, it is possible to speculate about methods of heightening motivations and defenses against any conceivable manipulative assault. Exclusively scientific tests probably cannot foreclose either possibility at this time.

Another important qualification to conventional ideas about the ultimate limits of the control of human behavior will become apparent in some of the discussions that follow. The purposes that men have in seeking to control, or to influence, the behavior of others involve the distinctively human capabilities of men and their significance for one another. The major fallacy of the totalitarian interrogator grows out of a poor appreciation of this fact. Some of the chapters here indicate that there are limits to which the ability of a source to reveal information can be separated from his willingness to do so. The analytic divisions we make between such aspects of mental activity as the recall and transmittal of information on the one hand and motivations on the other do not correspond to behaviors that are totally independent of one another in the organism. Furthermore, much of the use one person can make of another resides in the latter's ability to function in a voluntary fashion: in his having

initiative, making choices, preferring, and rejecting. The fallacy of belief in the possibility of total control for any purpose stands out as bizarre in the extreme when acted on by those whose purposes involve the control of self-initiated behavior. An example, simultaneously tragic and ridiculous, is the ideological interrogation.

A system in which mental conformity is sought through coercion and manipulation embodies an ever-present fear on the part of the controllers that conformity will be based on opportunism rather than conviction. In oppressive ideological systems, such as modern Communism, which demand "true sincerity" from their subjects rather than mere outward conformity, the inquisitorial process appears to be a natural development. It is a difficult matter to determine whether thoughts are indeed "true thoughts." The inquisitorial process, being itself highly coercive, reinforces the original suspicion regarding opportunistic conformity. In a vicious circle, coercion is used to produce conformity, generating fears that the conformity produced is insincere, generating in

turn further coercion to make it "sincere." The abhorrence of these practices by those subjected to them makes the fears of the controllers well founded and further reinforces the vicious circle.

Under these circumstances, the ultimate test of the loyalty and sincere devotion of the individual to the system is his acceptance of the inquisitorial process itself: the purge, coercion, confession, and the entire paraphernalia of enforced conversion. *Malleus Maleficarum* (22, page 212) provides an illustration of the manner in which the victim is compelled to adopt the frame of reference of the inquisitor:

> He [the suspected witch] must be asked if he believes that there are such things as witches, and that such things as were mentioned could be done, as that tempests could be raised or men and animals bewitched.
>
> Note that for the most part witches deny this at first; and therefore this engenders a greater suspicion than if they were to answer that they left it to superior judgment to say. . . . So if they deny it, they must be questioned as follows: Then are they innocently condemned when they are burned? And he or she must answer. (Cf. Krivitzky, 26, page 141.)

One final test of loyalty demands that the prisoner act as though he hated himself with the intensity of the criminal definition which the system has placed upon him.

At the outset of the study the impression of the editors from their prior investigation of interrogation problems was that the effectiveness of scientific innovations for controlling human behavior may have been exaggerated in most public discussions. Before final evaluations, alarming or otherwise, were ventured from a human standpoint regarding the significance of the control over behavior

which scientific developments will make possible, it was felt that a more sober, systematic, and accurate examination was required from a purely objective perspective. This evaluation relates to the applicability of such developments to a specified type of objective and to the nature and limits of the alterations of objective behavior that these developments will permit a would-be manipulator to induce in a resistant person. Although such an effort cannot settle the philosophical and emotional questions raised about the significance of the control which can be exerted, it can indicate that some are ill-founded and others premature. Yet others relate to very real matters.

This work does not represent an attempt to minimize the problem. The conclusions reached do in fact show that many developments can compound tremendously the already almost insuperable difficulties confronting the individual who seeks to resist an

interrogator unrestrained by moral or legal scruples. On the other hand, it can be shown that many of the measures popularly supposed to render an interrogator omnipotent actually have no demonstrable applicability to his purposes. Other measures that appear to have high potential utility for the control or influence of behavior seem to owe their effectiveness to quite different kinds of processes than popularly supposed. Among the latter are "placebo" measures, the success of which depends largely upon the attribution to them of a nonexistent potency by the subject, and at times the manipulator. Knowledge, it appears, is a "two-edged sword" in interrogation.

The latter fact is a source of some comfort. Several scientists have reported on the possible applications of scientific knowledge that might be made by the most callous interrogator or power. The results of their thinking are available here for anyone to use, including the unscrupulous. The alternative is to confer on the would-be manipulator a monopoly of knowledge by default. His success, as the various chapters of this book illustrate, depends heavily on the ignorance of his victims. Skinner (58) has argued that those who are most concerned with restricting the vulnerability of men to control by others have the most to gain from a clear understanding of the techniques employed (pages 320-322). (See also Skinner, 59.)

Focus On Objective Behavior

The question of controlling fundamental attitudes and values may hold greater interest for many than our attention to the eliciting of guarded facts by interrogators. Much concern of recent years regard-

ing behavior control, as has been discussed, has centered on connotations that have come to be conveyed by the term "brainwashing." The source of this concern is the belief that individuals can be "changed" in some fundamental way by devious and mysterious acts of influence. Certainly, Communist practitioners of "thought-reform" visualize the creation of a "new man" as their objective. People of Western nations, frightened and puzzled by these Communist practices, have also felt that the behavior displayed by many victims of such efforts could be explained only in terms of some very basic changes within the individual.

The difficulties confronting attempts to examine such complex issues scientifically argue in favor of dealing first with simpler and more objective forms of behavioral influence. In the "brainwashing" model, we have a basically nonrational attempt to effect nonrational changes of subjective states. Practitioners of "thought-reform" seek "real" changes in beliefs and values. They demand that the victim be "honest, sincere, and full"

in his "self-examination, repentance, and change" (27). It is difficult to find objective indicators of the extent to which a "thought-reformer" has achieved "honesty and sincerity," and particularly difficult when given the special ideological meanings such terms have for the practitioners of "thought-reform." As for producing "real" and "fundamental" changes in the person, the superficial and stereotypical concepts about human personality on which Communist " thought-reform" efforts are predicated might lead one to expect that any fundamental changes they produce must be accidental rather than a realization of a deliberate objective.

There is no question that it is possible for men to alter, impair, or even to destroy the effective psychological functioning of others over whom they exercise power. The concepts influence, control, and manipulation denote a certain kind of alteration: the consummation of a purpose of the influencer in the behavior of the influenced. If we wish to examine scientifically questions denoted by the terms influence, control, or manipulation, we must be able to observe objectively and to define in precise terms both the effects sought and those obtained.

A focus on the elicitation of guarded factual information simplifies the analytical problem considerably by posing a model that involves such objectively specifiable purposes and effects. To achieve further simplicity for purposes of this review, the contributors were asked to consider as their primary model interrogations where the interrogator's objectives consisted of obtaining simple, objective information regarding the physical world.

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Interrogators in this age of "psychological warfare" increasingly seek "social and psychological intelligence" from their sources. As in most social science interviewing, the content of this type of reporting depends on such factors as the subjective state and the personal and cultural frames of reference of the reporter. Considerable simplification is achieved by avoiding the complex problems of interviewing, which involve influencing persons to report psychological and social information accurately, and the infinitely more complex question of what constitutes accurate information on such topics.

There are various motivations or values which may underlie the resistance of a source to an interrogation attempt. The interest here is in any method through which these bases of resistance may be changed, outweighed, neutralized, or circumvented so that the person comes to behave in a manner he was originally strongly motivated to avoid. The particular form of behavior toward which attention is directed, the imparting of factual information, has various peculiarities. Some of these distinctive features are considered in the reviews. Few experiments, however, have dealt directly with attempts to elicit precisely this form of behavior. The attention of the contributors was broadened

of necessity to exploit the relevance of experiments studying interpersonal influence on other forms of behavior.

This book does not pretend to examine the processes by which fundamental and lasting alterations of the value system of a subject come about. Nonetheless, in the review of experimentation on interpersonal influence (Chapter 6), it was imperative to consider knowledge developed through experiments that involved theoretical concepts such as "changes in attitude or belief." From the present perspective, the validity of such observations does not depend upon the degree to which observed changes truly reflect stable and lasting changes in the subject. When a determination is made that later behavior negates some value strongly affirmed earlier in the experiment, or the reverse, the experiment accords sufficiently with the questions being posed here.

Although the kind of influence attempt considered here represents a considerably simpler problem than the attitude changes or even attitude reporting used here for some inferences, it nonetheless involves the production and observation of complex, symbolic, learned human behavior. Thus, evidence regarding the manipulations that are possible of the salivary response or other simple responses of either animals or humans would not provide answers to the questions raised by this review.

Scientific Purpose

We have attempted here to communicate scientific information to scientists, and the work originally undertaken for the U. S. Air Force has been revised and supplemented to this end. Emphasis has been placed on detailing the scientific implications of both the general and the specific subject matters, and their value for theory and research. The number of relevant questions left unanswered by the study points to the need for further investigation of the problem under consideration. The contributors represent a variety of scientific fields, and their material either separately or in the aggregate will undoubtedly hold interest for specialists in still other fields. The writing style here is akin to the broader style of papers designed for presentation at meetings of representatives from several different scientific disciplines.

This work might help the armed forces to offset the lack of knowledge that was in part held responsible for much of the success Communist captors achieved in interrogation of United States prisoners of war in Korea (64). Its value for this purpose is limited in that it assumes an interrogator who pursues his objective of developing information rationally. Past experience indicates that practices encountered by prisoners of war are not determined exclusively by considerations of logic (5). A rational

examination of the problem cannot lead to predictions of a nonrational opponent's actions. Historically, there has been frequent resort to coercive practices for eliciting information, despite abundant evidence that such measures are relatively ineffective. Some estimates of what an opponent is likely to do, in addition to those based on considerations of what it will be feasible and advantageous for him to do, are required in devising measures for thwarting enemy exploitation attempts against prisoners of war.

If the present study also receives the attention of interrogators, it may offset their tendency to adopt the sensational stereotypes of interrogation on which many of them appear to have modeled their practice in the past.

Sources

This book is based exclusively on publicly available scientific material. Parallel, but secret, investigations can be presumed to have been undertaken by a number of police and intelligence systems.

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Although the generally available literature would probably reflect in an over-all way the achievements of secret research, it is conceivable that some unknown discoveries or applications may have been made. Our contributors have indicated gaps in specially relevant knowledge, many of which would not be pursued intensively in the ordinary course of scientific development. Largely, however, the unanswered questions that are central to the topic of this book also point to critical gaps in present scientific knowledge.

It should be noted that interrogations almost invariably proceed in private. The two major sources of information about them are: practitioners of the "art" and their victims. The former are generally required to guard the details of their craft as secrets; the latter may have a limited perception, understanding, and memory of what they have experienced. It is possible that practice in some respects has advanced beyond the level of the inferences and conjectures presented here. In other respects, experience has proven that some potentialities of interrogation have been overestimated. Free access to the guarded handbooks of interrogators everywhere probably would not lead to any substantial modification in the general conclusions of this review.

Scope

A thorough review has been attempted of the scientific areas that have figured most prominently in speculations concerning "scientific interrogation."

Because of its defensive application during interrogation, one aspect of the problem receiving special consideration in this book is the ability of the source to thwart his interrogator by feigning psychological disorder. Malingering is a time-honored tactic. Its discussion here illustrates some of the implications of personality evaluation for manipulative situations.

Personality evaluation historically has been considered a clinical adjunct to manipulation. Its application requires the manipulation to be "tailor-made" to the specific individual differences encountered in the intelligence source. No comprehensive discussion of this topic has been attempted here for several reasons: (a) most means of personality evaluation require the willing cooperation of the subject, which is not likely to be obtainable from reluctant sources; (b) assessments not requiring the cooperation of the source (e.g., observation, graphology, analysis of speech or gestures) yield notoriously poor agreement among independent judges or observers, unless the behavior

is categorized into minutiae that are difficult to interpret meaningfully; (c) knowledge is lacking on how to effect maximal exploitation by differential treatment of sources on the basis of personality information, if it were available in reliable form; and finally (d) consensus on a theory of personality, which is critical to the integration and application of personality data, does not exist.

Published speculations that electrical stimulation of the brain might be employed for purposes of nefarious influence led the editors to believe initially that an examination of this area should also be included in this book. The notion that the action of the brain, and thereby the action of an individual, might be controlled directly is an ancient one. Electrical brain stimulation was one of the methods "Big Brother" used in Orwell's *1984* to control his subjects. Scientists, including Lilly (13, 29), Miller (39), Olds (42, 43) and Sargant (52), have indicated that recent experimental developments give some basis to the fiction-writers' conjectures. Observations, primarily from animal experimentation, led to the following surmises. First, and earliest, were possibilities suggested by observations of Penfield (46) that cortical stimulation might elicit "memory" and some spontaneous verbalization of information. Second, animal experiments raised the possibility that subjective experiences from subcortical stimulation might be so intense as to provide a basis for the administration of reinforcements of unprecedented strength. Also, the possibility was raised that organisms might be made more "teachable" by direct interventions of this kind.

The editors asked Sidney Marvin, M.D., Walter Reed Army Institute of Research, who has been working on subcortical stimulation for pain relief in human subjects, to

review current knowledge and techniques in this area from the perspective of this book. Colonel Marvin found that experimentation had not progressed sufficiently to allow for other than conjectural statements regarding the questions raised. The editors believe it sufficient for the purposes of this volume to quote briefly the general conclusions of Colonel Marvin's report:

> . . . In conclusion it should be said that in its current status: (1) subcortical electrostimulation is strictly in the research stage of development and that information is sketchy and variable, (2) precise implantation of electrodes into a given brain location is possible only within ±0.5 cm, a reasonable estimate of the present accuracy, (3) although damage to the central nervous system by such techniques is relatively minimal and usually reversible, still it is a major factor to be considered, (4) current knowledge and working concepts of neuroanatomy and other related disciplines are insufficient. . . .
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>
> Unless knowledge and techniques exist far more advanced than those known to the Western scientific community, intracranial stimulation as presently known would not be employed in any rational attempt to elicit intelligence.

Also excluded from these pages is a consideration of the role of Pavlovian conditioned reflex theory in interrogation. The notoriety attained by this theory, as explaining the inspiration and effectiveness of Communist techniques of coercive interrogation (20, 32, 36, 52), has prompted studies by other investigators. A number of students of the subject (2, 4, 17, 18, 55, 56) have refuted the contention that Pavlovian theory influenced these practices, whereas Schein (56) and Farber, Harlow, and West (10) indicate the inadequacy of simple conditioning models to account for the kinds of complex behavior patterns produced in the course of interrogation.

Contributors have been free to choose eclectically whatever models and theories appeared most adequate to their respective topics. On the whole, matters of length, level of generality, and organization similarly have been left to the judgment of the individual contributors.

In those cases where the contributors to this book were not themselves highly conversant with interrogation practices, the editors have drawn on their own experience and on research that they have conducted on interrogation in advising the contributors and in editing the chapters. The editors thus actively sought to increase the relevance of the reviews to the realities of interrogation.

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Washington, D. C.
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CHAPTER 1

The Physiological State of the Interrogation Subject As It Affects Brain Function

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Introduction

When an interrogation is carried out for the purposes of intelligence, we may assume that it is intended to obtain information and not simply to produce compliant behavior on the part of the man being interrogated. One might describe an interrogator as a man who tries to obtain information from another man who may or may not possess it and who is not necessarily motivated to give the information if he does. The interrogator would like to have this man produce his information rapidly, accurately, completely, and without amendments or additions. In the words of the law, he wants "the truth, the whole truth, and nothing but the truth" — and often he wants this as soon as possible because the information that he seeks has perishable qualities. In the urgency of his need, he may interrogate a man who is injured, fatigued, or in pain. He may use various maneuvers such as prolonged or repetitive interrogation in order to overcome his informant's unwillingness to give information. In doing so he incurs the risk that his efforts may produce compliant behavior without eliciting accurate information.

The information that the interrogator seeks represents what his source still knows about various events, situations, organizations, devices, etc., to which he has been exposed in the past. The most complete and accurate information that he can hope to obtain can be only an approximation of the "true facts of the case" even "under

the best circumstances." It is the purpose of this chapter to inquire into these "circumstances," to consider some of the situations where interrogation may be carried out, how these affect an informant's ability and willingness to give information, and what the ideal circumstances of interrogation may be. The term "circumstances" is taken to mean "the condition of the man being interrogated and the situation in which he finds himself at the time." We shall not consider methods of interrogation or the nature of the

interrogation process, but rather the limitations placed upon these by the state of the man who is being interrogated.

The human brain, the repository of the information that the interrogator seeks, functions optimally within the same narrow range of physical and chemical conditions that limit the functions of human organs in general; and it has, in addition, certain special limitations of its own. Any circumstance that impairs the function of the brain potentially affects the ability to give information as well as the ability to withhold it.

Effects of Disturbed Bodily Functions Upon Brain Function

Some aspects of the physical and chemical conditions necessary for the normal function of the human brain are rather precisely known. The brain, like other organs of the human body, exists in an "internal milieu" which is maintained in a remarkably steady state by a great number of feedback mechanisms, some quite complex. Any disturbance in the constancy of this milieu brings into play homeostatic responses which may involve the great majority of bodily processes as well as the activities of the man as a whole. When environmental conditions pose a threat, these mechanisms are capable of creating major alterations in the internal economy and in many facets of behavior (59, 129, 130). It is largely in this manner that changes in the condition of the man being interrogated may affect his ability to give accurate information.

Some features of the internal milieu may be considered briefly in order to illustrate some of the vulnerabilities of the brain to external influences.

The temperature of the human internal environment is maintained very near 37.5° C. A rise in temperature above 44° C (112° F) (10, 33, 121), or a fall below 24° C (75° F) (73, 116) may damage the brain permanently or be fatal. An elevation of body temperature to 41° C (106° F) or above — which may occur during the fever accompanying

disease or during heat stroke — nearly always impairs brain function. Sometimes such impairment appears at much lower temperatures. Similarly, a depression of body temperature to approximately 31° C (88° F) — a level which is sometimes produced artificially during anesthesia or which may occur naturally in men after extreme exposure to cold — also impairs brain function (2, 9, 37, 62, 123). The nature of the impairments of brain function that occur during these and similar disturbances of homeostasis are discussed shortly. These impairments show many points of similarity, regardless of the conditions causing them.

The concentration of the fluid in the internal milieu is maintained remarkably close to 310 miliosmols per liter. An increase in its concentration (as may occur after hemorrhage or after injuries that create shock) may impair the function of the brain. A decrease in its concentration (which can take place if a man is forced to drink excessive amounts of water over a short period of time) also may impair brain funtion (38, 134).[1]

The internal milieu contains a number of organic and inorganic substances in solution, and the concentration of each of these is also maintained at a remarkably steady level. Disturbances in the concentration of any of these substances, upward, downward, or in their relative proportions, may impair brain function. This impairment may be produced directly by the effect of these changes on the brain, or indirectly through the impairment of the function of other vital organs, which in turn produce a disturbance of the internal milieu. It would not be profitable to attempt to list the limits of the various elevations, depressions, or relative disproportions of these substances beyond which an impairment of brain function may occur. In practice no single change occurs, but rather a disturbance of the concentration of several. A variety of rather common conditions may produce such disturbances. Among these are excessive sweating, deprivation of water, diets deficient in salt, ingestion of excessive amounts of water or other nonsalty beverages over a short period of time, ingestion of excessive amounts of salt in food when water is restricted, ingestion of sea water in the absence of other water, poison-

ings of various sorts, vomiting or diarrhea from any cause, burns, shock caused by injuries, hemorrhage, and impairment of kidney function (14, 30, 42, 43, 100, 134). Even very rapid breathing, which sometimes occurs in people who are anxious or afraid, may lead to chemical changes in the blood that cause disturbances of brain function (17, 36, 77, 96).

Many of the crude procedures that interrogators have utilized from time to time to make informants "tractable" and to "make them talk" have an adverse effect upon the composition of body fluids: the "hot box" or "sweat box"; the deprivation of water; the salty diet; the "water treatment"; the use of emetics to produce vomiting; and the use of cathartics such as castor oil to produce diarrhea. These procedures have been used by

[1] The awkward term “brain function” is used here because there is no other that denotes all of the complex activities that the higher centers of the brain make possible. (We shall disregard its less complex and vegetative activities.) Terms such as “mentation,” “mental activity,” and “thinking” are inadequate. Consider all the human functions that are absent when the higher centers of a man's brain are inactive, and he is in “coma.” The term “brain function,” as here used, refers to all of these.

both European and Oriental interrogators in the historical past. They were also in use quite recently in Communist countries, and perhaps still are. American prisoners of war encountered some of them during World War II and the Korean War, and it is likely they will encounter some of them again in the future.

The brain, like other organs, maintains its functions by constant metabolic activity. The basis for this activity is energy obtained by the oxidation of the organic chemicals available from food. Thus, a constant supply of oxygen must be brought to the brain by the blood in the amount of approximately 50 cc per minute (40, 66, 102). The most common way by which the brain becomes deprived of oxygen is by failure of the circulation (65), which may be brought about by loss of blood from hemorrhage, by shock resulting from injury (which has an effect on the circulation quite similar to that of hemorrhage), or by illness. Such failure of the circulation may occur also when a man is forced to stand still in a fixed position for a long time. It is responsible for the common phenomenon of the soldier who faints while standing at attention (20, 22, 89, 90, 107). Transient circulatory failure is also involved in "emotional fainting," which occurs as a result of an acute fall in blood pressure produced by an "emotional" stimulus. Failure of the circulation has other adverse effects on cerebral metabolism in addition to the effects produced by relative anoxia.

Unlike other organs, the brain cannot use proteins and fats as sources of energy, and thus must rely on carbohydrates (65). It is, therefore, peculiarly sensitive to deficiencies in its supply of sugar, a substance normally present in blood. Small increases in sugar concentration, which usually occur after meals, have no discernible effect on brain function, but relatively small decreases in concentration

may have a distinct effect on mood and behavior. Small decreases set in motion homeostatic processes that lead to feelings of nervousness, restlessness, sweating, and inability to concentrate (27, 36, 92). A fall in blood sugar occasionally occurs in people who are anxious or fearful, and seems to contribute to their symptoms. A serious deficiency of blood sugar profoundly impairs brain function (65). This is one of the terminal events of starvation, and it contributes to the final stupor of the starved man (54, 67).

The brain is not dependent on the immediate level in the blood of any foodstuff other than sugar, but it does ultimately suffer if it is deprived of other foods over a long period of time. The prolonged deficiency of protein and fat, which is usual in general starvation, very probably contributes to changes in brain function occurring under these circumstances (1, 18, 54, 67, 82). More immediate and readily recognizable changes in brain function occur when the diet is relatively deficient in one of the accessory

foodstuffs, or vitamins, which the body cannot produce itself, but which it requires in minute but definite amounts. Among these the "B" group of vitamins are the most immediately relevant to the brain, probably because they take part in various processes of carbohydrate metabolism. A relative deficiency of thiamin (vitamin B1) causes beriberi; a deficiency of niacin causes pellagra; a deficiency of vitamin B12 causes pernicious anemia; and a deficiency of pyridoxine (vitamin B6) causes nervousness, insomnia, weakness, abdominal pain, and difficulty in walking. All these diseases may be associated with pronounced changes in brain function (95, 99, 120). Beriberi and pellagra have been endemic among prisoners of war from time immemorial (54).

The normal function of the brain is also dependent upon the removal of metabolic end-products from the fluid that surrounds it. Especially when there is impairment of the lungs, liver, or kidneys (the organs primarily involved in maintaining the normal composition of the blood and in clearing it of toxic substances), the internal milieu becomes deranged and impairment of brain function follows. The kidney is the organ most often implicated in this phenomenon because it is highly vulnerable to many common disturbances. Dehydration, surgical shock, hemorrhage (14, 38, 43), or the circulatory impairment produced by very long standing (20, 22, 89, 90, 107), all may impair kidney function to such an extent that the internal milieu may be seriously disturbed.

In summary, brain function is readily impaired by disturbances in homeostasis. It is easily disordered by physical abnormalities that affect the body as a whole, including such common conditions as

fever, a profound lowering of body temperature, dehydration, overhydration, disturbances in the composition of the blood, disturbances of respiration, shock, hemorrhage, diarrhea, vomiting, poisonings, starvation (partial or complete), and even static postures that are too long maintained. The disturbance of brain function produced by each of these-and indeed that produced by any homeostatic disturbance, or by any physical or chemical assault upon the brain — is remarkably uniform in many of its features. Even though the symptoms produced by any given homeostatic disturbance (such as overbreathing or dehydration, for example) may exhibit certain idiosyncratic features (such as muscle cramps or thirst), there are fundamental common elements in the disturbances of brain function which follow from all these types of assault.

Manifestations of Disordered Brain Function Produced by Disturbances of Homeostasis

All severe and uncompensated disturbances of homeostasis produce a syndrome of disturbed brain function which, in civilian life, is most commonly encountered in hospitals. This syndrome (officially, the "brain syndrome")[1] occurs in acute and chronic forms (128), and includes deliria of various sorts, some of which have been given the names of drugs or diseases thought to cause them. The present consensus is that the "brain syndrome," whether acute or chronic, is fundamentally a single syndrome, regardless of its cause (24, 25, 29, 76, 92, 97, 108, 128, 131).

The "brain syndrome" in its fully developed state is an across-theboard impairment of brain function: an impairment of all those aspects of mental activity that are commonly tested when the physician undertakes to assess the "mental status" of the patient. A patient exhibiting this syndrome can no longer carry on his usual complex activities, assume his daily responsibilities, or cope with interpersonal relations. As its symptoms develop, he may become restless, talkative, and delirious; ultimately, he becomes totally confused and lapses into unconsciousness.

The full-blown "brain syndrome" usually occurs in people who are distinctly ill, injured, or depleted. Generally, such people are interrogated only when it is feared that their information may be irretriev-

ably lost. Their deranged condition is easily recognized, and the information that they give can be evaluated with this in mind. However, under less drastic conditions the syndrome may develop slowly and be difficult to recognize, and its existence may elude an interrogator.

In the earliest stages of the "brain syndrome," the subject experiences the various uncomfortable symptoms associated with his physical state: pain, fatigue, thirst, hunger, drowsiness, or the like. He loses some of his capacity to carry out complex responsibilities accurately, speedily, effectively, and to plan and delay his activities. This is especially noticeable in his impaired ability to meet new situations and his occasional lapses in dealing with familiar situations (24, 25). His interpersonal relations may deteriorate; conflicts arise which he might have avoided under other circumstances. He is likely to become emotionally labile, irritable, depressed, jumpy, and tense, and at other

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[1] The syndrome has many other names: The “organic reaction syndrome,“ ”symptomatic psychosis,“

times to be unexpectedly blunted or apathetic in his reaction. His concern for the finer aspects of human behavior-for neatness, accuracy, honesty, veracity, and kindness, as well as patriotism and honor — may fall off to varying degrees, whereas at the same time he shows an increased and at times frantic concern for his more immediate bodily needs such as food, water, sleep, rest, and the alleviation of pain.

In this early stage of the syndrome, the only outward manifestations of disturbed behavior, other than those directly associated with illness, injury, or depletion, are likely to be a slight deterioration of dress, speech, and personal appearance. The subject's performance on short-term tasks, including psychological tests of moderate complexity, may not be outside the normal range (24, 25), especially if he is highly motivated at the time. Yet, despite his ability to rise to a short-term challenge, his performance on tasks generally will be slowed, less accurate, and less effective. If his premorbid level is unknown, a moderate deficit may be undetected. Frank disorientation may be absent. He is more likely to be vague and forgetful about time, place, and person, to have to be reminded, or to make a conscious effort to remember.

People who are injured, ill, or depleted by combat or exposure are often interrogated if they seem to be in good condition and capable of pulling themselves together. Under these circumstances they may be subject to disturbed brain function in this earlier and subtler form. The presence of this condition may not be recognized by either the interrogator or the man being interrogated, even though the source may wish to cooperate with his interrogator and may appear

to be mentally "normal." However, the subject's memory may be especially deceptive. There may be a distinct hiatus in his memory, without its being noticed either by the source or by one who examines him. More often he is vague, uncertain about details, and has temporary blocks of memory, especially for the nuances, or the finer (and sometimes the most important) details.

In this state, the subject may have no frank illusions, hallucinations, or delusions, but he overvalues small events, misinterprets, blames others, and accepts explanations and formulations which he might reject as patently absurd under different circumstances. He does not confabulate, but he may be willing to state that a report is "clearly true," or that an event "actually occurred," when in fact the report merely could be true, or the event might have occurred. His intellectual functions, his judgment, and his insight decline to a similar degree.

As the "brain syndrome" develops, the subject's dress, behavior, and speech deteriorate further. His orientation for time, place, and person becomes increasingly

deficient. Initially he may have been quite aware of the impairment of his mental faculties, and his awareness potentiates the apprehension that he may experience. The subject is especially prone to become fearful if his illness is precipitated rather suddenly by acute infection, injury, poisoning, or dehydration. When it comes on more slowly or is due to starvation, his mood may be one of apathy or depression.

The subject is quite likely to have thinking difficulties and sensory experiences, illusions, delusions, hallucinations, and projective or paranoid thinking. Frequently these contain naively transparent elements of wishful thinking. If starved, he may believe that he is about to receive a large meal or he may see it before him. Such experiences may be frightening. If the syndrome develops gradually, he may perseverate, or pointlessly repeat a fragment of thinking, speech, or behavior; or he may confabulate and create figmentary "memories" to cover up actual defects in his memory. Such confabulation may occur even if the subject has a reputation for the utmost adherence to veracity. Since he may be more than usually suggestible (131), the combination of confabulation and suggestibility may make it possible to elicit from him a plausible story that is largely figmentary.

Other mental activities deteriorate also. His intellectual functions fall off. His capacity to calculate, to abstract, to estimate time, to recall items, digits, or stories is impaired. General information that one might expect him to know is not available to him. His judg-

ment is faulty. Although he may at first have had some insight into the fact that he has lost his faculties, later he may have none at all. His memory becomes defective, at first for recent or special events, and later for all sorts of events and topics. The subject's awareness is increasingly clouded, and he becomes more and more drowsy as the process advances to the borderline of the pathological.

The state just described is not uncommon among men who have been through prolonged combat (114) or through prolonged and depleting activities of any sort (4, 39, 83, 124, 135), in men who are injured, who are ill, who have undergone serious exposure to the elements, and who are malnourished or deprived of water. It can be assumed that the U. S. Armed Forces would not deliberately create such a state in prisoners of war, but it is quite likely to occur among them naturally, simply because men often become prisoners of war after strenuous combat, and may be ill or wounded. It can be assumed that future enemies probably will create such a state in American prisoners of war, although they may not do so with any sophisticated intent. Historically, it has been the common practice of captors, police, and inquisitors to isolate their prisoners in places that are cold, damp, hot, unventilated, unsanitary, and uncomfortable, to deprive

them of food, fluids, sleep, and rest and medical care, and to beat, torture, harry, overwork and threaten them, as well as to question them interminably with leading questions. Such procedures have been used partly because they make prisoners more "pliable," more "ready to talk," and more "cooperative." They are very likely also to make the information obtained from the prisoner increasingly unreliable.

Some Circumstances under Which Brain Function May Be Disturbed without Demonstrable Disturbance of Other Bodily Functions

The phenomena just considered relate to men who have suffered some disturbance of their homeostasis — some measurable change in the internal environment affecting the body as a whole, other organs as well as the brain. People who experience the effects of isolation, fatigue, or sleep loss may show no measurable disturbance of their general homeostasis. They may nonetheless exhibit impaired brain function, for the brain has special vulnerabilities over and above those that it shares with other organs. It is possible to have disturbed brain function in the absence of any other significant alteration in homeostasis.

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The brain of man is an organ that deals with "information," using this term in the technical sense as it is used in communications theory (135). The accumulation and transmission of information in this sense is a characteristic of all living organisms. The nervous system of the higher animals is a specialized apparatus capable of dealing with information in complex ways and thereby greatly increasing the general adaptive capacities of the animal. The exceedingly complex nervous system of man has this fundamental function. It takes in information from the organs of special sense, and from the sensory nerve endings within the body and its surfaces, and transmits this information to the brain. There it is analyzed, organized, evaluated, stored, and used as a basis for organizing the activities of the man as a whole. We might say that "information" arising from the configurations of minute amounts of energy is the substrate for the activities of the brain, in somewhat the same sense that "food" is the substrate for the activities of the gastrointestinal tract.

Deprived of information, the brain does not function "normally." It must have a certain quantity of patterned, meaningful, sensory input from the external environment, and some opportunity to organize its output as behavior (31, 60, 74, 86, 87, 91, 136). Nor can the brain perform one sort of activity continuously and maintain its efficiency. Even though the task undertaken is entirely "mental" (or, as one might say, involves only the carrying out of activity within the brain), and no significant changes in the general physical state of the individual occur as a result of it, the phenomenon of "fatigue"

eventually supervenes, and brain function deteriorates (4, 32, 41). In addition to this, the brain requires "sleep" from time to time — a cessation of its "conscious" pattern of activities; otherwise its functions suffer (35, 64, 84, 98, 118). Thus the brain has special vulnerabilities of its own; it cannot function "normally" unless it receives a certain amount of information upon which to operate, and it cannot carry out a single pattern of activities unremittingly and indefinitely.

These points are considered briefly.

Isolation

The experiments of Hebb and others (11, 44, 45, 53, 55, 56, 80, 109, 126), who have concerned themselves with "sensory deprivation," have consisted of putting men into situations where they received no patterned input from their eyes and ears, and as little patterned input as possible from their skin receptors. In some cases there was a

diminution in sensory input itself; but it appears to have been the lack of patterning, the paucity of information, that was important. The subjects were deprived of opportunity for purposeful activity. All of their other bodily needs were taken care of-food, fluids, rest, etc. Yet after a few hours the mental activities of the participants began to go awry. Their capacity to carry out complex tasks and to perform well on psychological tests fell away. They developed illusions, delusions, and hallucinations, a mood of fearfulness, and many of them discontinued the experiment.

Such experimentally contrived situations are by no means the same as those of persons in prolonged prison isolation, yet undoubtedly some aspects of these observations on sensory deprivation are applicable to our understanding of the reaction of the individual to prolonged isolation. It is well known that prisoners, especially if they have not been isolated before, may develop a syndrome similar in most of its features to the "brain syndrome" (57, 58, 91). They cease to care about their utterances, dress, and cleanliness. They become dulled, apathetic, and depressed. In due time they become disoriented and confused; their memories become defective and they experience hallucinations and delusions. In these circumstances their capacity for judgment and discrimination is much impaired, and they readily succumb to their need for talk and companionship; but their ability to impart accurate information may be as much impaired as their capacity to resist an interrogator.

Classically, isolation has been used as a means of "making a man talk," simply because it is so often associated with a deterioration of thinking and behavior and is accompanied by an intense need for companionship and for talk. From the interrogator's viewpoint it

has seemed to be the ideal way of "breaking down" a prisoner, because, to the unsophisticated, it seems to create precisely the state that the interrogator desires: malleability and the desire to talk, with the added advantage that one can delude himself that he is using no force or coercion. The prisoner himself may be taken in by this and later stoutly maintain that the interrogator "never laid a hand on me." However, the effect of isolation upon the brain function of the prisoner is much like that which occurs if he is beaten, starved, or deprived of sleep.

The fact that some people, who have been through prison isolation before, or who can create for themselves an active and purposeful inner life of fantasy, can endure isolation for a long time (5, 15, 75) does not vitiate the fact that total isolation effectively disorganizes

many people who are initially obliged to undergo it, even when it is not carried out under circumstances of uncertainty and threat, as it usually is. There appears to be a wider range of variability in the capacity of men to withstand isolation, sleep deprivation, and fatigue than in their ability to withstand dehydration or fever, for example, even though ultimately brain function may be deranged by all these conditions. We shall consider the basis for this.

Sleep Deprivation

For reasons not yet known, a brain cannot continue to function without occasional periods of sleep. The amount of sleep men require is quite variable. Some can function effectively for fairly long periods with relatively few hours of sleep obtained at irregular intervals (64, 68). Under experimental conditions men have been known to endure for more than a hundred hours without sleep at all (16, 35, 46, 72, 98, 118, 123), and for more than two hundred hours with only a few brief naps (64). Yet most people deteriorate markedly after about seventy-two hours without sleep, and all deteriorate sooner or later (35, 46, 64, 118, 122). The highest functions suffer first; the capacity to cope with complex and changing situations without making mistakes or errors in judgment is often the first to go. This is followed by a deterioration of dress, speech, and behavior; dullness; emotional lability; defects of recent memory; disorientation; hallucinations, delusions, thinking disturbances; and impaired judgment and intellectual functions, all increasing in severity with the passage of time (35, 46, 64, 72, 98, 118, 122). Even at a fairly late stage of this deterioration, people faced with an acute challenge and highly motivated to meet it may briefly perform complex tasks quite adequately; but ultimately even this capacity is lost (4).

Sleep deprivation affects brain function directly, while producing little or no change in the general internal milieu. Efforts to demonstrate a disturbance of the general homeostasis consistently associated with lack of sleep have been largely futile (84, 118). The constituents of the blood and the function of organs other than the brain may show little or no abnormality in those who have been without sleep for many hours. People whose thinking and behavior are seriously deranged may show "nothing wrong with them" on physical examination or various chemical tests. Their demonstrable defect is a disturbance of brain function.

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Fatigue

"Fatigue" is a term which has more than one scientific meaning, as well as more than one popular meaning. We shall use it to denote a group of somewhat similar phenomena which occur in muscles, in reflex arcs, and in the brain. "Muscle fatigue" is precisely defined and denotes the deterioration in the function of a muscle produced by its steady or repeated activity. The phenomenon is readily measured and reproduced. It is associated with measurable changes within the muscular system, and it has its counterpart in the "muscle fatigue" that occurs in the intact man after muscular activity. The fatigue of neural arcs is similarly definable and reproducible. On the other hand, "fatigue" of the man as a whole has been given various definitions (4, 32, 88). It is often seen in people who are depleted or ill, but no measurable bodily change is necessary to it or consistently associated with it. The "fatigue syndrome" may be produced in a man if he is put to performing a given task over and over, without rest and without change. After a while he performs this task less rapidly, less efficiently, less effectively, and with more mistakes. This falling off in his performance on the specific task is usually accompanied by a feeling of "weariness," or "fatigue." His impaired performance on this task is not necessarily associated with any other changes in his bodily functions, and his performance on any other task may be unimpaired; indeed, if he is suitably motivated, he may perform even the task that fatigued him quite adequately for a short period of time (4, 32). In addition, the rapidity with which the fatigue syndrome develops is influenced by the attitude of the man to the task that he must perform (4, 32, 81).

"Fatigue" and impaired performance of the degree just described, or of even greater degree, is readily produced by purely "mental" tasks; and if such tasks are continued long enough, performance deteriorates to the extent that the task can scarcely be carried on (4). However, the most extreme degrees of fatigue that have been studied have been associated with combat or with other extremely trying military operations where muscular activity, lack of sleep, and sometimes injury played a part in their production (4, 8, 13, 32, 41, 49, 50, 81, 83, 88, 111, 114, 115, 135). Bodily changes were therefore present. The fatigue that occurs in combat or other military operations is like that

occurring during the prolonged and unremitting interrogation carried out by state police in various countries (57). The observed mental phenomena are quite similar in both cases. The profoundly

fatigued man, after combat or military operations, or after prolonged interrogation, shows a deterioration of his speech, dress, and general behavior, emotional lability and blunting, confusion, disorientation, defects of memory, hallucinations, delusions, illusions, paranoid thinking, impairment of intellectual functions, loss of judgment, and very little insight (4, 57, 114). Perseveration and confabulation may occur under these circumstances, as they also may after sleep loss (114). In addition, profound anxiety is often exhibited by those who have been in prolonged combat and who have undergone terrifying experiences (114).

The Manifestations of Disordered Brain Function Produced by Isolation, Sleep Deprivation, and Fatigue

The symptoms of disordered brain function that occur under these conditions differ little, except in detail, from those of the "brain syndrome," as this is produced by disturbances of homeostasis. It is easy to differentiate a man who has been long isolated or who is profoundly sleepy or tired from one who is suffering the effects of pneumonia, gunshot wounds, or starvation; but this differentiation is made upon the basis of symptoms and signs other than manifestations of disturbed brain function. It is not profitable to argue whether or not the symptoms produced by isolation, fatigue, and sleep deprivation should properly be classified under the "brain syndrome." However, if one assumes that the effective performance of complex tasks, alertness, orientation, memory, discrimination, and judgment are dependent upon the function of the brain, then there can be no doubt that isolation, fatigue, and sleep deprivation produce disturbances of brain function. If one accepts that the function of the brain is always associated with electrochemical events occurring within it, then these changes in brain function are, in fact, "organic," as are all brain functions. So far as "organicity" is concerned, the effects of isolation, fatigue, and sleep deprivation upon the brain are different from those produced by pneumonia, starvation, or gunshot wounds primarily in the rapidity of their occurrence and the extent to which they can be reversed. Not all of the phenomena that may occur as a part of the "brain syndrome" have yet been described as occurring during isolation, fatigue, or sleep loss, but this seems to be a function of the limited number of observations that have been made on people who are subject to these conditions in extreme degree.

On the other hand, there is a difference in the predictability of the point at which disturbed brain function will be produced by these various circumstances. One can state within rather narrow limits the

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levels of body temperature, blood glucose, or oxygen saturation, beyond which a severe disturbance of brain function can be expected. Isolation, sleep loss, and fatigue, however, present no such narrow limits. It is probably correct to say that if any of these are carried on long enough they will disorganize the brain function of anyone; but the differences in the ability of man to withstand these conditions are very wide. Under experimental conditions, some people have succumbed to sensory deprivation within one-and-a-half hours, whereas others have maintained adequate function for thirty-six hours or more (126). Under prison isolation, as this has been carried out by Russian and Eastern European state police, most prisoners developed symptoms of disorganization within three to six weeks (57); but some have been known to endure this for many months (15, 75), and some have succumbed within days. After forty-eight hours without sleep, some people become disorganized and ineffective, whereas others have been known to go as long as a hundred hours with their functions largely intact (35, 64). A task that will fatigue some men within a short while can be carried on by others for many hours with no evidence of fatigue (4, 32).

It must be conceded that these differences in the ability of men to withstand isolation, fatigue, and sleep deprivation may be based on subtle differences in their genetically inherited characteristics; but if this be true, no evidence has yet been brought forward to substantiate it. On the other hand, there is abundant evidence to indicate that the personality of a man and his attitude toward the experience that he is undergoing affect his ability to withstand it. People who enter prison with attitudes of foreboding, apprehension, and helplessness generally do less well than those who enter with assurance and a conviction that they can deal with anything that they may encounter. Those who readily withdraw into a life of meaningful fantasy and intellectual activity seem to do better than those who are dependent upon activity and interaction with other people. Some people who are afraid of losing sleep, or who do not wish to lose sleep, soon succumb to sleep loss; others, convinced that they can stay awake indefinitely, have done so for well over a hundred hours (64). A great number of reports from industry, and from experimental observations, indicate that the attitude of workers and experimental subjects is as important in determining the rate at which they fatigue as are the tasks they undertake (4, 81). Troops, carried without sleep or rest to the limit of endurance, have been able to straighten up and present a smart appearance for a short time when an appeal was made to their pride (118). In short, the brain, the organ that deals with infor-

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mation, also organizes its responses on the basis of information previously fed into it. This information, in the form of a personality developed through the experiences of a lifetime, as well as immediate attitudes and the awareness of the immediate situation, conditions the way that the brain will react to a given situation. There can be no doubt that personality, attitudes, and the perception of the immediate situation seriously influence the ability of a brain to endure the effects of isolation, fatiguing tasks, and loss of sleep.

Some Conditions under Which the Function of the Brain May Be Disturbed by Factors Not Intrinsically Harmful

In a certain sense one might regard isolation, sleep loss, and fatigue as direct assaults upon the brain; for the first can be regarded as depriving the brain of the substrate of its operations, and the last two can be regarded as leading to the depletion of processes in the nervous system which can only be repaired with a period of rest. However, hypotheses such as these cannot easily be applied to the explanation of the human reactions to pain, hunger, and situations interpreted as dangerous or threatening. Here one is dealing with a form of sensory input that may be of great intensity, but which is not in itself disorganizing to brain function even if continued indefinitely. Pain of fairly high intensity may be borne by individuals over a long period of time without necessarily producing impairment of their highest integrative functions (8, 50). In the heat of combat or of physical contests intensely painful conditions may pass quite unnoticed and may not impair performance. When the attention is focused elsewhere by various means, such as hypnosis, the pain of childbirth or of surgical operations may be withstood and not be remarked upon (103, 125). The reaction to pain is therefore quite variable (3, 6, 7, 28, 48, 50, 63, 69, 78, 93, 94, 112, 132, 133). So likewise is the reaction to hunger (21, 34). Hungry men have produced intellectual and artistic output of a high order, and have been responsible for extraordinary military feats. Men have undergone prolonged fasts without significant impairment of their highest faculties. And, so far as dangerous situations are concerned, there are some who are stimulated or even exhilarated by them, and many others who act as if they do not regard them as dangerous at all.

Thus, hunger, pain, signals of danger, and similar forms of sensory input cannot be shown to be necessarily toxic to the human brain, for, under the right circumstances, any individual apparently can

tolerate them indefinitely. The weight of evidence is that it is not the sensory input itself, but the reaction of the individual to this input which may adversely affect his brain

function. This is not so with isolation, sleep deprivation, and fatigue, where the effects are intrinsically adverse, and the reaction of the individual is a factor only in determining how long these effects can be withstood. With hunger, pain, and signals of danger, the adverse effects on brain function may be entirely the result of the reaction of the individual. Activities of the brain, initiated in response to incoming information, lead to an impairment of brain function. This special vulnerability of the brain to its own activities, long suggested by clinical observation, has recently received experimental support (24, 25).

Hunger

The syndrome commonly associated with the reaction to hunger is slow in developing, but it can be expected to occur in the majority of those who are exposed to prolonged hunger from any cause (18, 67). It has been seen among starved populations (1), among inmates of concentration camps (54, 70), and among prisoners of war (47, 61, 67, 104), and has been reproduced experimentally (18, 67, 82). This and other rigors of the prison camp experience were probably responsible for a good deal of the symptomatology that occurred among American prisoners in Korea (79, 105, 113). People deprived of food very soon develop a persistent hunger, which does not leave them until death approaches or nutrition is restored (18, 21, 54, 67). Accompanying this hunger there is a constant preoccupation with food, which may encompass the greater part of waking thoughts and activity (18, 54, 67). As starvation progresses, the niceties of dress and behavior are neglected, and if the lack of food carries with it a threat of death, behavior may cease to be governed by the restraints of "honesty," "unselfishness," "pride," and "honor," which are active under normal circumstances; in short, the very highest integrative functions drop away (18, 54, 67). During the earlier stages of hunger, irritability and emotional lability are the rule, but later profound and continuing apathy occurs (18, 19, 54, 61, 67, 104). In the most advanced stages of inanition, defects of memory, confusion, hallucinations, delusions, and intellectual deficits become evident (1, 54, 67). Advanced inanition is associated with major changes in the physical state of the individual. Although it is quite possible that this state is directly responsible for the derangement in brain function which takes place, the disturbances of behavior and of mood which occur during the

early part of starvation are present long before any significant derangement of the internal milieu can be demonstrated (18, 19, 67).

It is not to be taken that the reaction to hunger is always the same. In starved communities, in concentration camps, and in experimental situations, some people endure hunger for a long time, and maintain their highest level functions with very little

evidence of disorganization until the effects of illness or lack of food supervene (1, 18, 19, 54, 67, 70). Such people, although they do feel hunger and are aware of it, are able to engage in thought and behavior other than that centering around a preoccupation with food; their symptoms are less outstanding and their behavior is more "normal." So far as is known, this greater ability to withstand hunger has no constitutional or genetic basis; on the other hand, the attitude of the man to the experience that he is undergoing appears to be of great importance in determining his capacity to endure hunger.

Pain

The investigation of pain has been especially enlightening in this regard, because many careful laboratory studies have defined the difference between the "sensation of pain" and the "reaction to pain" (3, 50, 52, 110, 132, 133). The sensation of pain seems to be roughly equal in all men, that is to say, all people have approximately the same threshold at which they begin to feel pain, and when carefully graded stimuli are applied to them, their estimates of severity are approximately the same (6, 28, 48, 50, 51, 71, 85). In general, the reaction to pain is in proportion to its severity, and the most intense pains incapacitate men for any sort of complex function during the period of their duration. Yet exception must be taken even to this statement, for when men are very highly motivated, as they may be when their own lives or the lives of others are at stake, they have been known to carry out rather complex tasks while enduring the most intense pain. The variability of human reactions to the moderately severe grades of pain, such as those found in various diseases, is notorious. Some people perform quite effectively over many years while experiencing the pains of chronic headache, peptic ulcer, arthritis, or similar conditions; others with like amounts of pain are severely incapacitated (3, 6, 7, 8, 28, 48, 50, 63, 69, 78, 93, 94, 103, 112, 125, 132, 133).

The adverse reaction to chronic pain of moderate severity is clinically familiar. It is characterized by withdrawal from the more complex and responsible functions of life, a certain amount of irritability

and emotional lability, and concentration upon personal comfort and survival at the expense of the needs of others and of the society. Under experimental circumstances, those who try to "carry on" while experiencing moderate pain show impairment of their performance on complex tasks, impairment of decision making, loss of efficiency, and difficulty in estimating time (8) — symptoms which would be expected to occur in the early stages of the “brain syndrome” and much like those of people who have suffered the destruction of a small segment of their cerebral hemispheres (24, 25).

It is possible that the differences in the way that various people react to pain may be partly determined by their constitutions, for it sometimes appears to the clinical observer that people of "mesomorphic" build, the heavily muscled and big-boned individuals, are those who react to pain with stoicism or with anger and a mobilization for action that temporarily enhances their performance; whereas the lighter and asthenic "ectomorph" often reacts to pain with withdrawal, incapacitation, self-concern, and anxiety. Yet the exceptions to this are many, and the variations in the reaction of the same person from time to time are great. In general, it appears that whatever may be the role of the constitutional endowment in determining the reaction to pain, it is a much less important determinant than is the attitude of the man who experiences the pain (3, 6, 7, 48, 50, 52, 69, 94, 110, 112, 125, 132, 133).

Threat

Threats of any sort, direct, implied, or symbolic, are not necessarily derived from sensory input which is intrinsically "unpleasant." The question of the intrinsically noxious nature of a threat does not even arise. Complex situations, symbols, and small cues arouse potent reactions entirely because of the interpretation put upon them. In different men similar situations produce different reactions. Some men react to ostensibly dangerous situations with continued effective performance. When men react to such situations as threatening, and when their reactions are characterized by anxiety or other intense emotions, these reactions may disorganize their brain function. Intense anxiety, for example, is sometimes associated with defects in every area of performance that is impaired in the "brain syndrome." Threat is not usually thought of as a "physical" stimulus and the syndrome of anxiety is quite distinct from "brain syndrome." However, the defect in function that occurs in the anxious man is quite real.

Disturbances of Brain Function Produced by Pain, Hunger, and Threats

Pain, hunger, and threats are usually thought of as psychological stimuli because the conditions that produce them may not be noxious unless perceived to be so. The features that determine whether or not a man will perceive a given situation as noxious — his personality, his past experiences, his immediate mental set, and the characteristics of the situation — are outside of the scope of this chapter, but we must take due note of their importance.

On the other hand, the psychological reactions to pain, hunger, and threats will be discussed. These reactions are not called "organic reactions," and they are not considered to be part of the "brain syndrome," but this is a sterile distinction.

The same considerations that were applied to the reactions to isolation, fatigue, and sleep loss apply also to those of pain, hunger, and threats. Insofar as mood, thought, and behavior are functions of the brain, the disturbances of mood, thought, and behavior that occur in reaction to pain, hunger, or threat are disturbances of brain function. Insofar as all brain functions are concomitants of electrochemical events in the brain, these disturbances are "organic." Yet the impaired function associated with anxiety is distinguished from the "brain syndrome" because of its reversibility, and because of the relatively greater disturbance of mood and behavior than of intellectual functions, memory, or orientation that usually occur with anxiety. Yet impaired brain function, not entirely distinguishable from the organic reaction pattern, and in effect "permanent," may in some cases be produced by anxiety alone (24, 25).

Quite aside from the question of whether or not the reaction to threats, hunger, and pain may be directly associated with changes in brain function, there is no doubt that it may be associated with notable changes in the function of other organs. When environmental conditions pose a threat, adaptive mechanisms are capable of creating important changes in the internal economy (59, 129, 130). Manifestations of disturbed function of the gastrointestinal and cardiovascular systems are most frequently reported by prisoners (57), but disturbance of any organ system may occur. In the absence of other causes of disease, dysfunctions produced in this manner are not usually fatal, although they may be. When combined with the effects of isolation, loss of sleep, or starvation, they lead to rapid deterioration and sometimes to death. Even if one were to overlook entirely the

direct effect upon the brain of reactions associated with anxiety, fear, or depression, the indirect effect of the homeostatic derangements that often occur at the same time would ultimately be deleterious to brain function.

Some Implications of This Information

We have drawn a distinction between the "willingness" of a man to give information and his "ability" to do so. The implications of this may now be considered.

As the master organ of human adaptation, the brain functions as a whole in enabling man to carry out the exceedingly complex activities of life in the societies that he has erected. Even impairment of the lower level functions of the nervous system, for example, of sight, hearing, or motor function, to some extent impairs his performance of these activities. Yet many of the highest level activities of man remain possible despite such impairment. Milton was blind, Beethoven was deaf, and Winston Churchill was not

the last statesman to carry on after he had suffered a cerebro-vascular accident. The part of the brain essential to these highest level activities, without which they cannot be carried on, is the most recent evolutionary development and the part particularly well-developed in man: the cerebral hemispheres, the neopallium. It is this that must be intact for the performance of the creative and responsible tasks that confront a mature man and, in fact, for all those "conscious" activities that are part of being an alert, sentient, and civilized human being.

Within the cerebral hemispheres are many discrete pathways which have to do with lower level functions, including those of sight, hearing, and the motor functions that have been mentioned. These lower level functions are relatively localized. Damage to their pathways can impair them temporarily. But the highest level functions, those necessary for the adequate expression of human needs, appetites, and drives, those which provide the mechanisms for symbolic activity ("memory," "abstraction," "cognition," "integration," "reason," and so on), and those which enable men to tolerate frustration, to deal effectively with threats, and to maintain effective and well-modulated defense reactions, do not appear to be localized within the hemispheres (24, 25).

In carrying out these highest integrative functions, the cerebral hemispheres behave somewhat in the manner of a data-processing machine that has "digital" (or "counting") and "analogue" (or "meas-

uring") characteristics, as well as many other characteristics not yet duplicated by man-made apparatus (26). The cerebral hemispheres have no specific pathways associated with "abstraction," "cognition," "integration," "reason," or similar mental activities. Rather, they include a maze of potential pathways, over any of which the complex patterns of activity associated with the highest integrative functions may be set up. Thus, when any part of the hemispheres is damaged, none of the highest integrative activities are entirely lost, but the capacity to perform all is impaired to some extent. It is for this reason, undoubtedly, that anything that impairs the function of the cerebral hemispheres-direct injury, drugs, toxins, diseases, homeostatic disturbance of all sorts, isolation, sleep loss, fatigue, and some reactions to pain, hunger, and threats — ultimately produces a global impairment of the highest integrative activities.

Yet it is also true that some high level functions of the brain are more vulnerable than others. It seems to be a characteristic of the central nervous system that those functions that are "newest" and most complex, those which have appeared most recently in evolutionary development, are most vulnerable and drop out first when the function of the brain is impaired. The cerebral hemispheres provide no exception to this general rule. When they are impaired, the first functions lost are those that are thought to be the

most complex and to have been acquired most recently by civilized man: the capacity to carry out the highest creative activities, to meet new, challenging, and complex situations, to deal with trying interpersonal relations, and to cope with repeated frustration (24, 25). Relatively small degrees of homeostatic derangement, fatigue, pain, sleep loss, or anxiety may impair these functions.

As impairment of brain function continues, somewhat less complex activities deteriorate. There is a lessening of the speed and efficiency with which the ordinary tasks of daily life are carried out. Concern about "accuracy," "propriety," "moral rectitude," "honor," and "feelings of other people," and similar "socially oriented" behavior falls away, and an increased concern about sleep, rest, comfort, food, and other bodily needs becomes apparent (24, 25, 54, 67). There is less adherence to niceties in speech, behavior, and dress. Emotional displays lose some of their social orientation. Judgment and insight are less acute. These complex aspects of brain function may be distinctly impaired, whereas orientation, memory, recall, and the capacity to perform well on psychomotor tests are still intact.

Symptoms of impaired orientation appear as impairment proceeds. Memory becomes faulty, the capacity to recall remote events being re-

tained after memory for recent events is lost. Difficulty in simple computations becomes evident, and impairment of performance on tests becomes quite noticeable.

With still further impairment awareness becomes clouded. It is at this point that misinterpretations, illusions, delusions, and hallucinations may appear, and "delirium" may occur. Large defects in memory and profound impairment of discrimination and judgment are evident. As they develop, confabulation may take place and perseveration is likely.

With further deterioration of brain function, loss of contact with reality and finally loss of consciousness occur.

It is notorious that threats, pressures, and deprivations, skillfully manipulated by police and interrogators with long practice in their use, will "break" almost any man, "soften him up," "make him cooperate," and "make him talk." They succeed because the most complex, the most "civilized," and the most "socially determined" aspects of human behavior are most affected by these procedures. The "less civilized" behavior patterns, directed at comfort and survival, are brought to the fore in a man whose capacity for judgment and discrimination is diminished. "Honor," "bravery," "security," "loyalty," and "patriotism" then have less weight in determining his behavior; pain, fear, and confusion

have more. Rationalizations come easier to him, and points that once seemed important are now unimportant. He becomes more "willing to give information."

"Willingness to give information" is an "attitude," a "mental set," an "increased propensity of the individual to react in a given manner." It is not, in itself, a discrete function of the brain; it is a statement about the likelihood that a given pattern of reaction will occur, provided this reaction pattern can occur. Various degrees of "willingness" exist so long as the brain has any "ability" whatsoever to give information. The "ability to give information" is a statement about the capacity of the brain to furnish information: the possibility that it can do so under any circumstances. "Willingness" and "ability" are not necessarily parallel.

It is easy to see why various police procedures often increase the willingness of men to give information. So far as one can tell, the willingness to give information is not determined by any constitutional factor or by the direct action of any agent from the outside, but by information already within the brain, what might be called its "directions for action." Most of the "directions" which call for a prisoner to withhold information were implanted there by his society. They are the sum total of those learned reactions that have

to do with "loyalty," "honor," "propriety," "security," and so on. As brain function is impaired, information derived from past experience generally becomes less potent as a guide for action, whereas information derived from the immediate experience, pain, thirst, discomfort, and threats to life, becomes more potent. The "attitude" is likely to change, and the man becomes more "willing" to do whatever is necessary to secure his comfort and survival.

The new "attitude," the newly increased propensity, is directed toward doing whatever is necessary to secure comfort and survival. It is directed toward "compliance," toward doing what the situation seems to demand. This new state of the informant may be a trap to an interrogator, especially if he is a vigorous and persistent man with a good hypothesis as to what he might uncover. He is now dealing with a man who is likely to have lost some of his finer capacity for discrimination and judgment, whose insistent physiologic needs impel him toward ready solutions that may serve to relieve him of his discomfort, whose memory for details may be fuzzy and confused, and who is more than usually ready to accept a plausible suggestion. The source is, indeed, more prepared to talk, but he is also more likely to be inaccurate and to give false, misleading, incomplete, or inexact information, of a type like that which his interrogator happens to be seeking. The fact that the giving of this information does not redound to his credit or to his long-

term self-interest and the fact that he is prepared to state that it is true, and later to defend his statements, should not be taken as evidence of its accuracy.

Note that these are statements of probability; they are not absolute. "Willingness" is not necessarily enhanced as "ability" deteriorates. Our simple hierarchical outline of the way that brain function falls off is generally true. All the disturbing influences that we have mentioned can be accompanied by the "brain syndrome," and can ultimately cause disorganization and unconsciousness. However, one cannot make a more exact statement, because the precise nature of the symptoms and the facility with which they are produced are dependent upon the personality of the prisoner, what has happened to him before, and how he views the circumstances in which he finds himself at the time (24, 25, 131). These factors have a great deal to do with the form of the "brain syndrome" produced by disturbances in homeostasis. They determine whether a man becomes garrulous or withdrawn, anxious or angry, paranoid or trusting. They likewise determine the form of the "brain syndrome" produced by isolation, sleep loss, and fatigue, and they further have an important influence upon his ability to withstand pain and hunger, and they

approach being an absolute determinant of whether or not a "threat" will produce a disorganizing reaction.

Unwillingness to give information is a mental set. If it is strongly imbedded in a man before his capture, it may continue to govern one aspect of his behavior right up to the point of delirium or unconsciousness, no matter what symptoms he may develop. Some people -criminals adhering to the "code of the underworld" (127) as well as prisoners of war adhering to the "finest military traditions" (119) — do not give information although they reach the point of disorganization or death. The evidence suggests that a learned reaction pattern, if sufficiently reinforced, can sometimes govern a specific aspect of behavior as long as a man retains the capacity to carry out that behavior.

From the theoretical point of view it is hard to escape the conclusion that a man is best able to give accurate information when he is in an optimal state of health, rest, comfort, and alertness, and when he is under no threat. This would seem to be the optimal situation for interrogation. Any attempt to produce compliant behavior by procedures which produce tissue damage, disturbances of homeostasis, fatigue, sleep deprivation, isolation, discomfort, or disturbing emotional states carries with it the hazard of producing inaccuracy and unreliability.

However, it is often necessary for the interrogator to question people who are experiencing moderately severe effects of illness, injury, fatigue, discomfort, or anxiety. A

body of practical experience indicates that relatively reliable information can be obtained from most such people, if the information sought is neither complex nor extensive. The interrogator faces two special hazards under these circumstances. First, the source may have a fairly serious degree of mental disturbance that is not immediately evident and it may escape the interrogator's attention. Second, any informant in a threatening situation is liable to say whatever will please his captors, even though he may not do so intentionally. These ever-present hazards of interrogation are enhanced under adverse circumstances. It may be assumed, in the absence of evidence to the contrary, that the simpler, the briefer, and the more readily verifiable the information that is sought, the more likely is the evidence of the source to be of value.

On the other hand, granting that various procedures designed to make men more compliant will impair their ability to give accurate information, do these procedures not cause men to give more information than they might otherwise have given? Cannot a man be made to reveal information against his will?

Disordered brain function is indeed easily produced in any man. No amount of "will power" can prevent its occurrence. It can be produced without using physical means, that is, by fatigue or sleep deprivation. Since it may be associated with mental clouding, confusion, lack of discrimination, impaired judgment, and increased suggestibility, it is probably true that most men can be brought to a state where they will agree to statements that are dubious, incomplete, or quite inaccurate. Under these conditions some men will make up entirely fictitious stories incriminating themselves. Therefore, it is usually not difficult to obtain signed "confessions" that are biased, incomplete, inaccurate, or even totally untrue. This is the means by which Communist state police have produced false confessions with great regularity (57), although not with universal success (12, 101, 106, 117, 119).

Most people who are exposed to coercive procedures will talk and usually reveal some information that they might not have revealed otherwise. However, there is no evidence that a man must always reveal a specific item of information that he possesses. Disturbed brain function of the subject does not allow the interrogator to abstract information at will. An interrogator may occasionally trick a disturbed man into revealing bits of information that he had intended to conceal, but information so revealed is likely to be limited and interspersed with unreliable statements. If he elects to do so, a prisoner may endure to death or disorganization without revealing what he knows. Very few men, however, can hold themselves to such rigorous behavior through all the vicissitudes of captivity.

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CHAPTER 2

The Effects of Reduced Environmental Stimulation on Human Behavior: A Review

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Introduction

This chapter is concerned with experimental investigations of the effects upon human behavior of a reduction in either absolute or relative amounts of sensory or perceptual stimulation. Experimental efforts to achieve such a reduction in environmental input to the organism have been referred to in the literature by various terms, of which the most common appear to be "sensory deprivation," "sensory isolation," and "perceptual isolation." Although it is difficult to distinguish between the use of these terms, an effort will be made to examine the similarities and differences found in the growing number of investigations in this problem area. Regardless of the differences in descriptive terminology, these conditions have been observed to produce marked changes in the behavior of subjects exposed to them. These changes have included modifications in thinking, perception, and feeling states, as well as an increase in imagery, often bizarre in content. It is the purpose of this chapter (a) to examine briefly the sources of interest in this problem, (b) to review the extant experimental literature in order to assess the current status of knowledge

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about this problem, and (c) to review briefly its implications for our general understanding of behavior.

Background

Interest in these problems by diverse groups long antedates the current concern. Small (71), in 1900, summarized a great deal of data relevant to the relationship between social life and solitude. He offered the generalization that

> All knowledge of self and things is relative. Personal orientation depends largely on objects in the visual field. In the presence of a desert, a prairie, a sea, or the sky; in an absolutely dark cavern, or on the summit of a mountain, a feeling of disproportionateness between the man and what he sees overwhelms consciousness. Paralysis of association results. Retrogression to a half-vegetative state like that of infancy follows. If the eyes be open, they do not see. They have neither fixation point nor accommodation. Their gaze is as vacant as in the early days after birth, as stolid as the frozen stare that follows death. All the life that there is, lies within. When that which has seemed real, abiding and certain in the objective field becomes a blank, the psychic condition passes rapidly through a change whose nearest analogue is the bladder of air in a receiver from which the air is being exhausted. In the effort to expand itself to the range of its new conditions, the self finds itself only a loosely related mass of reflexes from experience, distrusts their coherence and their affinities, sees the flitting nature of consciousness, loses tself in the Unknown. (17, page 39.)

Until recently our primary sources of data on this problem have been the autobiographical accounts of prisoners, explorers, and shipwrecked sailors. They have reported rather dramatic, often gripping accounts of the response to isolation in narrow and cramped prison quarters, in endless days at sea, or in stark and desolate polar regions. Reports by Bombard (11), Byrd (15), Ritter (63), and Burney (13), to mention only a few, describe the inexorable monotony of these conditions and report unusual changes in thinking, feeling, and perception. Hallucinationlike experiences seemed quite common and a marked hunger for contact with people and things were manifest. These accounts, as well as a variety of other anecdotal literature, suggested the key role of a varied external environment against which to verify internally arising percepts and ideas. Two recent reviews have summarized these somewhat scattered, largely autobiographical reports (50, 72).

In recent years, interest in a systematic study of these problems has heightened considerably. This increase of interest can be at-

tributed to converging influences coming from three major sources. The first of these sources has been the rapid pace of development in several scientific disciplines. Advances in neurophysiology have led to a gradual revision in our conception of the nervous system and have produced data that provide changing physiological models for psychological events (37). There are now available increasingly sophisticated electrophysiological methods of measuring neural function at various levels of the nervous system. Recent reports (29, 61) have demonstrated electrical changes in the central nervous system followfag reduced sensory input. These changes are believed to have chemical consequences. Neurochemistry has begun to provide techniques for evaluating the nature of these consequences.

Psychoanalysis is another discipline in which interest in these issues is growing. Here, increasing emphasis is placed on the importance of understanding ego functioning and its role in mediating behavior. From this viewpoint, the question may be raised, "If the ego is the executive aspect of personality, enabling the individual to cope with reality, what becomes of ego functions in the absence of an external environment with which to cope?" Although Freud (31) dealt with these issues early in his work, interest in an experimental approach to this problem is relatively recent. The work of Hartmann (36) in elaborating the theoretical basis of "ego psychology" is important in this development.

A second major source of interest in human response to restricted environments has come from the military establishment. Technological developments, as seen in a variety of military applications, have given the pursuit of these questions a new urgency. With the advent of space craft, isolated radar stations, and a generally increased reliance on automated equipment, the problem of efficient functioning in severely restricted, monotonous environments is no longer merely of theoretical or academic interest. The problem of efficient personnel selection and utilization, in a wide variety of these circumstances, has provided marked impetus to the initiation and development of research programs dealing with reactions to limited sensory and social environments.

In this connection, the experience of prisoners of war with Communist "thought-reform" has had similar effects. The revelation that isolation may be one factor in the susceptibility of humans to radical changes in customary behavior and beliefs has heightened interest in the study of isolation. The shocked fascination of the general public, not excepting the scientific community, has served to highlight the need for a systematic understanding of the effects of physical and

social isolation on behavior. Literature on methods of "thoughtreform" or ideological reform has attempted to place these procedures in a context which emphasizes the fact that they are well known and not the result of new discoveries or magical innovations on

the part of the Communists (9, 10, 42, 49, 67). In these procedures, solitary confinement and monotonous, barren surroundings play an important role in making the prisoner more receptive and susceptible to the influence of the interrogator. The use of this technique rests not on laboratory science but is part of the empirical know-how of police and military interrogation.

A third major source of interest in these phenomena, although perhaps less dramatic than the foregoing, has come from developments within academic psychology. One such development has taken place in the area of motivation, in which a number of experimenters (14, 34, 58) have attempted to establish the existence and operation of what has been called curiosity or exploratory drive as a primary motive. Attributing a significant role in the determination of behavior to such a drive, we find that this research has arisen in a context which seeks to refute the strongly prevalent view of the organism as a passive receptacle of experience; one which responds only to drive-relevant stimulation. As formulated by Hebb, "Characteristically, stimulus response theory has treated the animal as more or less inactive unless subject to special conditions of arousal." (37, page 244.) In contrast to this approach, studies dealing with the relevance for behavior of a curiosity or exploratory drive indicate that the organism has an active need for experience, and initiates and structures activity in accordance with that need. Studying human response to restricted environments may indicate the mode of operation of the "need for experience."

Another development within academic psychology has contributed to the current concern with the effects of restricted environments on human subjects. Studies of sensory deprivation early in the life of animals, and the effects upon subsequent development and learning, have a relatively long history within psychology. Originally designed to evaluate the relative influence of innate organizational processes (as opposed to learning) on perception, these researches have since been more directly focused on the general effects of early deprivation upon a variety of subsequent behaviors. Although experimental work, because of ethical considerations, has of necessity been confined to animal investigations, clinical and anecdotal evidence such as the reports of Spitz (73, 74, 75) and others (22, 23, 26, 27), and those on "feral man" (70, 71) have supplemented these studies. These reports

have highlighted the importance of a full range of early environmental experience to the development of normal adult functioning. The occurrence of serious and irreversible disruptions of normal development and behavior has been reported. Because this work is beyond the scope of the present chapter, the reader is referred to Beach and Jayne's (5) review of this literature.

Methodological Considerations

Before turning to an examination of the experimental findings, it may be well to consider some of the methodological and conceptual problems raised by research in this area. The diversity of variables involved in a systematic study of response to reduced environmental stimulation makes for considerable complexity. It will be useful to take a brief overview of procedures employed by various investigators.

Three experimental approaches have been identified in the literature (72). In the first of these, efforts were directed toward an *absolute reduction* of input to the organism from the external world. Lilly (50) immersed two subjects up to three hours in a tank of slowly circulating tepid water, wearing nothing but a head mask that covered eyes and ears. There was minimal visual, auditory, or tactile stimulation. Subjects received an initial set of training exposures to overcome fear of the situation. On the day of the experiment, they were placed in the tank and were instructed to inhibit all movement so far as possible. The use of a soundproof, darkened room (65, 79) as a method for achieving sensory deprivation is similar in intent 'o the foregoing procedure. The subject's arms and hands are enclosed in cardboard cuffs and gloves. Plugs are placed in the ears to reduce further levels of stimulation. Although absolute reduction in sensory input is the goal here, this latter method places less of a restriction on motor activity.

A second approach to reducing sensory stimulation was used by Bexton, Heron and Scott (8). They *reduced patterning* of sensory inputwhile retaining levels of input at near normal. In this procedure using twenty-two male college students, the subject wore a pair of translucent goggles that permitted the perception of light but not of objects. Auditory input consisted of the masking sound of fan and airconditioner motors, and tactile experience was reduced through the use of cuffs and gloves that permitted no direct exploration of the immediate surroundings.

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In a third approach, sensory deprivation consisted of *monotony* or absence of change in the external environment, e.g., providing a repetitive auditory experience while presenting the subject with an impoverished visual field. In this procedure goggles are not used and the subject is exposed to normally patterned vision of a highly restricted environment. Wexler, Mendelson, Leiderman, and Solomon (80) placed seventeen subjects into polio tank respirators with arms and legs in cardboard cuffs. The repetitive drone of the respirator motor provided an auditory masking sound, whereas the visual environment consisted of the front of the respirator and the blank walls of a screen. Since the ports of the respirator were left open, subjects breathed for themselves. This procedure relies on monotony to achieve its effects and is thus similar to situations in which highly repetitive simple tasks are performed. It is also most similar to the

environment of the prisoner in solitary confinement as well as other isolation situations as encountered in real life.

Without attempting a comprehensive survey of methodological problems and issues, some examination of the choices confronting researchers in this problem area may be helpful. What are the limitations and problems of these procedures? Efforts at the absolute reduction of sensory input are limited by the impossibility completely of doing away with sensory experience in a living conscious organism. Even the most sophisticated instrumentation cannot eliminate sensations and perceptions arising from internal body functions. This end point of the stimulation continuum thus must remain theoretical. To the extent to which this goal is relevant to testing a variety of hypotheses, it can only be approximated.

Few if any investigators have attempted a rigorous definition of the terms they have employed. Most have used their experimental methods to provide an empirical basis for their conceptions. Indeed it is understandable that the number of descriptive terms and phrases in the literature is almost as large as the number of investigators. Without becoming too deeply embroiled in the sensation-perception issue, it may be useful to think of attempts at the absolute reduction of intensity of input to the organism as *sensory* deprivation, whereas reduced patterning and monotony may be more meaningfully seen as *perceptual* deprivation. The outstanding characteristic of the latter two approaches appears to be the decrease in the structure and variety of input. This inevitably results in a reduction of information. The term "isolation" is one which seems to be relevant to the social dimension rather than to the sensory and perceptual aspects of the various experimental conditions employed. At this stage of

our knowledge, it is unclear as to whether there are different behavioral consequences of sensory as opposed to perceptual deprivation, in the sense used above. It is possible to conceive of this range of stimulus conditions as a complex continuum.

In view of the unique complexities presented by research in this area, it is clear that somewhat arbitrary choices of procedure have been made. These choices must be evaluated in terms of the limitations they impose on the results obtained. Thus the observation of cognitive and perceptual functioning and the descriptions of emotional and affective changes makes simultaneous verbal reports of experience in the experimental situation most desirable. Retrospective reports raise difficult questions about their accuracy and make it impossible to study the concurrence of physiological events and verbal behavior. On the other hand, verbal reports of experiences by the subject during the experiment provide a complex feedback situation. The testing of

perceptual and cognitive functions during the experiment constitutes a definite modification of procedure.

One form of control over the subject's sensory experience has been achieved in many experiments by restricting his mobility. This is accomplished by restraining the subject, limiting the space available to him or by instructions to remain still. This limitation of mobility reduces kinesthetic and proprioceptive input. It is difficult to know whether the results obtained are a function of the additional sense of confinement or restriction which goes beyond reduction in sensory stimulation.

Most studies in this field have striven for absolute isolation of the subject from other human contact by avoiding all communication between subject and experimenter. Although social isolation contributes to reduced sensory input, whether this reduction is primarily effective in terms of loss of social contact per se, loss of patterned stimulation from speech, absolute reduction of sensory stimulation, or some combination of these is still to be determined.

Furthermore, the social isolation in these experimental settings is artificial and limited in that the subject knows there is an observer who is interested in his performance. He usually has good reason to suspect that this observer has strong motivation to prevent the occurrence of any long lasting or profoundly debilitating effects. These implicit aspects of the subject-experimenter contract may be major factors in the presumed social isolation seen in experimental studies. These limitations to isolation do not apply to situations such as those of the prisoner or shipwrecked sailor. In the former case there are the additional implications of the status of "enemy" which

undoubtedly also influences the individual's response. The "escape at will" clause present in laboratory studies constitutes a major difference from the motivational conditions of real life isolation situations.

These factors, along with the use of volunteers in experimental studies, constitute serious limitations to the laboratory testing of hypotheses regarding responses to real life isolation and sensory deprivation. We are unable to assess the effects of coercion or the ultimate consequences of prolonged confinement in a deprived environment. These conditions undoubtedly have a profound effect on the motivational aspects of the situation and thus influence response. The inability to replicate these conditions in the laboratory must limit our generalizations from the experimental data. In view of these considerations these data must be interpreted cautiously.

Empirical Findings.

The first experimental work which focused on the response of man exposed to reduced environmental stimulation per se was begun in 1951 in the laboratory of D. O. Hebb at McGill University (7, 8, 28, 38, 39, 40, 41, 69). Although earlier studies had dealt with more limited aspects of this problem, they grew out of an essentially different experimental interest. The McGill studies initially arose out of a concern with the contribution of perceptual isolation to the mechanism of brainwashing and the effects of monotony upon a person with a long sustained watchkeeping task. Previously Mackworth (52) had shown that in a vigilance task requiring prolonged observation, subjects increasingly and strikingly failed to respond to an appropriate stimulus. From this point of departure, the framework of these and other studies was expanded to focus on a wide variety of other variables.

Our approach in reviewing these studies has been influenced by the consideration that in the early stages of acquiring systematic knowledge about a problem, it may be useful to underemphasize considerations of experimental rigor and elegance in favor of developing a richer background of hypotheses and conceptual formulations, even if only at a suggestive level. Because of their exploratory nature, these investigations have often been designed to look for a wide range of possible relationships, rather than to test specific, focused hypotheses. For these reasons this review will not dwell upon limitations of experimental method and procedure. In general, the studies are uneven in quality, and range from carefully designed and

executed procedures to vaguely formulated, poorly controlled observations with small samples. Similarly, measurement in these studies has varied from precise psychophysical calibration to loosely defined clinical judgments unchecked for reliability. The effort has been to provide a comprehensive review of all pertinent studies for whatever light they shed on the problem or support they lend other studies. In reviewing this work we have largely restricted our concern to the psychophysiological aspects of experimental work with isolation and reduced sensory input. No attempt has been made to include the social-psychological aspects of isolation which, while relevant, represent a special subproblem.

For purposes of clarity we shall report the findings in the following categories: perceptual and motor abilities; cognitive and learning abilities; personality findings; feeling states; imagery; and physiology. In addition, we shall consider findings bearing on methodological choices, clinical applications, and a brief survey of theoretical interpretations. Despite some arbitrariness in these classifications and the necessity of considering the same experimental work in several categories, this approach will permit a

more coherent view of the evidence within a given experimental domain. In referring to these studies, reduced patterning, imposed structuring, and homogenous stimulation are referred to as *perceptual deprivation;* absolute reduction in variety and intensity of sensory input will be called *sensory deprivation.* In a number of experimental procedures elements of both are present.

Perceptual and Motor Abilities

The problems of vigilance under conditions of perceptual deprivation have been studied by Mackworth (52). Additional literature in this area was reviewed by Holland (44), who summarized these studies as showing a greater over-all percentage of detection when the number of signals per experimental session increases, and a more equivocal finding of an increased probability of detection for longer intersignal times. He interpreted vigilance behavior as a problem of reinforcement scheduling and probability of response. In this context, signal detections serve as reinforcements for observing responses. His own findings confirmed the earlier reports that within a given session, despite individual differences, the use of a larger number of signals increased response rate. He calls attention to the "rather precise control exerted by the environment over the human operator's observing behavior" (page 67).

Hochberg, Triebel, and Seaman (43), working with a different experimental interest, performed a series of studies on the percepts obtained under conditions of spatially homogeneous colored illumination over the entire visual field. These studies were designed to test the hypothesis that a colored *Ganzfeld* would lose its color under these conditions. Utilizing eyecaps made from halved table-tennis balls, these investigators found that complete disappearance of color was obtained in most cases, despite considerable individual differences in the course of the adaptation process and in the phenomenal content during adaptation.

Similarly, restricting stimulus input to homogeneous visual stimulation, W. Cohen and Cadwallader (20) studied the effects of uniform visual stimulation utilizing a different apparatus. Subjects' exposure to these conditions lasted from three to ten minutes while sitting alone in a room. The findings showed that under both monocular and binocular conditions, subjects reported a temporary cessation of ordinary visual experience after prolonged exposure to a uniform visual field. With increased exposure to these conditions the initial reports of the field as being "foglike" changed to an experience of "blanking out." The "blanking out" or "white-out" phenomenon often persisted for thirty seconds or more and the reappearance of the field occurred only after extensive eye movements and blinking, or with the introduction of an object to the field. Factors that facilitated "white-out" were found to include both extensive prior

stimulation and scotopic (rather than photopic) stimulation. A similar finding is reported by Ditchburn, cited by Bruner (12), who showed that if a visual pattern is stabilized on the retina so that it is not even displaced by the natural tremor of the eye, it disappears from view within about six seconds.

Bexton et al. (8), utilizing the procedure of reduced patterning of stimulus input, had twenty-two paid male volunteer college students serve as subjects and compared their performance with an equivalent control group. They were told to lie on a comfortable bed in a lighted cubicle, and they wore translucent goggles, cuffs, and gloves. Auditory input was reduced through the use of a partially soundproof cubicle, a U-shaped foam rubber pillow for the subject's head, and the masking hum of fan and air-conditioner motors, which was fed into earphones in the pillow. Upon leaving, after two or three days in the experimental situation, subjects had difficulty in focusing; objects appeared fuzzy and did not stand out from their backgrounds; the environment seemed two-dimensional; and colors appeared to be more saturated than usual. The experimenters also found deteriora-

tion in visual motor coordination as measured by such tasks as the Wechsler Digit Symbol test, handwriting specimens, and the copying of prose paragraphs. Another study by the same group (69) showed that performance on the Thurstone-Gottschaldt Embedded Figures test declined, whereas no change was manifest in a mirror tracing task. The deterioration of performance on the digit symbol test has since been confirmed by Davis, McCourt, and Solomon (21), who studied ten paid volunteer subjects under different experimental conditions of perceptual deprivation. These investigators failed to find deterioration in the Witkin Embedded Figures test. Vernon and Hoffman (76), after conditions of sensory deprivation lasting twenty-four and forty-eight hours, questioned four subjects about difficulty in focusing, increased saturation of hues, and lack of three-dimensional perception, and reported negative findings for all three phenomena.

Heron, Doane, and Scott (41) extended the duration of their experimental procedure to six days and served as their own subjects. They described the disturbances in visual perception as unexpectedly profound and prolonged, with similar manifestations for all three participants. These effects included apparent movement phenomena (with and without head and eye movements by the observers), distortions of shape, accentuation of afterimages, perceptual lag, and increases in color saturation and contrast. Further work from the same laboratory (28) described the fluctuating curvature of surfaces and lines, and disturbances in size constancy. In addition, these investigators observed that autokinetic effects were harder to abolish, larger figural aftereffects were obtained, and

spiral aftereffects were more persistent. A loss of accuracy in tactual perception and spatial orientation was noted.

Freedman, Grunebaum, and Greenblatt (30) studied the effects of isolation and reduced patterning of visual and auditory input upon visual perception. As controls they employed paid male volunteers, who received only social isolation. To induce perceptual deprivation, these investigators used translucent goggles, white noise fed into earphones, cotton gloves, and cardboard cuffs for the subjects' arms. Each of the eight experimental subjects was placed on a bed in a lighted room and was instructed not to move about. The control group of six subjects was similarly treated without the additional restrictions to visual, auditory, and tactile input. Both groups remained in the situation for eight hours and had no contact with the experimenters during this time. They found changes in perception similar to those cited by the McGill group.

Their report describes measurable perceptual "aberrations" found

in every experimental subject, but none in the control subjects. In some subjects these aberrations persisted for over one hour, and consisted of two-dimensional forms changing shape and size and of straight lines moving and curving. Comparing pre- and postisolation performance, they observed a decrement in size constancy and changes in the Müller-Lyer illusion. In both instances, changes consisted of increased variability of judgment rather than unidirectional effects. Visual-motor coordination, as seen in the copying of Bender-Gestalt figures, was significantly impaired following exposure to the experimental conditions.

An increase in apparent movement phenomena through perceptual deprivation has been demonstrated in a study designed specifically to test this relationship. Ormiston (59) compared thirty minutes of perceptual deprivation, sensory bombardment, and a neutral condition for their effects on the perception of the phi phenomenon with thirty subjects serving in each condition. The deprivation condition was realized through having subjects sit in a bare room wearing translucent goggles, ear plugs, and ear muffs. The sensory bombardment condition exposed subjects to motor tasks, a tape with varied sound effects, taste and smell stimuli, and a variety of colored goggles. The neutral condition consisted of having subjects sit on a couch in a waiting room. A comparison of pre- and posttests showed a statistically significant increase in the perception of phi for the deprived group, whereas the bombardment group showed a trend toward decrease in phi perception. The neutral group showed no change.

Vernon, McGill, Gulick, and Candland (78) studied the effects of sensory deprivation upon a variety of perceptual and motor skills. Eighteen paid volunteer

subjects were placed in a small, dark, lightproof, soundproof chamber containing a bed, an icebox with food, and toilet facilities. Subjects wore gauntlet-type gloves to reduce tactile stimulation and inhibit movement as well as the noise of movement. They were instructed to lie quietly and make as little noise as possible. A control group which did not receive sensory deprivation consisted of a similarly motivated group of graduate students. The experimental subjects remained in confinement for one, two, or three days, at the end of which they were required to perform a variety of tasks. The effects of sensory deprivation were assessed by a comparison of differences in pre- and postconfinement scores with those of the control group who were tested at similar intervals. The findings revealed significant deterioration in visual-motor coordination as seen in a rotary pursuit task, a rail-walking task, a mirror tracing problem, and mazes. In perceptual tasks, such as color

perception and delayed auditory feedback, a similarly significant decline in performance was observed. The only task of this series which did not show a decline was a test of depth perception, in which a trend was obscured by the large variability of scores. It should be noted that the mirror-tracing finding in this study contradicts that reported by Scott et al. (69).

Utilizing the shortest periods of exposure to reduced sensory input, Rosenbaum, Dobie, and Cohen (64) studied the effects of 0, 5, 15, and 30 minutes of two conditions of visual deprivation upon tachistoscopic recognition thresholds for numbers. For one group of sixteen subjects, visual deprivation was achieved by blacked-out rubber goggles, while a similar second group received perceptual deprivation through the use of goggles permitting the perception of diffuse light. These investigators found no differences between their two groups; both improved with successive days of practice. The five-minute condition resulted in a lowered threshold for both groups. The thirty-minute condition produced no change from the zero level. Since none of the experiments using longer periods of deprivation measured recognition thresholds, it is difficult to say whether failure to observe changes in this task was a function of an insufficient period of deprivation or whether no relation is to be expected.

In summary, the findings of these studies indicate a generally disorganizing effect of deprivation upon perception. The effects thus far demonstrated have been confined largely to the visual modality. These effects include the following: breakdown in visual-motor coordination, an increase in apparent movement phenomena, increase in color saturation, decline in size and shape constancies, loss of accuracy in tactual perception and spatial orientation, increase in persistence of autokinetic effect, larger figural aftereffects, difficulty in focusing, fluctuating curvature of lines and surfaces, and a general decrease in the efficiency of perceiving relevant stimuli. Although several studies

are in disagreement about some of the above details [e.g., Vernon and Hoffman (76)], most reports are remarkably convergent in their findings despite wide differences in experimental conditions. These effects may be best characterized as a general loosening of subjects' ability to perceive reality and the weakening of stable internal norms against which to evaluate perceptual (visual) experieuce. The increase in variability of a number of visual functions and loss of accuracy may be best understood in these terms. The breakdown of internal norms is demonstrated in a variety of other functions and begins to suggest one general parameter which may make isolation and sensory deprivation effective in increasing

the vulnerability and receptivity to new external environmental influences.

Cognitive and Learning Abilities

A wide variety of studies have referred to subjective reports of difficulty in concentration, attention, and problem solving following isolation and confinement (8, 16, 17, 30, 65, 80). These and other studies have also examined the effects of isolation and deprivation upon a wide range of cognitive functions. Included have been such abilities as those involved in a variety of intelligence test performances, learning and association tasks, logical reasoning, etc. We turn here to a consideration of these aspects of the experimental literature.

The report of Bexton et al. (8) is elaborated in a subsequent study (69). These researchers investigated cognitive performance during isolation and perceptual deprivation. In order to evaluate the duration of the effects, they examined several other functions following four days of isolation. On several occasions during isolation, they had subjects perform tasks such as mental multiplication, arithmetic catch problems, completing number series, anagrams, and wordmaking. Despite the fact that the decline in the twenty-two subjects of the experimental group was not statistically significant for all these tasks, the deterioration due to the experimental conditions was consistent. In a second series they found no change in digit span or analogies during isolation, whereas associative learning tended to decline, but not significantly. In a postisolation series they found significant deterioration in judgment of anomalies and in two block design tasks. Their general findings suggest that performance on intelligence test items grew progressively worse as length of stay in the cubicle increased.

Starting with this observation, Vernon and Hoffman (76) used a procedure of sensory deprivation similar to that described above. They studied the ability of four paid volunteer male college students to learn lists of adjectives after twenty-four and forty-eight hours of confinement. Comparing their experimental subjects to an equivalent

control group, they found that the ability at rate-learning improved with continued sensory deprivation. In a follow-up study, nine experimental and nine control subjects, who were all paid volunteer male college students, were compared for ability to learn a longer list of adjectives after twenty-four, forty-eight, and seventy-two hours of sensory deprivation (77). In this instance there were no significant differences between groups in errors or trials to criterion, although

the experimental group made fewer overt errors and showed less variability. Thus, despite failure to confirm their own previous findings, this study did not support the deterioration finding of the McGill group.

Goldberger and Holt (32) studied fourteen paid volunteer male college students under perceptual deprivation conditions similar to those of the McGill experiments. They utilized the halved tabletennis ball procedure of Hochberg et al. (43) to occlude vision and white noise to mask other auditory input. Subjects lay on a bed in a cubicie for eight hours and were encouraged to talk during their time in isolation. The following tests were administered at the end under the experimental conditions: arithmetic reasoning, digit span, and story recall. Subjects were then taken out of the isolation and a test of logical deductions was given. Comparison of the performance of the experimental subjects pre- and postconfinement (without a control group) showed that only the last of these, logical deductions, reflect significant impairment.

Davis, McCourt, and Solomon (21) utilizing a modification of the polio tank-respirator procedure initially described by Wexler et al. (80) kept five pairs of paid volunteer male college student subjects in relative perceptual deprivation for over ten hours. These subjects did not know one another. Although they could talk to each other, they were confined separately and could not see each other. In comparing scores before and after isolation they found no change in performance on a block design task. These authors considered the possibility of procedural variables causing failure to confirm Bexton et al. (8) in finding impairment in block design performance.

B. Cohen, Rosenbaum, et al. (17) studied four normal subjects and six patients from various clinical groups under conditions of brief deprivation. Subjects were seated individually for one hour in an isolation chamber in a comfortable chair. They wore goggles which were either blacked out or else permitted diffuse light perception. Audition was minimized through car plugs, padded earphones, and the masking sound of a fan motor. Their fingers were wrapped in elastic bandages and they wore elbow-length gloves. The instructions were to relax and move as little as possible. Subjects were also told that they would perceive sensations ordinarily below conscious awareness. These experimenters report that there was no "gross cognitive deterioration" under these

conditions as measured by the number of word associations produced in two minutes. The small sample size, the brief period of isolation, and the limited measure employed in this study suggests caution in interpreting this result.

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S. Cohen, Silverman, Bressler, and Shmavonian (18) reported an exploratory investigation on four subjects exposed singly to four hours of confinement and deprivation while seated in an anechoic chamber, with instructions to keep awake and to estimate the passage of successive thirty-minute intervals. All four subjects showed an increase in performance on digit span, and decrease in arithmetic reasoning, abstraction, and general reasoning. All subjects reported difficulty in problem solving and logical thinking. The small sample size and absence of a control group limit the relevance of these findings.

The few reports available, their currently sketchy detail, and their limited controls make it difficult to arrive at a firm generalization concerning the effects of deprivation and isolation on cognitive skills. Some tentative agreements among the studies may be worth highlighting. It appears that the skill most severely impaired under these conditions is that of general reasoning and problem solving, whether the situation involves verbal-conceptual materials or numbers. On the other hand, in several studies performance on simple recall tasks or rote learning seems either to improve or else does not decline. Tasks that involve analysis and synthesis of visual materials such as block design show equivocal results; in some studies there is deterioration, in others no change is seen. Some of these equivocal results may be a function of differences in procedure or duration of deprivation and confinement. The sequence in which postisolation tests are administered may be a relevant variable here since the duration of the effects, if any, is as yet unknown.

The conceptual analysis of cognitive skills into categories such as reasoning, memory, arithmetic, and manipulation would serve a very useful purpose in these studies. Goldberger and Holt (32) offer a tentative generalization which begins to specify some of the different factors involved in various tasks. They point out that, "Probably any task that can be done satisfactorily in a single brief effort by the use of highly overlearned sets of operations (as in simple arithmetic problems), and any learning or memory performance requiring passive receptivity (cf., digit span, rote learning) rather than reflection and manipulation of ideas (cf., logical reasoning) would be least interfered with by moderate amounts of isolation." (32, page 109.) This formulation appears to account for some of the reported results, but the criteria employed to classify cognitive tasks need further specification and expansion. For example, are there differences in the types of memory or recall involved in digit span as opposed to remote memory? Although the available results are certainly inconclusive, the Gold-

berger and Holt generalization suggests that remote recall would be relatively unimpaired by isolation. This would have implications for one interested in the interrogation problem where, leaving motivational issues aside, it would seem that the information a person might recall when cooperating would be reliable. Furthermore the data suggest a decreased interest in and ability to reason through the complexities of the interrogator-prisoner relationship and thus a decreased ability to cope rationally and effectively with the situation at hand.

Despite the more tenuous nature of the findings in the area of cognitive skills, to the extent to which a generalization is possible, it seems that in addition to the decline in internal norms or standards for perceiving reality, under conditions of deprivation and isolation there is a lessened ability to reason closely and solve complex problems. Should such a generalization be supported by subsequent findings, a relevant question remains about the extent of such impairment in quantitative terms.

Suggestibility

An issue related to that of cognitive functioning in isolation and deprivation is that of suggestibility. The reported success of isolated confinement in modifying beliefs and convictions initially directed interest to the question of suggestibility. Despite this concern, systematic data on this problem remain surprisingly sparse.

Heron (39) cited the work of Bexton (7) pertinent to this issue. After twenty hours of perceptual deprivation, twenty-four subjects were exposed to a recorded propaganda message consisting of a ninetyminute talk read in a boring monotone and arguing for belief in various psychical phenomena. To measure attitude change, a series of attitude scales of the Bogardus type were administered before and after confinement. A control group of twenty-seven subjects received both scales before and after a similar interval. Both groups, experimental and control, showed a significant change in attitude after listening to the records. The change, however, was significantly greater for the experimental subjects. Similarly, measures of interest in the topic and assessments of its importance showed a greater increase for the subjects exposed to perceptual deprivation. Although follow-up data were not systematically obtained, incidental evidence indicated that for some subjects at least, these effects persisted for as long as three to four days. Vernon and Hoffman (76) tested subjects for degree of body sway suggestibility following varying periods of

sensory deprivation. These authors remark cryptically that attempts to measure this phenomenon "proved unsuccessful."

The question of suggestibility has also been approached from a different vantage point. Rather than estimate the effects of isolation upon suggestibility, others have sought to establish a relationship between suggestibility as a personality attribute and response to deprivation. Petrie[1] measured body sway suggestibility in a group of nine subjects who had been exposed to the conditions of confinement and perceptual deprivation described by Wexler et al. (80). Her observations revealed a trend toward a negative relationship between amount of body sway and length of time voluntarily spent in deprivation.

Camberari (16) studied the response to sensory deprivation of twenty male unpaid volunteer psychology graduate students evenly divided into suggestible and nonsuggestible groups. This division was based on the composite scores of these subjects on several tests of suggestibility. Isolation and sensory deprivation were brought about by suspending subjects nude in a tank of water by means of a harness. His over-all findings appear to contradict that of Petrie in that the suggestible group remained in the situation significantly longer (183 minutes) than the nonsuggestible group (111 minutes). Upon closer examination, however, one finds that one of the ten measures in the battery was body sway suggestibility and that for this particular measure there was a negative relationship with length of stay similar to Petrie's.

The Camberari data pose the difficulty of interpreting the notion of suggestibility. The meaning of the term is difficult to assess independent of the operations defining it and the experimental consequences. As such it has limited utility for assessing the effects of deprivation and isolation upon the readiness to modify one's own conviction or belief in favor of those coming from an external authority figure. Once again, leaving aside the complex motivational issues which limit generalization of laboratory studies to real life situations, we are left with the Heron findings that following isolation and confinement, beliefs around a topic such as psychical phenomena change significantly. This observation is also consistent with the hypothesis of a decline in internal perceptual norms and in ability to reason efficiently. It would seem likely that changing the emotional relationship between the authority and the subject would introduce another complex variable which cannot be assessed without data. The tendency to modification of belief in experimental circumstances is

quite consistent with the reports of the response of prisoners. It should be kept in mind that in the latter situation additional elements of uncertainty, stress, and coercion were brought to bear in inducing these changes (10, 42).

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[1] Personal communication, 1958.

Personality Findings

The relationship of personality attributes to tolerance for isolation is one which has significant implications for issues as diverse as personnel selection and personality theory. That the study of response to this situation might be relevant to the study of personality was pointed out: by Hochberg et al. (43).

> Whether any relationships exist between personality factors, the mode in7 which the *Ganzfeld* is perceived, and the course of color adaptation, is yet to be investigated. However, the indeterminacy of the situation, the individual differences in hallucinatory objects and the intense fear and feelings of 'going blind' expressed by some of the subjects suggest a possible method for investigation of personality structure. (page 155.)

We referred previously to the work of Camberari (16). In addition to finding differences between suggestible and nonsuggestible subjects in tolerance for sensory deprivation, he observed a number of related personality attributes that seemed to differentiate the two groups. The suggestible subjects appeared to be more productive and more tolerant of regressive behavior, including delusions, hallucinations, and fantasies. The nonsuggesiible subjects, on the other hand, tended to be more threatened by disturbances in body schema, defensive about their intellectual control, and more aware of external factors which reinforce reality.

Wexler et al. (80) studied seventeen paid male volunteer subjects exposed to confinement and perceptual deprivation in a polio respirator up to thirty-six hours. They used a series of personality measures including the Minnesota Multiphasic Personality Inventory and the Edwards Personal Preference Schedule. None of the MMPI scales was related to duration of stay in isolation. For the Edwards test these authors reported a significant negative relationship between need Exhibitionism and length of stay in isolation, as well as near significant positive relationships between the latter variable and need Affiliation, need Succorance, and need Nurturance. They interpreted these findings to mean that subjects with greater tolerance for deprivation relate themselves more genuinely to people and seek more contact and emotional exchange with others. In a second experiment (47), with eleven subjects, under more severe conditions of isolation, these

investigators failed to confirm the original findings, observing instead a near significant positive relationship between need Autonomy and length of stay in deprivation.

Unlike Wexler and his associates, S. Cohen et al. (18), who studied four volunteer subjects seated in an anechoic chamber for four hours, found that the two subjects described as "schizoid personalities" on the basis of clinical interviews and psychological tests were comfortable in isolation and were willing to prolong it, whereas the two "fairly well integrated" subjects, who described the experience as unpleasant, were anxious, and felt that they could not tolerate the isolation much longer.

In studying ten subjects consisting of normal, neurotic, schizophrenic, and sociopathic individuals for response to one hour of isolation, B. Cohen et al. (17) reported that normal and neurotic subjects exhibited an increased sensitivity to the residual stimuli in the chamber. The schizophrenic subjects showed no appreciable increase or decrease in their hallucinatory behavior and had a generally positive reaction to the situation, devoid of the anxiety typically exhibited by normal subjects.

A more recent study of the response of schizophrenics to sensory deprivation was performed by Harris (35). Utilizing a procedure similar to that of the McGill group, he placed twelve subjects in isolation for periods up to two hours. He reports that the patients generally tolerated the procedure well. For the most part, hallucinations became less intense and less vivid. Over-all symptomatology either improved or showed no change. These findings appear to be consistent with those of the two earlier studies cited previously.

Working in a different theoretical context, Petrie, Collins, and Solomon (60) attempted to relate pain tolerance, cortical satiation, and perceptual deprivation. Using kinesthetic figural aftereffects, measures of pain threshold, and tolerance for isolation in the polio respirator, their findings tend to support the hypothesis that susceptibility to satiation is associated with tolerance for pain and intolerance for perceptual deprivation. Here satiation is seen as a key factor mediating the perceived intensity of stimulation; the higher the satiability the less intense are succeeding sensations.

Still another approach was taken by Goldberger and Holt (33) in their experiment. They emphasized psychoanalytic concepts, such as resistance to regression and modes of handling primary process material. Fourteen subjects were rated for the maturity with which they handled primary process as manifested in Rorschach test responses. Their verbal behavior during eight hours of isolation and

postisolation interview was then assessed by a scheme of content analysis which stressed modes of dealing with primary process material.

Two relatively independent reaction patterns to isolation were identified. In the first of these, subjects engaged in a variety of behaviors within the limits set by the situation

and instructions. They talked freely, experienced pleasurable affect, little unpleasant affect, thought rationally, and engaged in daydreams, fantasy, and playful thinking without being threatened by the situation. In the second reaction pattern, there was unpleasant affect, anxiety-laden intrusions of the primary process, preoccupation with terminating the experiment, and impaired efficiency in rational or secondary process thinking. They found these two reaction patterns to be significantly correlated in the expected direction with the Rorschach measure of maturity of handling primary process materials. Those who on the Rorschach handled primary process in a mature and effective way were those who reacted in an adaptive way to isolation. Conversely, those who on the Rorschach handled primary process with poor control or avoided it reacted negatively to isolation. This finding is consistent with several others which point to the exaggeration of usual personality defenses under the stress of isolation (18, 56, 65). From this point of view it should be possible, at least theoretically, to predict the dimensions of an individual's response to deprivation and isolation.

An overview of these data emphasizes the truism of marked individuality of response. Whether differences observed among various studies is a systematic function of varying experimental conditions is as yet unclear. Whereas the findings of Wexler et al. (80) and Goldberger and Holt (33) indicate a positive relationship between emotional relatedness and length of stay in isolation, several others have made a different observation. The findings on suggestibility as a personality attribute and those on the relationship to satiation and pain thresholds remain conceptually unrelated to the other work. The Goldberger and Holt demonstration of relationships between preisolation personality attributes and the content of response to isolation is a carefully executed study which has a clear theoretical orientation and makes complex but reliable assessments of verbal and other behavior. Other studies have tended toward utilization of too simplified an index of response such as length of stay which fails to take into account complex behavior during the isolation situation. It may well be that personality variables and their interrelationships are insufficiently reflected in such a simple measure of tolerance for isolation.

In addition it would seem desirable that workers in this area offer a conceptual framework within which to view personality response. Thus specification of terms such as "schizoid" and "withdrawn" may have more meaning, permit replication of procedures, and evaluation of results. Although some of this difficulty in the present studies stems from their preliminary nature, there appears to be some insensitivity to the need for both conceptual and operational specification of measurement and assessment techniques. Progress with the problem of personnel selection and utilization for a variety of tasks, as well as theoretical clarification, awaits such refinement in research programs.

Feeling States

Changes in subjective feeling in response to reduced environmental input has been a common observation in these studies. These observations range over many different experimental conditions, from the uniform visual stimulation presented by W. Cohen (19) in which the pattern of input to one modality is reduced, to sensory deprivation in the water tank suspension procedure used by Lilly (50) and Cambareri (16), where the effort is made at a total reduction of sensory input. We have already mentioned the breakdown in the subjects' ability to concentrate, think clearly, and solve mental problems. Bexton et al. (8) emphasized the progressive increase in irritability during confinement, followed on release by a sense of being dazed and confused. They also noted the presence of headaches, fatigue, and mild nausea, persisting in some cases for twenty-four hours after confinement.

Lilly (50) whose subjects both had a number of trial exposures to the situation in order to get used to it found in the actual situation early feelings of relaxation and enjoyment, followed by tension, restlessness, and an extremely heightened awareness of residual stimulation. This course continued into fantasy and reverie, and finally into the projection of visual imagery. Following the isolation experience, subjects reported a sense of refreshment as though having just awakened from sleep. Camberari (16), on the other hand, utilizing a similar procedure without preliminary exposures, found no such progressive stages, and subjects came out of the immersion feeling fatigued rather than rested. Suggestible subjects felt secure during most of their stay in the tank, although there were some reports of apprehension, fear, and panic. The nonsuggestible subjects generally tended to deny any affective or emotional involvement.

After prolonged visual stimulation, W. Cohen (19) found that his subjects had feelings of drowsiness, excessive yawning, and their voices took on a hesitant, drawling quality. In a study of perceptual deprivation, Hebb, Heath, and Stuart (38) reported that subjects who wore earplugs for three consecutive days while going about their normal activities showed slight to marked irritability, seclusiveness, and personality disturbances not due to discomfort. One subject manifested poor speech coordination while in the experimental conditions. Goldberger and Holt (32) noted that despite the individual differences in response, all of their subjects found the experimental situation frustrating because of lack of things to do, see, and hear, and the physical discomfort attributed to motor restriction. Comparing sensory and perceptual deprivation with sensory bombardment, Ormiston (59) found that the former group reacted with unpleasant affect, whereas the latter group experienced mixed affect of amusement and anxiety.

Davis et al. (21) required their ten subjects to complete an adjective check list describing their feelings following isolation. This was compared with the same check list completed under control conditions. Significantly more somatic complaints, feelings of physical inactivity, and mental clouding were checked following isolation, whereas significantly less satisfaction, elation, friendliness, and impulsivity were reported.

Several studies indicated a wide range of response ranging from comfort and satisfaction, through sleep, to unpleasant affect, anxiety, and paranoid fear (19, 30, 65).

Goldberger and Holt (32) also reported marked variations in postisolation feeling states. Seven subjects described such reactions as feeling dazed, disorganized, groggy, dizzy, and unstable; eight subjects indicated a state of fatigue; four subjects described motivational changes such as losing interest in things; two subjects showed virtually no disttirbance.

In part these responses may be interpreted as a reaction to the novelty and threat of a strange and unfamiliar situation. Undoubtedly these subjective states also reflect the earlier discussed individuality of personality response to these experimental settings. The general response to isolation seems to include boredom, a general state of restlessness related to inactivity, and often anxiety or fear of extreme proportions. Postisolation responses most often seem to reflect fatigue, drowsiness, confusion, loss of time orientation, and a need to reorient one's self to the familiar aspects of reality. These subjective states appear to be consistent correlates of the changes in

perception, cognitive function, and personality function previously described. These feeling states would seem to make one quite vulnerable to new input from a controlled source such as might appear in the prisoner-interrogator relationship. To the extent to which an interrogator becomes associated with the reward of anxiety reduction, providing human contact and directed activity, and thus providing relief for the cumulative discomfort of isolation, he assumes a benevolent role which may be one source of his influence. [See Biderman (9) and Lifton (49).]

Imagery

Lacking a more adequate descriptive term, we shall in this section use the term "imagery" in dealing with a wide variety of phenomena seen in studies of isolation and deprivation, including what have been called hallucinations, delusions, illusions, fantasies, daydreams, dreams, hypnagogic states, and the like. As pointed out earlier, these phenomena constitute perhaps the most dramatic aspect of this research, and indeed the promise of studying their genesis has undoubtedly been most responsible for

exciting the interest of clinically oriented groups. Apart from the autobiographical accounts of isolation, normal persons have rarely reported feelings of depersonalization, breakdowns in body image, and hallucinatory phenomena. Furthermore, the ability to produce such states experimentally brings these concepts much closer to understanding by permitting close observation and perhaps control. With this introductory remark, let us turn to an examination of the pertinent data.

We have already referred to the observation of Hochberg et al. (43) about individual differences in hallucinatory objects. Three subjects in one of his studies reported the appearance of such hallucinatory objects during adaptation, and it was later difficult to convince them that such shapes had not been included as part of the experimental procedure. Bexton et al. (8) reported that these phenomena were largely visual and ranged from simple geometrical forms and patterns, to simple colors, to complexly integrated scenes which were sometimes in color and three-dimensional. The latter often contained dreamlike images. Subjects were able to exercise only minimal conscious control over the content. The images often involved other senses including auditory, kinesthetic, and somesthetic elements. There were also reports of bodily strangeness and peculiar perceptions of body image. Usually these experiences disappeared when the subject began a complex task, such as mental arithmetic.

Time of onset for these phenomena varied from twenty minutes to seventy hours. In the supplementary report (39) it is noted that subjects did not believe in the reality of these experiences and that compared to normal imagery greater vividness is the main difference. Often there was considerable movement of the visual patterns, at times sufficiently disturbing to cause subjects to experience nausea.

To test the notion that residual stimulation was necessary for the production of these phenomena, these same investigators placed opaque goggles on three subjects after several days in isolation with translucent goggles. These subjects had been 'hallucinating' persistently. With this change, they observed an initial increase in vividness, but in one subject this was soon followed by a very marked diminution, and by the total disappearance of these experiences in the other two. With restoration of translucent goggles, the 'hallucinations' reappeared. Two other subjects, run from the beginning with opaque goggles and then shifted to translucent ones, showed an increase in the incidence and vividness of these visual phenomena.

Under the conditions of isolation utilized in Vernon's series of experiments, despite some differences in results, a similar implication emerges (79). Two conditions of sensory deprivation were compared. In one, nine subjects were blindfolded when they periodically had to leave the cubicle. As a result of this procedure they were exposed to a

variety of visual stimulation from light leaks, etc. In a second phase, conditions of deprivation were more extreme; the eleven subjects did not leave the lightproof cubicle during their stay. Contrasting the visual imagery reported under these two sets of circumstances, the authors found that the less extreme condition produced many more 'hallucinatory' phenomena. In addition there seemed to be a positive relationship between length of confinement and number of images. The content of the imagery tended toward simple flashes of lights or geometric shapes, rather than meaningful, symbolic, integrated scenes. These authors concluded that confinement permitting the greatest amount of nonpatterned visual stimulation produces the greatest., amount and variety of images. A similarly limited amount of imagery is reported by Ruff et al. (65) who, using both volunteers and nonvolunteer military personnel as subjects observed 'hallucinations' in only two subjects out of more than sixty, run under a variety of experimental conditions of isolation.

Mendelson and Foley (54) observed that a number of polio patients treated in tank-type respirators developed psychoticlike symptoms of disorientation, confusion, 'hallucinations,' and delusions. Physiologi-

cal, psychiatric, and behavioral studies of these patients suggested that these symptoms were not a function of toxic or metabolic factors, but were the result of conditions of life in the respirator. In a follow-up report discussing these phenomena, Mendelson, Solomon, and Lindemann (57) summarized the elements present in these terms: denial of distressing reality; wish-fulfillment in terms of reassuring, pleasurable life situations; rehearsallike anticipation of dreaded possibilities. The authors describe the 'hallucinations' as representing a restitutional attempt on the part of the ego to predict and cope with anticipated stress.

Starting with these observations, Wexler et al. (80) placed seventeen normal adult male volunteers in the tank-type respirator up to thirty-six hours in the perceptual deprivation procedure previously described. These investigators described the incidence of a range of mental experiences in their subjects. These experiences included the occurrence of 'analogies,' 'daydreams,' 'fantasies,' 'pseudosomatic delusions,' 'illusions,' and 'hallucinations.' These phenomena were not related to length of stay in confinement. Under similar, but more severe, conditions of confinement these investigators reported a comparable total incidence of these phenomena, with a higher frequency of occurrence in the categories reflecting more marked deviations from normal imagery (47). This observation held true despite the fact that subjects remained in the experimental situation for a much shorter period.

S. Cohen et al. (18) observed male and female volunteer subjects seated in isolation for two hours in a dark acoustical chamber with no orienting instructions, the only sound being a low hum from a ventilator motor. In this exploratory study the period of deprivation and isolation lasted two hours. Seven of the ten subjects reported unusual visual phenomena ranging from flashing lights to moving objects. The authors suggest classification of the experience on the basis of criteria such as vividness, recognition of subjectivity of experience, conscious control, and emotional accompaniments. Another interesting aspect of this report is the description of changes in the texture and consistency of the chamber walls and floor. Descriptions of an actual metal wall included such adjectives as, "soft," "ruglike," and "spongy, velvetlike." The lack of orienting instructions in this experiment introduces an element of anxiety which may be a factor in the images reported.

Freedman et al. (30) found that several subjects experienced changes in body image, spontaneous auditory and visual illusions or 'hallucinations.' These latter were not subject to conscious control

and had qualities different from dreams or daydreams. They appeared to originate outside the self, and did not seem to be meaningfully related to anything.

Goldberger and Holt (32) also found that subjects in eight hours of isolation reported the spontaneous occurrence of visual and auditory imagery different from that perceived in the normal waking state. These were usually recognized as internal in origin, although several subjects perceived them as being external. These authors feel that these phenomena are most like hypnagogic imagery. In addition they found subjects with body image disturbance, depersonalization, and dreams dealing with the experimental situation. In discussing these data, they argue against the use of the term "hallucination" in that it requires, in addition to an illusory image, a failure to recognize its unreality. On the other hand, it is known that alcoholic patients in delirium tremens, or patients under mescaline intoxication may often recognize the unreality of their percepts and hallucinations. The definition of terms here is complicated by confusion and inconsistency in language usage. Goldberger and Holt suggest consideration of these phenomena in terms of vividness, structure, persistence, realism, and plausibility. From this standpoint they offer the generalization that perceptual deprivation during the period of experimental confinement tends to increase the vividness and structure of imagery without a breakdown in reality testing.

In summary, there are now several studies which point to the importance of some extraneous stimulation for the occurrence of visual and auditory images and hallucinations (39, 65, 79). The role of body movement as a factor in the causation of

these phenomena has been cited (30, 32, 65). Freedman et al. (30) attribute the occurrence or nonoccurrence of imagery, at least in part, to differences in motility and kinesthetic feedback. Although this factor is partially confouuded with variations in visual input, they point out that in only two procedures, those of Ruff et al. (65) and Vernon et al. (79), was there free movement and these two report the lowest incidence of imagery. Freedman et al. (30) emphasize the role of motor activity in the general maintenance of spatial and cognitive orientation.

Direct quantitative comparisons of various studies in this area will require agreement about the descriptive parameters of the experiences here subsumed under the rubric of imagery. These dimensions should make possible a more precise evaluation of different experimental conditions for their relationship to the production of these experiences. Similarly it would make possible the detailed comparison of imagery in sensory and perceptual deprivation conditions to

that seen in hypnagogic states, mescal intoxication, and experimental response to flicker.

Another problem in the quantitative assessment of the imagery phenomena lies in the fact that most of the data has been obtained by retrospective report. This procedure raises difficulties in the reliable assessment of vividness, frequency, or other suggested dimensions of analysis. It may be that encouraging verbal report during the procedure and making simultaneous recordings of other variables such as physiological responses will make possible independent assessment of these experiences.

Without such independent assessment it would be premature to consider the imagery experienced in deprivation experiments as necessarily indicative of pathology as a number of reports have implied. Such experiences may indeed reflect creative adaptations to a special environment. The evidence that artists, mystics, and religious individuals may utilize isolation for constructive syntheses of experience cannot be ignored. It would seem that the response to the increased awareness of primary process material may be more predictive of adaptation than would the fact of the increase itself or its content. The imagery phenomena may turn out to sustain some individuals confronted by real life situations of isolation and deprivation. On the other hand, the anxiety engendered by the rise of primary process material may serve to increase an individual's susceptibility to external pressures as in the interrogation situation. In general, a broader conceptual framework than that provided by the model of psychopathology would seem to be needed.

Physiological Findings

Apart from an intrinsic interest in the consequences of reduced stimulation for physiological functioning, such data can also be compared to concurrent verbal reports of the experience. One such index of response thus far studied has been the electroencephalogram. Attention has focused on this instrument in hopes of clarifying the nature of cortical activity in sensory and perceptual deprivation. In addition it has been used to make assessments of the sleep-wakefulness cycle under these conditions.

Heron (39) described the results of periodic EEG tracings on six experimental subjects. The results showed that slower frequencies appear in the parieto-occipital tracings taken at sixteen hours than those taken at the beginning of the isolation period; even after subjects had emerged from isolation for some hours, the records had not returned to their normal state. This finding was confirmed in a

quantitative analysis of wave frequencies within a given time interval. Furthermore, they found that records obtained while a subject was 'hallucinating' showed greatly reduced amplitude and appeared similar to those which might be obtained from a subject in an alerted state. Though these investigators were unable to make accurate determinations of sleep-wakefulness patterns, it was their general impression that subjects slept more during the early part of their stay in isolation and progressively less later in the period of confinement.

Studying the EEG correlates of the "white-out" phenomenon, W. Cohen (19) hypothesized that under conditions of uniform visual stimulation, the "termination" of visual experience should be accompanied by a return of alpha activity. Despite considerable individual differences, he found that in occipital records, strong alpha activity usually followed the onset of "white-out" with a latency of one second. In general, the onset of alpha occurred when visual experience spontaneously became less differentiated. The occurrence of "white-out" seemed to be related to the amount of alpha shown. Thus about half the subjects showed little alpha even when kept in the dark without stimulation.

Vernon et al. (78) in their study of perceptual and motor skills under conditions of twenty-four, forty-eight, and seventy-two hours of sensory deprivation, found that despite the fact that subjects ate well, there was a consistent loss of weight, averaging two and one-half pounds. Measuring strength of grip with a hand dynamometer, they observed gains for control and confined groups except for the seventytwo-hour confined group which showed a slight loss. A third measure was galvanic skin resistance taken before and after isolation. The authors hypothesized a gain in skin resistance because of

the quiet and sleeplike conditions for the confined groups. Instead they found that while control group values rose, a statistically significant drop from preisolation conditions appeared in the experimental group. There was, however, no report of control for the humidity in the chamber.

Utilizing a continuous recording of skin resistance throughout isolation on their four subjects, S. Cohen et al. (18) found that resistance rose and remained high for the two subjects comfortable in isolation. For the remaining two subjects, less comfortable with the experience, this autonomic index remained low. Ruff et al. (65) cited observations that confirm the foregoing, and point to skin resistance measures as a useful reflection of arousal, which parallels overt behavioral manifestations during isolation.

A similar analysis is provided in a detailed case study of the psychological and physiological responses of two subjects exposed to per-

ceptual deprivation in the tank respirator procedure (56). General relationships were observed between patterns of EEG, heart rate, and epinephrine-norepinephrine excretions on the one hand, and behavioral measures of activity, verbalization, and emotional responses on the other.

A more detailed analysis of the catechol amine response of ten subjects isolated in the tank respirator is provided in another report by this group of investigators (55). Comparing preisolation, isolation, and postisolation excretion levels, these authors found a generalized increase in both measures followed by a decline after removal from the respirator. They emphasized the wide variability of response, and identified a number of individual patterns which are masked by the group data. Their findings also showed that of the two measures, epinephrine seemed to change more than norepinephrine in response to this stress.

R. C. Davis (24) compared the physiological responses of twenty-two subjects exposed to minimal stimulation with that of twenty-eight subjects who received unpatterned stimulation at near normal levels. The "reduced-stimulus" group lay on a cot in a dark soundproofed room for about forty minutes, whereas the "unpatterned-stimulus" group was given continuous moderate light and sound after five minutes. He recorded circulatory and respiratory variables and muscle potentials from three locations. Comparing the changes in the two groups during isolation, the "reduced-stimulus" group showed a significantly greater increase in muscular and circulatory activity and a decrease in respiratory activity. The author finds the responses of the "reduced-stimulus" group similar to those seen in subjects anticipating a stimulus.

In general, the data on physiological response is sparse, with much of it resting on case observations. Few of the studies utilize precise measurement as well as adequate controls and sample sizes. Nonetheless, a number of indices have by now shown promise of providing useful information about response to sensory deprivation. These include EEG, skin resistance, epinephrine-norepinephrine excretion levels, and muscular, respiratory, and circulatory activity. There has been frequent mention of movement of gross musculature as related particularly to the phenomena discussed in the section on imagery. [The Davis study (24) cited previously measured muscular activity but not imagery.] Such determinations might prove helpful in relating the role of kinesthetic stimulation to behavior generally and to body image in particular. This latter relationship has been a subject of much speculation.

The physiological measures thus far observed have received attention largely due to their presumed relationship to the concept of arousal. The work of the McGill group has been concerned with the use of EEG tracings as an index to the state of arousal (39). Others have used skin resistance measures in this way. The work with catechol amines has focused on the deprivation situation as a stressor agent. Needless to say a variety of other approaches are possible. Thus the measurement of eye movements during the occurrence of imagery and the comparison with eye movements as they appear in dreams [see Dement and Kleitman (25)] may yield important information about the possible similarities of the two processes. Furthermore, the specification of a variety of physiological changes under conditions of sensory deprivation may provide other important clues in the clarification of the entire range of observed effects.

Length of Stay in Experimental Isolation and Time Perception

In this section we shall consider several aspects of the literature being reviewed. One issue concerns tolerance for isolation and deprivation as measured by voluntary length of stay in the situation. Findings on this problem have varied considerably, depending on the experimental conditions. Many investigators have not attempted to assess this aspect of the problem. Others have discarded data from subjects who failed to complete a prescribed length of stay. Thus it is difficult to compare the various experimental procedures for degree of stress as it might be reflected in such a measure.

It was suggested earlier that length of stay is perhaps too simplified an index of tolerance for isolation. There is little information available on the relationship between this and other responses in the deprivation situation. Although it is perhaps not independent of problem-solving efficiency, or incidence of imagery, for certain purposes an estimate of tolerance measured in length of stay is important.

The sensory deprivation procedures involving suspension in water (16, 50) appear to be sufficiently extreme as to make a stay of more than three hours quite difficult. Use of a darkened, soundproof cubicle seems to make considerably longer periods of isolation tolerable. Ruff et al. (65) reported that subjects stayed as long as seven days. Both water tank and cubicle procedures presumably attempt an absolute reduction of levels of sensory input. In the latter there is much more mobility and less restriction necessitated by the physical needs of the subject for food and toileting.

The reduced patterning procedure of the McGill group has been

tolerated for as long as six days. In the tank respirator procedure, despite the experimenters having set a limit of thirty-six hours, subjects have tended to stay much shorter times. Comparing two sets of conditions of deprivation using this procedure, it was found that under less severe deprivation, subjects stayed an average of 18.8 hours. With more extreme conditions, another group averaged a significantly shorter 8.8 hours (47). Reducing social isolation by allowing subjects to talk to a second subject in an adjacent respirator has been shown to increase the length of stay significantly (21).

Ruff et al. (65) reported on the importance of the subjects' knowledge of the length of confinement. This knowledge added structure to the experience and thus increased the capacity to withstand the situation. They also reported that repeated exposures have a similar effect in reducing the stress of the experimental conditions; an observation also made by Lilly (50). Upon repetition, the situation loses some of its novelty and the subject becomes better able to assume an attitude of passive acceptance. They make the general observation that when subjects are run to maximum tolerance, the decision to leave is made when there is an impending or partial breakdown of personality defenses.

The option of leaving at will, available to all subjects in laboratory research on this problem, complicates extrapolation of these findings to real life situations. Nevertheless, the data on length of stay are useful, insofar as they permit some assessment of the total impact of isolation and deprivation.

Another issue which some investigators have examined is that of orientation in time. In general, these studies have shown a wide range of response, from minimal to gross disorientation in time judgment. Lilly (50) reported a subjective postisolation impression of being out of step with time, as though the day had started all over again following isolation. This was not confirmed by Camberari (16). Wexler et al. (80) reported data for seventeen subjects which showed no consistent pattern of either underestimation or overestimation of time. Comparing these results to those obtained under more severe deprivation, it was found that in the latter conditions average time

error was greater (47). This difference did not achieve statistical significance and appears to have been, in part, an artifact of the relative availability of time cues under the two conditions.

In a situation requiring the estimation of successive thirty-minute intervals, S. Cohen et al. (18) found that the two subjects comfortable in isolation underestimated the passage of time, whereas the two disturbed by the experiment overestimated time in isolation. Ruff

et al. (65) cited the importance of awareness of time as an orienting factor during deprivation which adds structure to the experience. Their subjects showed a general tendency to underestimate time. The loss of time awareness often seemed to make the experiment intolerable.

Goldberger and Holt (32) also referred to this lack of time orientation as an important source of frustration in isolation. Time seemed to pass very slowly for their subjects. Despite this, their judgments were surprisingly accurate, with a relatively small but consistent underestimation. This finding suggested to the authors the relative independence of experiencing time from the act of judging time. Ruff et al. (65) have suggested that the underestimation of time is a defensive maneuver where the subject avoids a premature anticipation of his release from confinement. Thus he avoids the frustration of having to remain in the situation at a time when he might otherwise expect release.

The importance of time orientation in influencing response to isolation and confinement is well documented. Burney (13) describes the elaborate procedures he developed for telling time and of his precise knowledge of dates during eighteen months of solitary confinement. Anecdotal reports have cited very complex schemes worked out by subjects to maintain their orientation in time. Just as deprivation and isolation appear to disrupt general cognitive orientations, so too this situation appears to have similar disruptive effects on time perception. As such, resistance to the disintegrative effects of deprivation and isolation might well emphasize the importance of developing orienting anchors in the external environment for both time and space.

Stimulus Hunger

Although the implication of most studies thus far discussed has been that deprivation produces "stimulus-hunger," only one study has made a direct attempt at its measurement. The boredom and restlessness mentioned in the section on feeling states

may refer to the phenomenon. Lilly (50) has explicitly described "stimulus-hunger" in the following terms.

> . . . a tension develops which can be called a "stimulus-action" hunger; hidden methods of self-stimulation develop: twitching muscles, slow swimming movements (which cause sensations as the water flows by the skin), stroking one finger with another, etc. If one can inhibit such maneuvers long enough, intense satisfaction is derived from later self-stimulations. (50, page 6.)

Bexton (7), using the apparatus previously described, attempted to determine whether perceptual deprivation would lead subjects to elect to listen to materials they might otherwise consider uninteresting or tedious. These subjects, college students, had an opportunity to listen to records of five minutes' duration. These records contained the following types of material: eight repetitions of the 16-bar chorus of "Home on the Range"; two talks for children, taken from a religious primer; radio commercials for soap; and part of a stock market report. Subjects were divided into two groups of four each. One group heard the records before isolation, whereas the second group was told nothing about it until several hours after entering isolation. Once in the experimental situation, subjects were told they could hear any of these materials, whenever and as often as they liked. They found that the four subjects exposed to the material before isolation universally disliked the records and only asked to hear them a total of nine times. The other group asked for the records fifty-three times, and reported that they helped to relieve the boredom. In addition, it was found that the rate of requests for the records was dramatically higher during the second half of the confinement period. Previous exposure to the material seemed to be the principal factor influencing the demand for stimulation.

One major problem that subjects report in the deprivation situation is the lack of things to see, hear, do, or think about. This subjective complaint seems to have clear relevance to the notion of curiosityexploratory drive studied in experimental work with animals. The isolation conditions thus seem to increase receptivity to otherwise dull, uninteresting material. Whether the same is true for "ego-alien" material is not yet known. In the context of other disruptions of the individual's functioning, this effect appears to magnify the affective value of stimulation. Quantification of these phenomena might provide a useful index for comparing the relative severity of deprivation conditions.

Influence of Experimental Setting

We have already referred to the findings of Ruff et al. (65) in highlighting the effects of time structure in increasing the tolerance of subjects for deprivation. Such factors as provision of tasks during isolation, specification of the length of deprivation, and previous exposure to isolation result in making the experimental conditions more tolerable to subjects. The comparison of two conditions of confinement in the tank respirator has also pointed to the increase

in stress and decreased length of stay that accompanies an increase in isolation and reduced contact with experimenters and environment (47). Additional papers discuss other variables operating to influence response to isolation and deprivation (18, 46). These include such factors as experimenter's expectations, subject-experimenter relationship, and the physical setting of the experiment.

Kandel, Myers, and Murphy (45) compared the effects of two sets of instructions on the reporting of visual sensations in ten minutes of darkness. They found that one group, who were told the experiencing of such sensations was to be expected under these conditions, reported significantly more visual sensations than did another group, told that these sensations appeared in psychiatric patients. Prior verbalization of "fantasy material" through exposure to Rorschach cards did not increase the number of sensations reported when compared with a group not given this test.

A number of other procedural issues require further clarification. We have mentioned earlier that all of these studies have employed volunteer subjects, generally paid volunteers, with the exception of that of Ruff et al. (65). When, in one study (80), these volunteers were questioned about their motivation for participating, they offered, in addition to the money, reasons such as aiding science and testing themselves. There is no such data available on possible differential reactions of volunteers and nonvolunteers. Similarly, one must leave open the possibility that solitude and perceptual deprivation sought at the individual's own need or whim may have different effects than when imposed by an experimenter who creates a highly artificial situation so that he may systematically observe the subject. Another issue related to the work of Kandel et al. (45) cited above, is that of the experimenter's purpose in the research. Instructions that stress endurance, or content of thinking, may produce different responses than do those that state the experimenter's interest to be in the problem of rest and relaxation.

These studies highlight the importance of procedural variables and limit the direct comparison of studies utilizing different procedures. They emphasize again the need for specification of experimental purposes and for procedural choices consistent with those

purposes. In this connection the importance of evaluating the total context and its implicit motivational and emotional consequences needs to be clearly recognized.

Clinical and Anecdotal Reports

The application and relevance of these findings to diverse areas of interest have proceeded along with the basic exploration of these phenomena. One of the earliest interests in this area was reported by Spitz in a series of articles (73, 74, 75) which dealt with the deleterious developmental and behavioral effects of institutionalization and separation from the mother upon infants. A reading of these reports indicates that perceptual deprivation was a prominent feature of the experience of these children.

A more direct application of isolation and deprivation to clinical procedures has been attempted recently (1, 2, 3, 4). In these procedures, patients with a variety of clinical diagnoses were kept in a darkened hospital room, wore translucent goggles, and had their arms in cardboard cylinders. These periods of isolation ranged from two to six days. Although few of the cognitive changes described earlier were observed, these investigators concluded that deprivation led to a state of disorganization, and in some cases precipitated psychotic reactions. On the other hand, some groups, particularly depressives, seemed to show improvement in the form of increased motivation, socialization, and assertiveness.

Phenomena akin to those reported in isolation and deprivation have also been reported in aviators, especially in high speed, high altitude flying. Citing clinical material on these flyers, Bennett (6) compared their reactions to those seen in isolation studies. Operating in a severely restricted environment with extremely monotonous stimulation, aviators have reported feelings of isolation, unreality, and dreamlike states. Evidence suggests that these feelings, called by some the "breakoff phenomenon," occur at times in approximately one-third of jet pilots.

Earlier reference was made to the response of prisoners who in solitary confinement apparently experience similar reactions. Meltzer (53) reported the occurrence of a range of effects in such prisoners. These included, on the one hand, occasional tense pacing, restlessness, tension, and assaultiveness. On the other hand, some prisoners exhibit a regressed, dissociated, withdrawn, hypnoid, and reverielike state. Hypochondriacal states of a transient type were also seen.

Already mentioned is the work of Mendelson and Foley (54) which showed the importance of isolation and deprivation in polio patients. Two recent papers have

appeared that stress the importance of these findings in understanding a number of phenomena seen in medical

practice (48, 81). These reports stress the relevance of this work to the hallucinations of cataract patients, and to the disturbances seen in patients with orthopedic disorders who are suspended in traction.

Perceptual deprivation also has relevance to prolonged and repetitive tasks in man-machine systems, such as long distance driving, flying, assembly line production, continuous monitoring duty at isolated stations, etc. The factor of the external environment and its influence upon behavior is increasingly being recognized for its role in a wide variety of practical situations. The findings discussed in this chapter may account for such things as accidents, loss of efficiency, and emotional alienation often observed in these situations.

Interpretations and Implications

Focused research on the responses of human subjects exposed to reduced environmental stimulation has only recently begun. The phenomenal growth of interest in this problem and some reasons for this have been discussed. Many of the investigations referred to in this paper are pilot studies; others leave much to be desired in rigor, elegance, and methodological sophistication. At the same time, these investigations now provide a rich source of new observations and hypotheses, which touch on a wide variety of issues. The findings, tentative though they are, have important implications.

The results of this work, of the research on curiosity or exploratory drive, and of studies on early sensory deprivation converge to provide a revised conception of human motivation. This conception recognizes and emphasizes the "immediate drive value of cognitive experience" as a necessary factor in a theory of motivation (37).

From the viewpoint of theory this work has important implications for several scientific disciplines. Methodologically it makes available a technique for the relatively controlled study of imagery and hallucinations, a problem thus far inaccessible to experimental observation without the use of drugs. Practically, it suggests a whole range of applications from management of medical patients to highway design.

Theoretical accountings of how reduced environmental input produces the various responses described in previous sections have varied widely. Our purpose here will be simply to indicate the range of explanations used and some of the terms of their analyses.

Rapaport (62) discusses these data from the viewpoint of psychoanalytic theory, in the context of the relationship between id and ego functioning. In a detailed discussion of these issues, he states that

in the absence of external stimulation, the ego becomes unable to maintain its autonomy from the id and the "effectiveness of these (ego) structures in controlling id impulses may be impaired" (page 19). The reduced control of these impulses may be manifested in the difficulty of thinking, in the unpleasant affect, emotionality, and content of imagery previously discussed. In this formulation, ego functioning is closely tied to external stimulation. Ruff et al. (65) extend this notion to account for individual differences by using the concept of sharpness of ego boundaries. Orientation in time and space structure the situation and may thus help the individual retain ego autonomy by keeping some ego functions in operation. Since isolation destructures the id-ego relationship, initial variations in the differentiation of ego boundaries may account for the individual differences seen.

The increased awareness of primary process material states in psychoanalytic terminology what others have described as the heightened awareness of internal bodily states. The decline in perceptual stability and reasoning and the increase in anxiety and imagery seem to arise not only as a function of the increased sensitivity to one's own thoughts, feelings, and ideas but also because of the absence of an external reality against which to validate one's inner experiences experientially or consensually. Although periodic "regression in the service of the ego," to use Kris's phrase, can be quite productive and creative, the sustained inability to go through the validation process seems both to increase anxiety and the distance from the social community. Burney's (13) reluctance to leave his solitary confinement after eighteen months, which has been observed in other autobiographical reports as well, may be one manifestation of this process. At the same time, if one accepts Hebb's notion of the "immediate drive value of cognitive experience" (37), the increased receptivity to any cognitive experience as seen in the brainwashing reports becomes more comprehensible.

A recent paper by Bruner (12) places the work on deprivation in a functional context. Perception is seen as instrumental behavior that permits the organism to manage its necessary transactions with the environment. Successful management of these transactions depends on acquiring an adequate internal model of the external world. Early sensory deprivation interferes with the learning of a stable model. Thus the

organism becomes limited in acquiring a full range of efficient problem-solving strategies. Deprivation in adult life interferes with the perceptual-cognitive maintenance needs of the organism. Thus, it disrupts the vital evaluation process by which one monitors

and corrects the models and strategies used in dealing with the environment. Freedman et al. (30) utilize a similar notion of "perceptual degradation" to account for their findings. They attribute the observed phenomena to the organism's continuous search for order and meaning in the unstructured perceptual environment provided in their experimental setup.

From a neurophysiological point of view, Lindsley (51) emphasizes the function of the reticular activating system because of its role in attention, perception, and motivation. This system serves the homeostatic function of adjusting input-output relationships. Sensory deprivation is one of a class of conditions which upsets the balance and thus disturbs the regulating function of the ascending reticular activating system. With markedly reduced input, perception is disrupted; attention gives way to distractibility; interest gives way to boredom; and activity is either held in abeyance or becomes highly stereotyped and nonadaptive. Heron (39) points out how sensory and perceptual deprivation may be equivalent. He cites evidence to show that the capacity of a stimulus to evoke and maintain arousal is lost upon repeated exposure of the stimulus. Hebb (37) presents an excellent theoretical discussion of the implications of the concept of arousal and the manner in which these findings bear upon a variety of issues in motivation theory, such as the generality or specificity of drive states, the need for varied stimulation, and the intrinsically rewarding quality of cognitive activity.

These findings are relevant to the problem of interrogation. There are no experimental data available in the studies reviewed bearing directly on the relationship of isolation and deprivation to the amount and accuracy of information which can be obtained when under interrogation. Nonetheless, the findings reported suggest some major parameters which may facilitate or inhibit the disorganizing effects of isolation.

Before considering further the implications of these studies for the interrogation problem, it may be important to point out some limitations. There has been some tendency to equate the effects of sensory and perceptual deprivation studies with those reported under conditions of solitary confinement. One possibly gratuitous assumption in equating the two is that. the nonpatterned stimulation in these studies simply accelerates the debilitating effects observed with social isolation alone. Several studies (21, 30, 32) explicitly control or account for the social isolation variable as contributing

little to the effects observed. Schachter (66) studied the reactions of five students to social isolation without interference with ordinary sensory

input. He concludes that for isolation two to eight days seems to produce relatively little of the painful effects seen in the autobiographical reports of sailors and explorers. However, specific investigations of the social factors in the sensory deprivation studies will be necessary in order to make a more precise generalization.

We have earlier elaborated some aspects of the differences in motivation between the experimental situations and the real life conditions. Because of these differences, and of limited data, caution in generalizing the relevance of these experimental studies is necessary. Pending clarification of these issues, some tentative implications may be suggested as relevant.

The loss of internal standards and the absence of opportunity to validate one's ideas against an objective reality would seem to apply in real life as well as in experimental circumstances. The boredom, restlessness, irritability, and other mood changes observed also may well apply. The stimulus-hunger and increased suggestibility which have been observed may make an individual more vulnerable to revealing information he might otherwise withhold, particularly when accompanied by the social uncertainty induced in the interrogation situation. Unprepared for these consequences of isolation and deprivation, like many experimental subjects, an individual may become apprehensive and indeed panicked by his reactions. The appearance of hallucinatory-like phenomena and their emotional accompaniments have often been quite anxiety provoking. On the other hand, previous exposure to these circumstances, familiarity with their consequences, and training individuals in techniques of dealing with them may well increase resistance. Knowledge of the importance of retaining spatial and time orientation, and self-stimulation in concrete tasks, are two examples of techniques for reducing stress by increasing psychological structure. Schachter (66) points out that isolates who are able to keep occupied with distracting activities appear to suffer less and be more prone to the state of apathy. Schonbach (68), in an experimental study, has demonstrated that a state of deprivation is far more bearable under conditions of irrelevant and distractive thought than under conditions where thought is concerned almost wholly with the source of deprivation.

Since direct research on the problem of resistance to interrogation in a realistic setting is difficult, some reliance on the type of study reviewed here is necessary. Further investigation of these problems will undoubtedly continue to shed new light on resistance to the disorganizing consequences of deprivation. However, despite their often dramatic results, these studies have remained within the limi-

tations posed by ethical considerations and have not pushed subjects to their ultimate limits. Indeed, polio patients survive years in respirators without psychosis, whereas prisoners, sailors, and explorers often successfully endure long months of severe deprivation and monotony. Furthermore, the autobiographical evidence, even if selfselected, implies that the long term effects are reversible and in some instances leave the individual with a sense of having achieved a new and better personality synthesis. From this point of view, the findings reviewed must be considered as suggestive, rather than spelling out in final terms the complete and precise parameters of response.

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CHAPTER 3

The Use of Drugs In Interrogation

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Introduction

The purpose of this chapter is to review available scientific knowledge on the use of pharmacologic agents to influence the communication of information which, for one reason or another, an informant does not wish to reveal. This problem in communication is not an unfamiliar one to the psychiatrist, who often aims to recover unconscious conflicts or memories from the neurotic or psychotic patient in the hope of producing therapeutic benefit. The purpose of this chapter, however, is not so much to review our knowledge on how to bring to a person's awareness, the feelings, impulses, and ideas of which he is not consciously aware; rather, the object is to focus particularly on the problem of getting data from a source of information when the individual is aware of the information but does not want to communicate it, either because the giving might incriminate him or put into possible jeopardy an aggregate of people toward whom he feels strong allegiance, identification, and belonging.

In the physician's customary role as a helping person and as a healer, it is generally contrary to his method of operation to employ any coercion, overt or subtle, to induce a patient to behave in a way that may be detrimental to himself or to his social or national group of origin. Coercion may be used, however, if the patient is considered to be behaving in a manner that is destructive to himself (e.g., a diabetic refusing to take insulin or an alcoholic refusing to stop drinking) or to his social group. Furthermore, the code of ethics, particularly of the psychiatrist, ordinarily binds the physician to keep

confidential the secrets that his patients impart to him, whether or not the patient has been aware or unaware of their nature. In the practice of psychiatry, the code of respecting and keeping the confidences of a patient is considered to be a tool that facilitates the confession or expression of otherwise taboo material from the patient. The psychiatrist's office is, ideally, one place where the patient finds that he has immunity

from punitive or disapproving action by the society in which he lives, except for the adverse criticism forthcoming from the patient's own internalized standards of behavior.

Occasionally the psychiatrist's occupation brings him into contact with patients with whom the psychiatrist himself is led into a conflict between his interest in championing the welfare and privileged communications of his individual patient and that of the welfare of the group: family, city, state, nation. In such a quandary, e.g., the question of what to do about a person who has confided his participation in a major crime, the physician's obligation to the individual and to the community may be in opposition to one another. In this position the physician may be forced to disqualify himself as a continuing confidant for the patient until the patient has remedied his social obligation to the state.

Mentioning these situations and the customary attitude of the medical profession has a bearing on the substance of this report. The use of drugs in obtaining a confession from a criminal, or in obtaining information that a source may consciously wish to keep confidential for fear of repercussion to himself or his group, is fraught with ethical conflicts for the physician. This explains in part why there is a relative paucity of systematized published scientific investigation by physiciaits on this matter. The general feeling in western countries regarding the employment of chemical agents to "make people do things against their will" has precluded serious systematic study of the potentialities of drugs for interrogation. It has not, however, precluded considerable speculation on the subject, some of it rather unrealistic.

Much relevant scientific information has been published on the therapeutic employment of drugs. The bulk of the medical articles of the last few years on the effects of drugs on behavior deals with the use and effects of these drugs on the mentally ill population. In fact, a growing avalanche of articles of this type sprang up with the advent of tranquilizing drugs. From this large body of publications, the reviewer aims to extrapolate to the problems of interrogation. Then, there is a notably smaller group of studies that deals principally wiih explorations in methods of assessing the psychopharma-

cologic effects of drugs on relatively normal individuals. From these studies, too, the reviewer aims to transfer what has been learned to the problems of interrogation. Finally, there are the relatively rare published investigations on the use of drugs for purposes of interrogation in police or security procedures; these are reviewed carefully because of their direct relevance.

No published reports have come to the attention of this author detailing the scientific application of drugs by intelligence agencies of any nation as a means of obtaining information. Apparently, what knowledge is available, whether derived from haphazard experience or systematic study, is not accessible in open sources. This reviewer found only two references touching on this topic. Rolin (112) casually claims that the Nazis used mescaline to get information from prisoners at Dachau. In discussing the methods of communist indoctrination of Americans who have fallen into the hands of communists or communist-controlled countries, Hinkle (62) has stated that the methods of Russian interrogation and indoctrination are derived from age-old police methods that have been systematized, and are not dependent on drugs, hypnotism, or any other special procedure designed by scientists.[1]

Methodological Problems in Determining the Applicability of Drugs to Interrogation Procedures: Nonspecific Effects of Drugs on Verbal Behavior

One of the crucial questions arising in evaluating the use of a drug for interrogation techniques is what responses are related to the pharmacologic activity of the drug administered and what responses are related to some other aspects of the transactions taking place when a person receives medication from another person. A large variety of nonpharmacologic factors can affect the responses of an individual after getting a dose of medication (see also Masserman and Pechtel, 102). In fact, one of the major problems plaguing investigators of

ps class="continued"ychopharmacologic relationships is how to discriminate the factors that are responsible for observed effects, how to single out factors so their sole effects can be observed, and how to study summation and combined effects of different factors.A series of nonpharmacologic factors within the total transaction of a person giving another person a drug has been found to be more or less capable of contributing

[1] Popular literature contains a number of accounts alleging the use of drugs in interrogations. Recent well-publicized examples include the alleged use of mescaline against Cardinal Mindszenty (S. K. Swift, *The Cardinal's Story*, New York: Macmillan, 1949); the prison memoir of an American civilian held by the Chinese Communists (R. T. Ryan, *I came back from a Red death cell, Saturday Evening Post*, January 17, 24, 31, and February 7, 1953); and the account by the Communist editor, Henri Alleg, of an alleged use of sodium pentothal in interrogations he received while held by French forces in Algeria (H. Alleg, *The Question*, New York: George Braziller, 1958, pp. 91-102).

to the responses occurring with administration of the drug. These factors may be listed and what is known about each will be taken up separately.

1. Reactions due primarily to the "placebo phenomenon."
2. Silent administration.
3. Reactions to attitudes or motivations of the person administering the medication and interacting with the informant.
4. Drug effects modified by the current state of the recipient organism.

Reactions Due Primarily to the "Placebo Phenomenon," i.e., Reactions to Taking a Medicinelike Substance, Even Though It Is Pharmacologically Inert

There has been an increasing interest in the importance and mechanism of action of the placebo (46, 67, 83, 135, 136). The studies of Beecher and his group (7, 8) indicate that 30 to 50 per cent of individuals are placebo reactors, that is, respond with symptomatic relief to taking an inert substance. If one is interested in the pharmacology of a new drug and tries it out on a group of patients, a third to a half of this group will be relieved of their symptoms by a placebo; they react favorably to the syringe, pills or capsule, regardless of what it contains. Thus they dilute the significant data derived from the half or two-thirds of the group that react only to the active ingredient in the syringe or capsule. In studying a new drug-whether one is interested in applying its pharniacologic effect toward the alleviation of pain, amelioration of emotional distress, or the facilitation of communication of covert information-the scientist is not primarily interested in the subjective and behavioral effects of syringes and pills. Thus the scientist is obliged to take into account the placebo reactors, who must be screened out if one is to get an accurate idea of what the drug itself does.

Of course, to relieve pain or facilitate communication in a patient or prisoner, the "placebo phenomenon" can be made use of itself and

the investigator can expect that in 30 to 50 per cent of trials pain may be relieved or interrogation may be facilitated.Some additional factors are known which increase the likelihood of a placebo effect:

1. A sympathetic woman investigator can obtain a higher percentage of pain relief from various niedicatimis than can a colder, more remote male (7).
2. Individuals under increased stress are more likely to respond to placebos (9).

3. Greater responsiveness is associated with certain personality characteristics according to Rorschach findings with placebo reactors in a group of 162 postoperative patients: (a) more than one "insides" response; (b) Sum C > M; (c) A% < 50%; (d) CF > FC; (e) more than two “anxiety” responses; (f) less than two “hostility” responses; (g) average F + % 51; (83).

4. Clinical psychiatric findings in the same study regarding placebo reactors found greater responsiveness characteristic of individuals who are more anxious, more self-centered, more dependent on outside stimulation than on their own mental processes; persons who express their needs more freely socially, who are talkers, and who drain off anxiety by talking and relating to others. In contrast to the placebo reactors, the nonreactors are clinically more rigid and more emotionally controlled than average for their age and background. No sex and I.Q. differences between placebo reactors and nonreactors were found (83).

If one is interested in ascertaining whether a drug produces a given effect to a degree greater than a placebo, it becomes obvious that the effect produced by the drug must exceed the chance variations of the placebo effect to a reliable extent. In experimental investigations exploring the usefulness of drugs for various purposes, the placebo and other nonspecific reactions to medicaments must be separated from the effects specific to the active drug. Devising an experimental study using infrahuman animals to assess the pharmacologic effect of a drug only postpones the assessment of the complicated responses likely to occur when the drug is given to a human being. For the researcher interested in discriminating specific from nonspecific effects of drugs, Beecher (7) has outlined a series of principles and practices on the basis of seventeen drug studies in which he has participated, as follows:

1. Subjective responses are the resultant of the action of the original stimulus and the psychic modification of that stimulus.

2. Man is the essential experimental subject for a definitive answer to questions in this field, and men are easier to work with than women, for with men the controls are simpler.
3. The investigating staff is constant during any given series of experiments.
4. The "unknowns" technique is employed throughout. The agents tested and the time they are tested are unknown not only to the subjects but to the observers as well. This requires the use of placebos, also as unknowns.
5. When a new agent is to be compared with the agents of past experience, and this is nearly always the case, a standard of reference is required (morphine in standardized dosage is used as the standard for analgesics, etc.).

6. Randomization of new agent, placebo, and a standard of reference is essential.
7. Significant comparisons of side actions of agents can be made only on the basis of equal strength in terms of their primary therapeutic effect.
8. Mathematical validation of supposed difference in effectiveness of the two agents is necessary.
9. The subjective (and behavioral) effects of drugs can be quantified accurately and rapidly only when placebo reactors are screened out.

Silent Administration

The obverse of placebo administration, the deliberate administration of an inert material, is silent administration, the unknown administratiou of a pharmacologically potent substance.

The act of administering a medication usually potentiates its effect since it invokes the status of a professional person and the prestige of social institutions and organizations that are a part of the setting. A general recognition of this fact has made the control of the placebo effect a routine feature of all carefully designed drug studies. Conversely, silent administration has received little or no attention.

Not all psychoactive drugs are equally suited to silent administration. A minimal requirement is the successful masking of the drug by substances otherwise introduced into the body, such as foods, liquids, smoke, or air. From this point of view the ideal drug would be tasteless, odorless, and completely soluble.

Theoretically, the net effect of a silently administered drug should be equal to its effect following routine procedures minus its placebo effect. In practice this effect would be modified by the state of the organism, the general setting in which the subject finds himself, and his typical and persistent modes of reacting, i.e., personality-constitutional factors. One may expect a very different reaction from a subject who is sensitive to his internal, subjective processes than from one who has learned to disregard and reject them in favor of "objective" external cues. Likewise, reactions will vary between subjects who yield to and expand upon their internal experiences and those who

strive to maintain a steady state by exercising deliberate control in the manner of negative feedback compensation.

For these reasons it is difficult to specify dosage levels at which a subject is likely to become aware that he is responding to a drug, since so much depends on personality and situational factors and on the subject's previous experience with drugs. In naive subjects

moderate doses which noticeably modify their behavior may escape their attention, or be ascribed to other sources, such as fatigue, thirst, apprehension, dyspepsia, etc.

The judicious choice of a drug with minimal side effects, its matching to the subject's personality, careful gauging of dosage, and a sense of timing, makes silent administration a hard-to-equal ally for the hypnotist intent on producing self-fulfilling and inescapable suggestions. Surpassing "magic room" procedures in their efficacy, the drug effects should prove even more compelling to the subject since the perceived sensations originate entirely within himself.

Reactions to Attitudes or Motivations of the Person Administering the Medication and Interacting with the Informant

One of the major problems involved in the assessment of drug effects is distinguishing the psychopharmacologic effect of a drug from that consciously or unconsciously desired by the person administering the drug. Another related problem of consequence is the extent to which a drug effect, noted by one person using the drugs to achieve his special aims, may be expected to occur in the hands of another person using the same drug for an essentially different aim. Although one assumption of this present report is that drug effects are to some extent generalizable from one situation to another, the limitations of such generalizing need to be clarified. The inference exists that the reaction to a specific drug when used by a physician to relieve the symptoms of a patient will produce a similar response when used to extract covert information from a recalcitrant source. In every instance, where such extrapolations are made from one such situation to another, the reviewer does so merely because little or no germane scientific reports are available in connection with the interrogation situation. In every instance where such an extrapolation is made, it is for heuristic purposes, and the generalized ideas and concepts require careful testing and validation.

What is some of the evidence that attitudes and motivation of the giver of the drug may affect the observed responses?

A classical study by Hill et al. (61) illustrates how the behavioral

effect of a drug may be influenced by the incentives given for participating in a drug study. The subjects were former narcotic addicts who volunteered for research. They were accepted after thorough screening by a board of hospital psychiatrists and other professional personnel, with a view to selecting only subjects with histories of repeated relapses to narcotic addiction and very unfavorable prognoses for future abstention from narcotic: drugs. Simple visual-manual reaction times were measured: without

administration of drugs; 50 min after subcutaneous injection of morphine; and 50 min after subcutaneous injection of 250 mg of pentobarbital; each was measured under four incentive conditions, defined in terms of the schedule of morphine rewards offered for participation in the experiments. When a fixed reward was given a week in advance of the tests, morphine accelerated and pentobarbital slowed reaction times. When a fixed reward was scheduled for delivery after completion of the tests, neither drug affected reaction times significantly. When the amount of the posttest reward was made contingent upon speed of performance, morphine exerted no significant effect, but pentobarbital accelerated reaction times. When the same group of subjects were retested one to three days later, with posttest rewards again fixed for all subjects regardless of performance, morphine slowed reaction times and pentobarbitat had no significant effect. In other words, depending on the incentive conditions arranged by the investigators, the same dose of either morphine or pentobarbital exerted. either no effect or acted as a "stimulant" or as a "depressant" on simple visual-manual reaction times. Nevertheless, the action of either of these drugs was "specific" with respect to the actions of the other; thus, the action of morphine changed from "stimulant" to "depressant" when conditions changed from "low" incentive (rewards fixed and delivered before testing) to "high" incentive (rewards contingent on performance and scheduled for delivery after testing); whereas the action of pentobarbital changed from "depressant" to "stimulant" when identical changes in incentive were made. Further analysis of the data of Hill et al. revealed that, in comparison with the range of changes in mean reaction times produced by varying the incentive level when no drug was administered, morphine reduced but pentobarbital increased the sensitivity of the subject's performance to changes in incentive level.

A study by Wolf and Ripley (137) illustrates further that the effect produced by a drug depends not only on the particular agent used, the dose and route of administration, but also on the circumstances under which it is given or how its effect is measured. (See also: Rinkel, 110, 111; Sargant, 116.) They observed the effects of amo-

barbital (0.1 to 0.5 gm intravenously) on 700 patients with various complaints, including hypertension and "tension headache." They found that after administration of the drug, the patients were "at ease" if the setting was "secure" and friendly, but the patients were tense and anxious with equal facility if disturbing topics were introduced during interviews. The effects of the amobarbital on headache and blood pressure varied similarly with the nature of the interpersonal milieu. Another illustration is the report of Beecher (7) that a higher percentage of pain relief from various medications was obtained by a sympathetic woman investigator than by a colder, more remote male.

Drug Effects Modified by the Current State of the Recipient Organism

It is now well known that many drugs when taken internally may produce a transient excitant effect where the user becomes euphoric, talkative, and sometimes emotionally responsive. For example, it has been known through the ages that alcohol loosens the tongue during an excitant phase and that a person with enough alcohol may reveal things he would not ordinarily discuss. As is also well known, however, people react differently under the influence of alcohol. Some become depressed and morose. Some become excited and volatile. Some talk freely and others shut up like a clam. As has been previously pointed out, different people may have different reactions to the same drug and similar reactions may occur to different drugs. One cannot always predict what type of reaction may be obtained.

Relevance of Nonpharmacological Factors

Various factors such as sex, intelligence, and mental and physical condition can influence the speech patterns of an individual. In order to assess the pharmacology of a drug, the predrug differences in verbal communication must be taken into account. Furthermore, there is strong evidence that the pharmacologic effect of a drug interacts with the status of the human organism receiving the drug.

Effect of Sex, Intelligence and Educational Level on Speech Patterns

It is obvious and requires no documentation that people with differing intelligence and educational level show large qualitative differences on tests of intelligence. That they speak differently under standardized conditions of eliciting the speech would seem to follow, but this has not heretofore been investigated systematically. It is also

a common observation that the sexes use language differently, if not in a formal, structural way, then in the items of information that they choose to convey in their speech. Gleser, Gottschalk, and John (54) have studied the relationship of word-type usage to gender and intelligence as measured by the Wonderlic test. They obtained five-minute speech samples of a group of ninety occupationally adjusted, medically healthy individuals. These speech samples were elicted by standardized instructions given by a male investigator. The wordtypes were analyzed and scored according to two systems of categories: a grammatical system and a "psychologic" system. The "psychologic" system attempted to classify words according to the emotive, cognitive, and perceptive processes conveyed, and the animate and inanimate objects denoted, regardless of grammatical part of speech. Under these experimental conditions, significant differences were found to occur in the proportion of certain types of words used by men as

compared to women. These differences appeared principally among the "psychologic" categories of words. For example, women tended to refer to themselves more frequently than did men. Women expressed more feeling and emotion, and used more negations. They used relatively fewer words referring to place or spatial relations and to denoting destructive action. Significant differences were also found to be associated, step-wise, with level of intelligence. These differences occurred principally among the grammatical categories. For example, the more intelligent adult was found to use significantly more adjectives and prepositions, but fewer adverbs, verbs, and interjections. A multiple correlation of . 65 was obtained between these variables and Wonderlic I.Q. scores. The differences between the sexes in word-type usage tended to decrease at the highest level of intelligence. These investigators have published tables of separate word-frequency norms for males and females and for word categories that vary with intelligence.

In summary, this study illustrates that gender and intelligence influence speech patterns at the microscopic level of word-types. In experimental studies for determining whether or not a drug will facilitate interrogation, the fact that intelligence and gender separately affect speech requires consideration. Suitable controls need to be included in the research design.

Effect of Individual Differences in Personality and Cerebral Funcitions on Reactions to Drugs

There is considerable evidence to support the concept that the mental and physical state of an individual can affect his reaction to pharmacologic agents.

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Kornetsky and Humphries (77, 78) have shown that there are reactors and nonreactors to drugs and that the reactors are likely to be those who are more depressed (on the D scale of the MMPI), to have more unreasonable fears, and overreact to environmental stimuli (the Pt. scale of the MAIPI). These investigators explored the effects of a placebo, promazine, secobarbital, and meperidine hydrochloride on a series of objective motor, intellectual, and perceptual activities, as well as on subjective responses. The subjective responses were evaluated 30, 90, 150, and 210 min after the drug was taken. Promazine and secobarbital had an adverse effect on the performance of motor tasks but not on simple intellectual and perceptual tasks. Meperidine hydrochloride in 50 to 100-mg doses did not impair performance in any of these same psychologic functions. The more deviant a subject was on four MMPI scales (psychasthenia, depression, hypochondriasis, and hysteria) the greater the effect of the drugs. Also, those who were most affected by one drug were most affected by another. Finally, if large enough doses of a drug were given, all subjects tended to respond in the same manner.

In a well-controlled study, Lasagna et al. (84) concluded: "In addition to dose and route of administration, the nature of the subject and the situation in which a drug is administered are important determinants of drug effects." Using a double-blind technique, these investigators administered, in randomized order, a placebo (1 ml of physiological saline solution subcutaneously), amphetamine (20 mg/ 70 kg body weight subcutaneously), heroin hydrochloride (2 to 4 mg subcutaneously), morphine phosphate (8 to 15 mg subcutaneously), and sodium pentobarbital (50 and 100 mg intravenously) to twenty healthy "normal" volunteers,' thirty patients in a hospital for chronic diseases, and thirty former narcotic addicts serving prison sentences in an institution devoted to the treatment of narcotic addiction. At intervals, before and after administration of the drugs, the subjects completed a questionnaire designed to measure the "subjective" mood changes induced, and this was supplemented by discussing with the subjects their responses to the drugs. In "normal" and, to a lesser degree, in chronically ill patients, amphetamine surpassed morphine, heroin, pentobarbital, and a placebo in producing euphoria. In the narcotic addicts, however, morphine was reported to produce a more pleasant effect than heroin, amphetamine, or a placebo.

Laverty (85) gave randomized injections of sodium amytal and a placebo to forty subjects divided into four groups of ten each: introverted neurotics, introverted normals, extroverted normals, and extroverted neurotics, as assessed by scores on Guilford's *R* scale for

extroversion. The sedation threshold, as measured by the onset of slurred speech, was highest for neurotic introverts and it decreased step-wise for each of the groups in the order given. In other words, the group of introverted neurotics required the largest amount of intravenous sodium amytal (6.4 mg/kg body weight) before developing slurred speech.

Weinstein et al. in a series of studies (127, 128) have explored the differential effects of intravenous sodium amytal on subjects with preexisting organic brain disease and nonbrain-damaged individuals with illness not involving the nervous system. Some of the brain-damaged patients, who before receiving the drug had expressed awareness of illness and who had good orientation for place and person, with the drug became disoriented for place and grossly misidentified the examiners and explicitly denied illness. Weinstein claims that these changes with sodium amytal occurred only in the brain-damaged individuals; whereas, in nonbrain-damaged individuals receiving sodium amytal, the subjects talked of illness in terms of a third person, used more "concrete" symbols, selectively misinterpreted questions about illness, and misnamed the examiners in "paraphasic" fashion. (Incidentally, Weinstein reports that with the types of patients he studied, sodium amytal did not make them more communicative.) The significance

of Weinstein's investigations appears to be that the person with brain-damage gets his sensorium more disorganized with sodium amytal than a nonbrain-damaged individual; an instance, apparently, of the effect of adding insult to injury.

Hoch, Cattell, and Pennes (64, 65) administered sodium amytal, pervitin, and mescaline to each of sixteen patients suffering from the pseudo neurotic form of schizophrenia, twenty-four patients with an overt form of schizophrenia with slight. to moderate deterioration, and nine schizophrenic patients with severe deterioration. With these drugs, especially with mescaline, they found typical physiologic changes occurring, mainly involving the vegetative nervous system. However, with most patients, some aspects of the drug experience seemed to be a direct continuation of previous personality factors. For instance, a patient who showed obsessive compulsive features before the drug experiment would tend to show the same obsessive structure while intoxicated. The same was true about anxiety attitudes, intellectualizations of conflicts, preoccupations with artistic, philosophical, or other matters.

Although Beringer () in his drug studies, using mescaline, did not find any correlation between personality and drug reaction, Stockings (122) found that cyclothymic and schizothymic individuals re-

sponded differently. Bensheim (15) thought that the cyclothymic group responded with euphoria and depression to mescaline and the schizothymic group with ecstasy. Lindemann and Malamud (94), experimenting with sodium amytal, cocaine, hashish, and mescaline on the same patients, found that each drug has its specific characteristics, but that the changes produced by a given drug were molded by the patient's personality (see also, 92, 93). Guttman and MacClay (59) and Sarwer-Foner (118) also found correlations between personality and drug reactions. Rubin et al. (114) suggested that the drug reaction be divided into two parts: those responses that are characteristic of a drug regardless of the patient in whom they occur, and those seen in a given patient regardless of the nature of the drug used. The first could be called a collective reaction and the second an individual reaction dependent on the individual's personality.

It is perhaps of interest here that Russian scientists have also emphasized the differential response of different types of individuals to drugs, specifically chlorpromazine (86).

It has been obvious to those who listen to and study people with personality disorders that the verbal behavior of an individual suffering from an emotional disorder is relatively peculiar, both in form and in content. The depressed person is laconic. The manic person is diffusely wordy. The hysteric and schizophrenic are quite variable in the

duration and length of their remarks. There are typical thematic and structural characteristics of the speech habits of patients with these types of psychiatric disorders. (See, for example, Gottschalk et al., 56.)

At present, there are more gaps than facts in our knowledge about the reactions of different personality types to the same and different drugs. Years of intensive research are needed to supply some of this unavailable knowledge.

However, it is already acknowledged that individuals with features of hysterical, conversion, or dissociative reactions are likely to be suggestible and to react strongly to all psychopharmacologic agents, including placebos (83, 85).

Drugs may tend to reinforce the need to give for individuals burdened with feelings of neurotic shame and guilt, especially if such feelings are enhanced by the interrogator. Drugs may also furnish the needed excuse and relief from personal responsibility for sources who violate internalized values and loyalties in revealing information.

The pharmacologic effect of the drug is probably of less decisive influence in facilitating information-getting (although acting as a catalyst) than is the potential readiness of individuals with such per-

sonality features to behave in a typical way under certain circumstances. The consideration of drugs as an aid to interrogation presupposes a thorough understanding of the personality characteristics of the informant and of drugs, to predict what might be expected by their use.

Effect of Physiologic Conditions on Drug Responses: Biologic Rhythms, Nutritional States, Isolation, and Fatigue

There is evidence that the physiologic condition of the individual affects his behavior and responsivity to further incoming stimuli. If so, this propensity is pertinent to our specific interest regarding the use of drugs in affecting the verbal behavior of informants.

It is difficult to ascertain to what extent the behavioral alterations that have been noted under various physiologic conditions are mediated by biochemical changes per se, and to what extent they are secondary psychophysiologic reactions to subtle changes in body chemistry. The answer need not occupy us here, except to note that a chemical alteration within the body is probably one important feature of the varying responsivity of the individual. Under such circumstances, the addition of other chemicals complicates

the problem of predicting the behavioral outcome. This is particularly true if the new chemical introduced into the body is mild in its effects, or if it is given in a small dosage.

Citation of every technical article bearing on this point would be unnecessarily burdensome here. Instead, a number of key investigations are reported to illustrate the point.

Biologic Rhythms. Benedek and Rubenstein (12, 13) have studied the relationship of associative material presented by women during psychoanalysis at various phases of their menstrual cycle, as measured by vaginal smears. These two types of data, verbal material and physiologic changes in the vaginal mucosa, were collected and analyzed independently by the two investigators, one a psychoanalyst and the other an endocrinologist. After a long period of collecting such data, the investigators related verbal productions to the phases of the menstrual cycle. A high concordance between the two types of data occurred. This has been validated in clinical studies to some extent. However, because of the importance of the psychophysiologic implications of this classical study, independent validation by other investigators would be desirable. In brief, the investigators found that during the estrogen phase of the menstrual cycle, the women were more extroverted, had more fantasies, dreams, and subjective experiences indicating strivings to be loved and impregnated and had con-

flicts about such strivings. During the progesterone phase, the women were more introverted, were more preoccupied with interests in their own body and self. During the premenstrual phase of the cycle, there were increased references to cleaning out, washing out, evacuating, losing something, and the women were more depressed. Again in these studies, individual variations occurred in relation to the varying hormonal phases of the sexual cycle, depending on the woman's personality type and the kinds of conflicts she had about procreation, childbirth, mothering, etc.

Nutritional States. Studies of the effects of the state of nutrition, especially vitamin deficiency, on human behavior are replete in the medical literature and indicate that neurological and psychiatric disorders may ensue with various vitamin deficiencies, particularly of the B complex. The effects of starvation, voluntary and enforced, in provoking increasing lassitude, apathy, depression, preoccupation with food, flattening of affect, and mood are sufficiently well known and are discussed in another chapter of this study. The more subtle effects of satiation with food and the brief deprivation of food typical of everyday rhythmical eating habits on response patterns to psychologic tests and interviewing procedures have received little careful study, even apart from problems of drug effects.

Clinical psychiatric experience indicates that some individuals become querulous, demanding, restless, even paranoid, and experience hunger contractions if they have not eaten for one to two hours, although they show no demonstrable pathologic, metabolic processes. Other individuals may miss several meals, yet experience no subjective reactions and show no signs of distinctly different behavior. Gottschalk and Gleser (55) did a controlled study of the effect of fasting for twelve hours on the speech patterns of six paid physically healthy and occupationally adjusted volunteers, three males and three females. MMPI's were obtained on all subjects. No homogeneous effect of fasting states on thematic speech variables or on the proportion of various categories of word-types was found under these experimental conditions. In one subject, however, characteristic and repetitive reactions occurred to the stress of the mild fasting, reactions which were principally in the form of significantly increased references to food, home, mainland, mother, and involving attempts to bridge the distances between such objects. Hypoglycemic states were induced by the injection of intravenous insulin in this same subject and the effects of these states were noted. A repetitive, but different, thematic reaction occurred to this experimentally induced hypoglycemia as

compared to voluntary fasting for twelve hours. The investigators concluded that fasting for twelve hours was not enough of a stress to produce consistent effects in the speech patterns of five, out of six, paid volunteers. Susceptibility of reacting to twelve hours of fasting was considered to be due to individual personality features. These investigators did not feel that this initial study gave them enough data to be able to predict accurately which subjects might react and which might not react to this stress.

Isolation and Fatigue. In unnatural biologic states, such as in experimental or enforced isolation from other humans or from ordinary levels of physical stimuli (19, 25, 60, 91) or in loss of sleep (124) emotional disturbances and transient psychotic states have been reported. In states of sleep loss, paradoxical reactions to drugs may occur. In this connection, Wendt (129) is quoted as observing: "There are some interesting things about secobarbital or any of these drugs when ased in individuals under stress, e.g., after 40 hours of enforced wakefulness people become irritable, anxious, apprehensive, and difficult to keep awake. A small dose of secobarbital of 100 mg will wake them up and make them volunteer to go through another night." To this reviewer's knowledge, this phenomenon has not been reported elsewhere and it is important enough to merit. further testing. Such paradoxical effects have been noted clinically with other drugs, notably amphetamine which may have a sedative and quieting effect on restless. anxious, irritable small children with behavior problems presumably associated with psychomotor or petit mal epilepsy (see Forster, 48) and which may reduce the agitation of excited schizophrenics (21).

Methodologic Problems in Determining the Effects of Drugs on Verbal Behavior: Influence of Method of Sampling the Verbal Behavior on the Effect of a Drug

In this brief section, the reviewer, for the sake of completeness, wants to emphasize that the scientist studying this problem must realize that he will discover no more information than his method of evaluation will provide, and that different methods of sampling the verbal behavior of a subject under drugs may give somewhat different information about the psychopharmacologic effect of the drug. Each scientist will tend to use the measuring instrument most familiar to him, and each instrument or technique will have different merits.

The questionnaire of subjective reactions and the directive interview will provide yes and no answers and some qualified answers to structured concepts and hypothesis of the investigator. These methods have the advantage of relative speed and ease of evaluation.

The nondirective interview and the free-associative technique can be applied in a systematic and quantitative way and constitute a valuable means of studying the pharmacodynamics of drugs (see also Kubie, 79 and Wikler, 132), but evaluation of the data is generally slower and more complicated. Although some specific questions in the mind of the investigator may remain unanswered (e.g., is the material fantasy or fact?), these methods may provide considerable information about the drug's effect on symbolic processes, effects, and psychodynamic relationships. To approach definitive answers regarding the potential action of drugs on human behavior, emotion, cognition, and conation, our knowledge needs to be much more complete at the physiologic, biochemical, and psychologic levels of organization. The scientist would best look at his data in as many ways as possible and use a variety of approaches in studying these phenomena (see also Wikler, 131 ; Miller, 103).

The Efficacy of Drugs in Uncovering Information

Several investigators have employed drugs to facilitate the recovery of information not freely yielded by the individual.

In 1921, R. E. House, an obstetrician in Texas, observed in deliveries in which the mother had been given scopolamine that in a certain stage of anesthesia or sedation she might be talkative and reveal things she would not ordinarily discuss. He noted that after childbirth, the mother frequently forgot that she had suffered pain, that she had complained of it, and that she had spoken of personal matters. After the use of scopolamine, often with the addition of chloroform, had proved to have certain

advantages in the obstetrical management of a woman delivering a baby, House persuaded himself to extend the use of scopolamine beyond its original purpose to the interrogation of criminal suspects. He gave many enthusiastic demonstrations throughout the United States. As a result, newspapers quickly applied the term "truth serum" to this sedative drug. House's enthusiasm about scopolamine as an adjunct in obstetrics led him to overenthusiastic statements about the value of the drug in interrogation. In 1931, on the basis of two cases, he stated (69) that a person under scopolamine could not lie and that the drug could distinguish the innocent from the guilty. This statement is an example of an

investigator observing the drug action he wanted to see, but which was not observed in subsequent studies (82).

Since House's early experiments with scopolamine (69), which led to the misnomer "truth serom," a great deal more has been learned about drug action. During World War II an interviewing method employing the administration of an intravenous barbiturate was used with disturbed soldiers who were experiencing acute war neuroses in order to allow them, transiently, to relive certain of their battle experiences which were believed to have aroused persistent emotional conflicts (58, 117). In psychotic patients, particularly catatonic schizophrenics, who will not talk and therefore do not participate in psychiatric therapy or reveal any clues to the mental experiences which may underlie their disorder, sodium amytal has been used to facilitate communication with the patient (117). If it works, there is a transient phase that can sometimes be prolonged by injecting the drug slowly, during which the patient will answer some questions and communicate some of his life problems. If the patient passes through this stage into a deeper stage of narcosis there may be a transient period of talkativeness as he recovers from the sedation or anesthesia.

For certain personality types, some drugs lower conscious ego control, thereby facilitating recall of repressed material and increasing the difficulty of withholding available information. The ideal drug for an interrogator would be one which not only accomplishes this feat, but does so without interfering with integrative capacities and intellectual functioning. Because of the uncertainty of the truth or falsity of statements obtained under circumstances of reduced ego control, and because certain drugs may give rise to psychotic manifestations such as hallucinations, illusions, delusions, or disorientation, the verbal material obtained cannot always be considered valid. Such data is not accepted in a court of justice and the information so obtained is not considered wholly accurate by the medical profession.

What experimental data and critical reviews are available which have examined the validity of such material from the viewpoint of the interrogator's interest in factual Inforniation?

Jean Rolin (112) has written a book entitled *Police Drugs* in which he inveighs strongly against the use of drugs for medico-legal purposes. His argument is in part moral, but it is also based on the grounds that there is uncertainty as to the truth of revelations obtained by such means. He concludes that ". . . from a purely medical standpoint, confessions obtained by drugging are valueless and do not give grounds for determining responsibility."

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In the same book, E. V. Saher's (115) chapter on narcoanalysis provides an extensive review of the literature. In summarizing the viewpoint of the medical profession on narcoanalysis, he says:

> Narcoanalysis is not a sure method of bringing out the truth and nothing but the truth. Any confession made is not necessarily true; and if no confession is made this does not necessarily prove that the patient has not committed the crime with which he may be charged. Does this mean that narcoanalysis has no importance at all from the angle of the administration of justice? The answer to this question is again in the negative, because in many cases the confession is true and often facts are brought out which are very helpful to the public prosecutor in proving his case. It seems fair to say that in the present stage of development narcoanalysis can be of great help in finding the truth. But it is also a dangerous means of investigation as the right interpretation of statements made depends largely on the skill of the analyst.[1]

The published experimental studies on the validity of confessions obtained with drugs are few. Much further careful investigation is needed to clarify the problems involved. This reviewer was able to locate only four studies worth reporting here.

The first study is only of borderline relevance and involves the use of intravenous barbiturates as an aid in the differential diagnosis between conversion hysteria and malingering. The author (104) claimed that the use of intravenous sodium amytal was found to be helpful in detecting (and treating) individuals who were suspected of consciously distorting and feigning disability. He found such individuals to be negativistic, sullen, and nonproductive at first under amytal but prone to reveal the fact

[1] See also MacDonald, 99, 100; Underhill, 125.

of and causes for their malingering as the interview proceeded. It was common in his experience to turn up a neurotic or psychotic basis for the malingering. (See Chapter 7.)

The other three studies deserve more detailed review because of their relative superiority, and thus rarity, as research studies in this highly specialized and untouched area.

Redlich, Ravitz, and Dession (109) asked a total of nine university students and professional persons to relate some true shame- or guiltproducing life incident. Then the subjects were asked to invent a "cover story" to be told to another examiner who interrogated them after the intravenous injection of amobarbital, 0.25 to 1.0 gm. In six of the subjects, the "cover story" was given during the amytal interrogation, in one it was mixed with the true story, and in two the true story was given. In nearly all subjects, the "cover story" contained elements of the guilt involved in the true story. However, except in

the cases of those who confessed the truth, the true story could not be inferred from the story told under amobarbital. An additional finding of interest was that the more normal, well-integrated individuais could lie better than the guilt-ridden, neurotic subjects.

Gerson and Victoroff (53) used amytal interviews on neuropsychiatric patients who had charges against them at Tilton General Hospital, Fort Dix, New Jersey. The patients were told that none of the material from the interviews would be used in the prosecution of charges against them, since it was considered a breach of medical ethics and because the material, derived with the full knowledge and consert of the patient, could not have been presented in court without violating the Twenty-fourth Article of War and the Bill of Rights of the Constitution of the United States.

The researchers first gained the confidence of the patients by discussing their life history. They were not informed that amytal would be used until a few minutes before narcoanalysis was undertaken. It was explained that the drug would make them sleepy and encourage them to discuss things with the doctor that might enable him to gain fuller understanding of the patients' personality and motivations. Under these circumstances, the patients' attitude varied from unquestioning compliance with the procedure to downright refusal to submit to the injection. (One gram of drug in 10 cc of distilled water was injected slowly in the median cubital vein.) Questions relevant to the charges against the patient were not brought up until later, the initial discussion involving relatively innocuous material about the patient's personality and life history which had been discussed previously. A follow-up, waking interview was carried out on the day following narcoanalysis, during which the covert material unearthed during the

amytal interview was brought up, and possible psychologic factors in the patient's criminal behavior were discussed. During the follow-up interview, nine patients admitted the validity of their confessions and eight repudiated their confessions. Gerson and Victoroff examined the following factors interfering with the completeness and authenticity of the confessions: (a) inept questioning, (b) tendency of the patient to perseverate on unrelated topics, (c) mumbled, thick, inaudible speech and paralogia, (d) fantasies, (e) contradictory but apparently truthful evidence, and (f) poor rapport between doctor and patient. These experimenters concluded from their study that under sodium amytal subjects could sometimes lie and that their reasoning powers were sometimes present, although much distorted. Although they found amytal narcoanalysis successful for the revelation of deception, they felt that the validity of the information

garnered by this method was not so decisive that it could be admissible in court without further investigation and substantiation. They acknowledged that the doctor could not tell when the patient's recollections turned into fantasy, could not positively state whether he was simulating deep narcosis and actually maintaining his lies, and could not, without social investigation, determine which of contrary stories told under narcoanalysis was true.

Clark and Beecher (30) tested the ability of twenty, paid, volunteer male college students while under drugs to withhold deliberately information during four to eight hours' sessions from a male interviewer, who also administered the drugs intravenously. Thiopental, atropine, amphetamine, methamphetamine, sodium amobarbital, ethyl alcohol, scopolamine hydrobromide, pentobarbital sodium, morphine, caffeine sodium benzoate, and mescaline sulfate were given singly and in combination. The subjects were motivated by their desire for monetary compensation, their perceived importance of the experiment, and pride in their integrity and "will power." The information which the subjects were asked to withhold consisted of (a) two items of personal information (e.g., birthplace, mother's maiden name, etc), (b) an "experimental secret" devised to resemble military intelligence, and (c) a guilt-laden personal experience for which the subject devised a "cover story." All of this information was reduced to writing and deposited with a technician. To check possible forgetting, the subject was asked to produce the withheld information at the end of the experiment, and this was verified against the written version.

> The drugs and combinations of drugs used in these experiments were given in such large amounts that they produced grossly abnormal states of mind. At various times, subjects became semicomatose, mildly delirious, panicky, markedly loquacious, euphoric or underwent transient dissociative reactions; yet, curiously, at no time was there sufficient ego impairment that they were

unable to identify the significance of questions about the suppressed information and avoid answering them in response to direct questioning. As long as they remained in auditory contact with the interrogator, they consistently refused to reveal the suppressed items.

The “experimental secret” was not given up by any of the subjects. Similarly, none of them revealed the suppressed items of amnestic data in response to specific questioning. However, on two occasions the names of close relatives being used as suppressed information were revealed, apparently as slips of the tongue, in the course of spontaneous, dissociative rambling while severely intoxicated with scopolamine and thiopental in combination.

The findings with the "cover story" technique were essentially those of Redlich et al. Under thiopental narcosis, two subjects produced significant variations in the cover story which betrayed the content of the true story.

These individuals were of a more neurotic character pattern than the other subjects, and their true stories centered on problems of unresolved guilt. However, the remaining subjects, if they were able to talk at all coherently, reproduced the cover stories with remarkable fidelity to the original version.

In evaluating the considerable ego-integrity maintained by these subjects, it is important to consider that they may have felt relatively secure in a protected experimental situation, in the hands of a responsible experimenter and physician.

In summary, then, clinical experience and experimental studies indicate that, although a person's resistance to communicating consciously withheld information can be broken down with drugs, and particularly sodium amytal, the interrogator can have no easy assurance as to the accuracy and validity of the information he obtains (see also MacDonald's discussion, 100, and that of Inbau and Reid, 71). Furthermore, a lack of crucial information from a subject under a drug does not mean that the subject has no information. An interrogator would have to evaluate many other factors — the personality of the subject, the milieu, other sources of evidence, etc. — to decide how to interpret the outcome of an interview with a drugged informant.

Specific Effects of Drugs on Verbal Behavior, Particularly Drugs Potentially Applicable to Interrogation Procedures

After looking at these efforts to elicit information with a variety of drugs, it may be well to consider each psychopharmacologic agent in turn, for its possible applicability to the interrogation situation.

Barbiturate Sedatives and Calmatives

The major share of studies on the use of drugs in interviewing procedures involves the barbiturates: amobarbital, secobarbital, and pentothal. These drugs have been found useful in treating the acute war neuroses (58, 116, 117), and in civilian practice (23, 32, 106). In psychiatric practice, the purpose of these drugs is to effect a violent emotional response which may have cathartic value for the patient. In the hands of some psychiatrists (117), the emotional reliving enhanced by the drug is not considered necessarily related to a real experience. In order to bring about a high degree of excitement, Sargant (117) has recommended putting the patient back into a past which has been modified by the therapist's invention. In his drugged

state the patient accepts a false version of the facts as if it were the truth, and experiences the appropriate emotional response.

Sodium amytal has been found helpful in determining whether or not a subject is feigning ignorance of the English language (96). It is reported that familiarity with a language will show up under the influence of intravenous barbiturates.

Kelley et al. (74) reported that more reliable estimations of intelligence are frequently possible under amytal. They also found that patients under sodium amytal injection gave a greater number of Rorschach responses and fewer rejections of cards. This made diagnoses possible in cases previously considered unreachable. The responses were found to be qualitatively less bizarre and stereotyped, permitting more nuances in personality descriptions.

Brickner (22) has recorded many interviews of patients receiving deep narcosis therapy with barbiturates. The detailed analyses of the verbal productions of these patients have indicated certain typical peculiarities worthy of mention in this review. If they are present, obtained information should be discounted as factual data, although they certainly may reveal in an indirect way some of the gamut of life experiences of the interviewee. Brickner noted the processes of "fractionation" and "recombination" in the verbal productions of patients under deep amytal narcosis. These processes were

operative not only at the level of words and word elements, prefixes and suffixes, but also at the level of phrases and clauses, ideas and concepts. The fractionation and recombination manifested itself in the juxtaposition of word fragments, phrases, and concepts which are not ordinarily brought together and in which the connection was often illogical. Brickner believed that this drug process is a caricature of the waking process of comparing new stimuli, percepts, and concepts with others, new and old. He believes that this process of comparison has survival value and is built into human neural structure.

Sodium amytal injections have not been useful in alleviating aphasic speech defects, secondary to cerebral insult (17, 108).

Although the detection and study of such phenomena are of basic research interest to the investigator studying the neuro physiologic correlates of psychologic processes, the decoding of such verbal material by any interrogator seeking factual information is likely to present a very difficult problem. It is probably such phenomena which Gerson and Victoroff (53) observed in their interviews of criminal suspects under barbiturates and which they found to be one of the obstacles to assessing the validity of their informants' verbal productions.

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In summarizing the specific effects of barbiturates as facilitants in interviewing, the references already presented and the work of others (32, 101) indicate that, with some exceptions, the following effects on behavior may be expected from the administration of barbiturates to human subjects: (a) decreased attention to stimuli; (b) warmer and more appropriate mood; (c) decreased anxiety; (d) increased contact and communication; (e) reduction of psychotic manifestation.

Nonbarbiturate Sedatives and Calmatives

An increasing variety of nonbarbiturate sedatives have been compounded in recent years. Although they are in wide use, no experimental studies have compared these drugs to the barbiturates as adjuncts to interviewing individuals, either to relieve emotional disturbances or to obtain consciously withheld information.

A list of the chemical and trade name of some of these drugs may be worth including as an illustration of their variety and for heuristic purposes: ethchlorvynol (placidyl), glutethimide (doriden), methyprylon (noludar), methylparafynol (dormison), captodramin (suvren), oxanamide (quiactin).

Stimulants and Antidepressives

Amphetamine and its Derivatives

A drug that has been used to a fair extent in pharmacologic therapy, but not, as far as is known, in interrogation work is amphetamine (benzedrine) and a similar drug, methamphetamine.

Administered intravenously to nonpsychotic individuals, researchers have found amphetamine to produce a "push": an outpouring of ideas, emotions, memories, etc. (24, 31, 37, 39, 73, 90). It is of diagnostic help with psychiatric cases by itself (24, 49, 90, 95, 121), or following an intravenous barbiturate (37, 39, 70, 113). It is widely marketed and used in combination with a barbiturate as a mild stimulant drug for patients having neuroses and neurotic character problems.

Brussel et al. (24) claim that methamphetamine hydrochloride is useful in the interrogation of the psychopath who feigns amnesia or withholds vital information which he covers with lies or cautiously alters as he shrewdly weighs his words. These authors claim, perhaps extravagantly, that such a psychopath is powerless under the influence of methamphetamine. Once the drug takes effect, they hold, the tempo of productivity and the insurmountable urge to pour out

speech gives the liar no time to think. They also claim that functional aphasics can be expected to recover their speech under the influence of intravenous methamphetamine.

It should be noted again that amphetamine and its derivatives are among the main drugs that have been employed in well-designed and controlled studies, showing that the effects of drugs are variable and influenced by personality differences (83, 84, 126).

Pipradrol

Pipradrol (meratran) is another drug of the stimulant type which increases not only psychological activity but motor activity as well. In reaction to the "inner push" of ideas, emotions, and speech, some normal subjects report mild euphoria, but others report tension and displeasure. The occurrence of the predominant pharmacologic effects of this drug depends to some extent on the typical personality of the subject (57). Like amphetamine, pipradrol in single, small doses improves the performance of normal subjects in tracking tests (107). It has an advantage over amphetamine in having fewer undesirable side effects, particularly on the cardiovascular system.

This drug has been used in the treatment of patients with "simple depressions" (3, 44, 120). Pharmacologic effects are noticeable in mentally ill patients, but more than a transient therapeutic effect has not been established. No studies are reported on the use of this pharmacologic agent for psychotherapeutic or interview purposes.

Methyl-Phenidylacetate (Ritalin)

Phenidylate (ritalin) is another one of the newer compounds having analeptic effects, such as producing arousal and elevation of mood and increasing the rate of communication. In psychiatric practice this drug has been reported to exert beneficial effects on psychotic patients receiving reserpine (a rauwolfia tranquilizer), which sometimes induces manifest depressive reactions in patients as a side effect (45). But a double-blind, placebo-controlled study has not found ritalin to be of any benefit in chronic schizophrenia (29). The analeptic effects of this drug are well established. The utility for interrogation purposes of the analeptic properties of this drug, as compared to those of other stimulants, such as amphetamine, cannot be evaluated from existing information.

Iproniazid (Marsilid)

Iproniazid is another antidepressive drug. Its analeptic features were first noted in chronic debilitated tuberculous patients who were

receiving the drug as part of an experimental chemotherapeutic regimen (35). It has been said to improve the performance of normal individuals, enabling them to work more energetically and more effectively, and to need less sleep. Iproniazid has been used in the treatment of mental depression (97) with encouraging results. Definitive well-controlled studies, however, have been reported for neither normal subjects nor mentally ill patients. Several instances of fatal toxic hepatitis have occurred when doses over 150 mg a day were given. Nevertheless, the advent of drugs of such a presumably powerful therapeutic effect in depression, owing either to psychologic conflicts or secondary to chronic somatic illness, opens up further areas of exploration of relevance to the present topic.

Hallucinogenic or Psychotomimetic Drugs

It has been common knowledge for centuries that many drugs may modify the behavior of man to the extent of producing psychotic behavior. Hoch et al. (66) have pointed out that acute and chronic psychosis of the toxic type can be produced in susceptible individuals by central nervous system depressants (barbiturates, bromides);

central nervous system stimulants (amphetamine, caffeine); analgesics (acetylsalicylic acid, acetanilid); autonomic activators and blockers (atropine, scopolaniine); local anesthetics (cocaine, novacaine); antimalarials (quinine, atabrine); oxytocics (ergot alkaloids); heavy metals (lead, mercury, arsenic); hormones (thyroid, cortisone, ACTH); gases, including low and high oxygen concentration in the inhaled air, and even water in toxic amounts. The interests of psychiatrists in these phenomena have stemmed largely from the supposed resemblance of these psychoses to schizophrenia, because of the time-honored, though as yet unproven, hypotheses (11) that schizophrenia is due to a "toxin." Since Wikler (131) has recently reviewed the literature on this subject critically it will not be done here. Two psychotomimetic drugs are discussed briefly here as examples, from the viewpoint of their psychopharmacologic effects and their possible pertinence to interrogation procedures.

Mescaline

Mention was made earlier of an alleged use of mescaline against concentration camp inmates by German interrogators (112, page 15).

Mescaline has also been studied as a potential diagnostic and therapeutic adjunct with psychiatric patients. Cattell (27) found mescaline to be a useful drug in investigating personality structure,

but of no value in the therapy of psychiatric patients. He studied fiftynine patients, seventeen with pseudo-neurotic schizophrenia (Group I), twenty-six with overt schizophrenia but without deterioration (Group II), and sixteen deteriorated schizophrenics (Group III). New psychodynamic material was gained from the first two groups, but relatively little from the last group. Cattell reasoned that the new material obtained in the mescaline state had been condensed and repressed in the drug-free state. Mescaline in general (63, 65, 66, 110) has been found to produce perceptual distortions and hallucinations, accentuation of affective experiences, and increased psychotic manifestations. In some patients contact and communication were increased and in others decreased. Denber and Merlis (40, 41) using 0.5 gm of mescaline in water intravenously on both psychoneurotic and psychotic patients claimed that mescaline induced the production of suppressed and repressed sexual and aggressive conflicts, with a predominance of emotional rather than ideational reactions.

Hoch (63) noted that mescaline in "normals" produced more of an "organic reaction" with some schizophrenic features, as compared to its effect in schizophrenics and latent schizophrenics where mescaline produced more complete schizophrenic

disorganization. Hoch also emphasized that mescaline produced a falling off in intellectual functioning.

These articles are typical of the reports on the psychopharmacologic effects of mescaline. When interrogators extrapolate clinical psychiatric observations of this kind to the problems of interrogation, mescaline might serve their purposes in attempting to create an atmosphere of fear or terror in the informant and the illusion of magical overpowering omnipotence about himself. After such a transient state has been created, the susceptible informant might be induced subsequently to reveal information. The perceptual and cognitive disturbances produced by the drug make it unsuitable for obtaining undistorted information while the source is under its influence. From the viewpoint of the informant, the creation of a transient psychotic state by the ingestion of mescaline or lysergic acid might offer him some temporary protection against being successfully interrogated. An interrogator is not likely to consider an individual in a psychotic state a suitable candidate for providing reliable and useful information, at least until the drug effect wears off.

Lysergic Acid (LSD)

Lysergic acid (d-lysergic acid diethylamide tartrate) has been studied recently as a drug which might contribute additional knowledge about

the mechanisms and treatment of mental disease in general and schizophrenia in particular.

Busch and Johnson (26) gave 30 to 40 gamma of LSD-25 to twentyone chronic psychotic patients (mostly schizophrenics) and later to some psyclioneurotic patients. They noted that the drug transiently increased the mental activity of their patients 30 to 60 rain after ingestion. The effect was a transitory toxic state in which repressed material came forth "sometimes with vivid realism" and emotional expression. Busch and Johnson thought that LSD might be useful as an adjuvant in psychotherapy.

Deshon et al. (42) studied the effect of the ingestion of 1 gamma per kg body weight of LSD on fifteen normal volunteers. Alterations were observed in thinking, speech, emotions, mood, sensation, time perception, ideation, and neurologic signs. The reaction lasted 12 to 16 hr in most cases, but several days in one case. The reaction was typical of an exogenous toxic state, simulating a schizophrenic reaction. The reaction was not specific and the extent to which it was dependent on the basic personality was not determined.

Bercel et al. (16) studied the relation between the type of LSD psychosis produced in normals and of the Rorschach Test findings of the subjects. They could not predict the type of psychotic reactions from the pre-LSD Rorschach, but they could often say from the Rorschach records which normal subjects would show psychotic symptoms.

Abramson et al. (1, 2) found, after administering large doses of LSD-25, that intellectual functioning, as measured by a battery of tests, was disturbed in many spheres. In another study, Levine et al. (89) showed that Rorschach Test scores were altered in the direction of a more psychotic picture.

Davies and Davies (36) treated sixteen mental defectives with LSD-25 in dosages of 20 to 400 gamma in water for as many as twenty-six treatments in three months. Seven patients became more talkative and cooperative. Their "memories were stimulated," but emotional reactions were limited. No lasting benefits were observed. An interesting, unexplained phenomenon was that only two out of the sixteen cases had the expected bizarre hallucinatory experiences.

There are many other reports of experimental and clinical studies employing LSD-25, but those reported here are fairly representative. There is enough given here to suggest the possible applications of LSD to interrogation techniques. It is apparent that this drug impairs perceptual and intellectual functioning. The conclusions reached on mescaline hold equally for the possible applications of this drug to

interrogation. As a tool in the advancement of knowledge of psychopharmacology, LSD-25 is a drug on which clinical and experimental research is likely to continue.

Major Tranquilizers

Recently a large number of new compounds with sedative and anxiety-relieving properties have been introduced, sufficiently different from the classical sedatives, such as paraldehyde, chloral hydrate, barbiturates and bromides, to warrant using new terms to describe them. These compounds are referred to as "tranquilizers" or "ataraxics." They have been investigated clinically on an unprecedented scale in the treatment of psychiatric disorders, particularly the psychoses, and to a lesser extent in the psychoneuroses. The use of these drugs has revolutionized psychiatric therapeutic procedures, especially within the mental hospitals. A thorough review of their effects and mechanism of action in mental illness would be out of place here. Unfortunately, the usefulness of these tranquilizers in exploring psychologic processes and in facilitating communication has not been very extensively tested. Their applicability to interrogation procedures is still speculative. Yet, for the sake of completeness, and to indicate the

directions further research might take, the psychologic actions of these drugs deserve mention.

Phenothiazine Derivatives

Among the phenothiazine derivatives now in medical use are: chlorpromazine (thorazine), mepazine (pacatal), perhenazine (trilafon), proclorperazine (compazine), promazine (sparine), thiopropazate (dartal), and triflupromazine (vesprin). Of these, chlorpromazine has been most widely used and investigated at this time. Therefore, the psychopharmacologic actions of only this compound are discussed here.

Chlorpromazine (thorazine) . Delay and his associates (38) appear to have been the first to explore chlorpromazine in the treatment of mental illness. They found that the effects of chlorpromazine in patients with manic psychoses were somnolence, decreased responses to external and internal stimuli, pleasant indifference, and decreased spontaneity of speech. Subsequent reports (5, 20, 28, 32, 75, 81, 87, 88, 134) have been in agreement that chlorpromazine is effective in quieting or abolishing severe agitation and psychomotor excitement, whether of manic-depressive, schizophrenic, or toxic origin. Most of these reports agree that the basic disorder in these conditions is not

altered by the drug. In the psychoneuroses, chlorpromazine was reported (52, 80) to decrease anxiety and tension temporarily, but to have no specific ameliorative effects on conversion symptoms, obsession, piaobia, depression, or physical pain. A recent, controlled investigation (123) on the effect of chlorpromazine on the communication processes of psychiatric patients has indicated no specific facilitating effect. In normal subjects, the effect of 10 mg of proclorperazine (a phenothiazine derivative) was compared with that of 10 mg of phenobarbital. No specific differences were found on tests of mental performance, hearing, and pain perception, although a decrement in muscular coordination and efficiency occurred under proclorperazine (14).

Other phenothiazine derivatives are being extensively investigated at this time in psychiatric practice with the hope of finding one with equal or better therapeutic effects and fewer of the side effects of chlorpromazine, such as Parkinsonism, obstructive jaundice, dermatitis, tachycardia, etc.

There are no reports of the use of the phenothiazine derivatives in interrogation and no evidence to support the thesis that these drugs might be of avail to an interrogator's work, except perhaps with excited and agitated informants who might be encouraged to report material in exchange for peace of mind. On the other hand, such drugs might help a harried informant to keep his knowledge to himself

Rauwolfia Alkaloids

The principal rauwolfia alkaloids being used in psychiatric practice are reserpine (serpasil), deserpidine (harmonyl), and rescinnamine (moderil). Of these, reserpine has been most thoroughly studied. Its actions are discussed here as representative of the group.

Reserpine (serpasil). Reserpine, believed to be the most active of the rauwolfia alkaloids, was identified by Müller et al. (105), and its sedative and antihypertensive effects were noted in animals by Bein (10). Initially the drug was used in the United States for treating high blood pressure (133). From such experiences it was noted that reserpine produced a state of calmness without significant impairment of sensory acuity, muscular coordination, and alertness. The effects of single doses of reserpine (2.5 to 10.0 mg intramuscularly) were found (98) to be more marked in patients exhibiting high levels of psychomotor activity, regardless of the clinical psychiatric diagnosis. Repeated doses of reserpine over long periods of time reduced or

abolished hyperactivity, combativeness, destructiveness, insomnia, flight of ideas, etc., in the majority of disturbed psychiatric patients, regardless of clinical diagnosis (4, 6, 47, 51, 68, 76).

The tranquilizing action of reserpine and chlorpromazine appears to be quite similar. This similarity extends to some of the side effects, such as miosis, lowering of blood pressure and body temperature, increase in appetite, nasal congestion, and Parkinson syndrome. Although certain differences in side effects do occur, they do not require our attention here.

The literature on the effectiveness of reserpine and chlorpromazine as aids to individual (119) and group (34) psychotherapy is extensive. Whereas there is agreement that the drugs lower anxiety and tension, there are such notable differences of opinion about the aims of psychotherapy and about what constitutes psychotherapy that no definite statement can be made regarding this point. If the reviewer were to add his voice to the disharmonious chorus of viewpoints on this subject, he would, on the basis of impressionistic evaluations only, say that the tranquilizers are of some aid in the psychotherapy of those patients who are so agitated, anxious, and hyperactive that they cannot sit still very long for psychotherapy. However, working out the finer nuances of emotional conflicts of a patient in psychotherapy is precluded when the patient is regularly taking a tranquilizer, because the patient appears to become too insulated against emotional reactions to realize or care that he is responding with feeling in some pertinent way.

As with the phenothiazine derivatives, the place of the rauwolfia alkaloids in the potential armamentarium of the interrogation has not been established. There are no relevant articles on this matter. Speculatively, the tranquilizers might be of avail in selected informants who are highly agitated and disturbed, and who might yield information in return for the relaxation they experience with such a sedative. On the other hand, less emotionally disturbed informants might strengthen their resolve to retain information under a tranquilizer. The only way to decide this problem is by experiment. Furthermore, tranquilizers in moderate dosage do not notably impair intellectual and sensory functioning. Therefore, their use probably does not contribute to the distortion of factual information produced.

Addiction

The dependence of the drug addict on the supplier of drugs has figured in speculations regarding the use of drugs to control behavior.

Such speculations assume that the need of an addict for a drug is so strong as to override many other values, including strong social proscriptions when these conflict with the satisfaction of drug-created needs.

The writer is unaware of any actual or alleged utilizations of drugs in this manner for the purposes of interrogation.

One of the cardinal criteria of addiction is the occurrence of severe reactions when the drug is withdrawn. Withdrawal syndromes occur with opiates, barbiturates, and, recently, an animal study has made this claim for meprobamates (43). Beyond a minimal dosage and time period, the continuous usage of these drugs produces addiction in almost everyone (72). No demonstrable impairment of cognitive or psychomotor functions has been identified in subjects operating under the maintenance dosage to which they are habituated.

Under most of the opiates, the subject is likely to show a keen awareness of a limited segment of reality, a decrease in spontaneity and creativity, a decrease in suggestibility, and an increase in rigidity and compartmentalization of thinking. As with other drugs, the reaction varies widely from individual to individual 50, 131).

Information contributed by an addicted source is naturally suspect, since many addicts have gone to great length, fabrication of information being the least of them, to maintain their drug supplies. If a source became addicted as a sequel to the treatment of injuries, the ability of the interrogator to give or withhold the drug would give him a

powerful hold on the source. It appears unlikely that this weapon is so unique as to lead an interrogator to create addiction deliberately. An interrogator who would be willing to produce addiction would not hesitate to employ more reliable and instantly effective means for inducing results as unpleasant as withdrawal symptoms. Since the initial reactions of most subjects to drugs of addiction are unpleasant, these drugs would not appear to have a role as positive motivators, except for subjects experiencing pain.

Counteracting Drug Effects

When the effects of a drug are not consonant with the subject's wishes, the extent to which the subject can successfully counteract these effects without the aid of other drugs becomes an important problem. Inasmuch as this is an unusual condition, little or no empirical information is available. Yet, it may be worthwhile to indulge in some speculation.

If the subject marshals his efforts to fight a drug, one may surmise that he has become alarmed about its effects on him, and that this alarm most likely is in the form of anxiety over losing control. Other instances of this type of anxiety in neuroses, psychoses, and cerebral insult have demonstrated that it feeds on itself. Specifically, the anxiety increases in something like a geometric progression whenever the source of concern is put to the test and adequate control is indeed found to be wanting, with the mounting anxiety itself contributing to further loss of control. Some persons more than others habitually use the mechanism of control and might presumably attempt to do so in this situation.

Small to moderate doses, although affecting the subject, might not alarm him, since the drug effects may be within the range of his ordinary experiences, and since none of the functions which form the basis for his sense of control may have been seriously impaired. Because it is difficult for most persons to succeed in their efforts to relax, the main resultant of any effort presumably is anxiety and arousal. If this is so, the effect of stimulants would be intensified, whereas the effect of sedatives might be counterbalanced to some extent. Here, the question of how massive a dosage of a sedative the subject could counteract would need to be considered. The phenothiazine tranquilizers might be expected to produce a sufficient lack of concern in the subject to prevent his attempting to undo their effect, or, more directly, preclude a state of arousal.

All these speculations deserve careful experimental study.

Summary and Conclusions

Nature of Reviewed Studies

A distinction has been made between interviews carried out for psychotherapy and those to obtain factual information. Although there has been considerable speculation regarding the possible use of drugs for the latter purposes, open publications of serious research dealing directly with such cases are scant. The paucity of reported studies on the matter has obliged the reviewer to include related published material of psychopharmacologic studies. When extrapolations are made from published material of this sort, they are presented as hypotheses, and in every instance require testing and validation.

Drug Research that May Produce Knowledge Applicable to Interrogation

Apart from any applied research that governments may sponsor for improving interrogation or for aiding their own personnel to resist interrogation, the pursuit of various current scientific and medical interests will doubtless result in developing knowledge of drug action applicable to interrogation. The interest of scientists in employing drugs in research transcends an interest in drug effects, per se. Drugs constitute valuable tools for experimentation directed toward developing basic physiologic and psychologic knowledge, such as the study of neurophysiologic correlates of symbolic and psychodynamic processes. Work by scientists in such areas is also likely to increase knowledge of drugs which may be applicable to interrogation.

Methodologic Problems in Determining the Applicability of Drugs to Interrogation Procedures

A large initial section of this report is devoted to a survey and discussion of the nonspecific effects of drugs and to the difficulties involved in discriminating these effects from the pharmacologic effects of the drugs used. The time spent in describing some of these nonspecific factors is needed to illustrate how the many variables involved complicate the problem of making a judgment regarding the present or potential usefulness of a drug for either therapeutic or intelligence purposes. This section has been included to point out some of the problems which require consideration in designing well-controlled studies in this area. The complexity inherent in psychopharmacologic research requires the integration of all levels of research on drug action: biochemical, neurophysiological and psychological. These problems are multiplied and prediction is lessened when the actions of drugs on living human beings are considered, rather than

on isolated nerves, tissues, or animals of simpler neural structure. This reviewer has included only very few bibliographical references to work with animals, and yet a significant portion of excellent experimental, psychologic studies involve animals. This relative omission can be explained by the problem being one unique to human beings: the use of language symbols to communicate and interact with other human beings.

A review of the literature illustrates a variety of effects produced by pharmacologically inert substances which simulate medication

(placebos). Depending on the personality of the subject and the circumstances under which the placebo is administered, 30 to 50 per cent of individuals show or experience a reaction. Well-designed studies can distinguish the pharmacologic effect of a drug from the placebo effect. The possibility is raised that an interrogator might exploit the "placebo phenomenon" with a susceptible subject, instead of employing a pharmacologically active drug.

An examination of the literature demonstrates that the effects of drugs vary with the attitude and motivation of the person administering the medication and the person interviewing the informant. The sex and intelligence of the subject, the presence of mental or physical illness, the occurrence of biologic rhythms (e.g., mensis), state of nutrition (e.g., fasting or nonfasting), degree of fatigue, and experimental or enforced isolation have been found to affect the capacity to react and the reaction of individuals to testing procedures, with or without drugs. The method of sampling the verbal behavior of an individual under the influence of a drug, directive, nondirective, free-associative, etc., also determines the kinds of reactions observed. For these reasons, it is recommended that a variety of sampling methods be used in experimental studies.

The Efficacy of Drugs in Uncovering Information

When one examines the literature for experimental and clinical studies that bear directly on the use of drugs in interrogation procedures, one finds relatively few studies. Reports dealing with the validity of material extracted from reluctant informants, whether criminal suspects or experimental subjects, indicate that there is no "truth serum" which can force every informant to report all the information he has. Experimental and clinical evidence indicate that not only the inveterate criminal psychopath may lie or distort under the influence of a drug, but the relatively normal individual may, with many drugs, successfully disguise factual data. Less well-adjusted individuals, plagued by guilt and depression, or suggestible individuals, who are compliant and easily swayed, are more likely to make slips revealing withheld information. Even they may, at times, unconsciously distort information and present

fantasies as facts. The anesthetic action of the drug, as in narcosis with barbiturates, can interfere with cerebral functioning and promote the presentation of fantasy material as fact, or otherwise alter the form of verbalizations to render them relatively unintelligible. It would be very difficult under these circumstances for an interrogator to tell when the verbal

content was turning from fact to fantasy, when the informant was simulating deep narcosis but actually falsifying, which of contrary stories told under narcosis was true, and when a lack of crucial information coining from a subject under a drug meant the informant had none to offer. To derive useful information from an interrogation in which drugs are employed, an interrogator would have to consider and weigh many important factors: the personality of the subject, the milieu, other sources of evidence, the rapport obtained, and the skill of the questioning. These and other factors affect the validity of information obtained from an informant under sedation. Analogous considerations apply to stimulants.

Specific Effects of Drugs in Interrogation Situations

Advantages and limitations of a number of different types of pharmacologic agents as adjuncts to interrogation can be examined by reviewing clinical and experimental data from the works of psychiatrists, neurologists, psychologists, physiologists, and pharmacologists.

Barbiturates tend to increase contact and communication, decrease attention, decrease anxiety, decrease psychotic manifestations, and make the mood more appropriate and warmer. When combined with interview techniques that aim at arousing emotions, strong emotional reactions may be catalyzed for psychotherapeutic purposes. Barbiturates have been found helpful in detecting whether an individual is feigning knowledge of the English language and in getting mute catatonic schizophrenics and hysterical aphasics to talk. They are of no avail, however, in remedying the speech defects of true aphasics, even transiently. The use of barbiturates has helped to get more reliable estimates of intelligence and personality through psychological tests, particularly in emotionally upset individuals.

The use of various stimulant and antidepressive drugs has been explored, for diagnostic and therapeutic purposes in psychiatric practice, but not to any extent for interrogation. Amphetamine, pipradrol, methylphenidylacetate have in common the capacity to produce an outpouring of ideas, emotions, and memories. An injection of amphetamine following an intravenous barbiturate is said to provoke a striking onrush of talking and activity from psychiatric patients. Without adequately controlling his study,

one author claims that methamphetamine produces such a strong urge to talk that the criminal who feigns amnesia or withholds vital information cannot control himself and thus gives himself away. Iproniazid, an antidepressive drug which is relatively slow and sometimes dramatic in its thera-

peutic effect, should be considered for experimentation. This drug, and similar, less toxic analogs which are being developed, might be considered for use in special instances. For example, informants suffering from chronic depression, whether due primarily to emotional factors, situational stress, or physical debilitation, might become very responsive after using a medication of this type. As a class, the stimulants probably present the most obvious exploitative potential for an interrogator.

The psychotomimetic and hallucinogenic drugs, mescaline and LSD-25, have been used largely to study the nature of psychotic conditions and, in a minor way, as an adjuvant in psychotherapy. The use of such drugs by an interrogator would tend to produce a state of anxiety or terror in most subjects, and promote perceptual distortions and psychotic disorientation. Their use could constitute a definite threat to most medically unsophisticated subjects, i.e., the threat of making the subject "crazy." Thus, they emphasize the unrestricted control of the source by the interrogator. When the subject is not under the influence of such drugs, vital information might be extracted as a price for ceasing further medication. An enlightened informant would not have to feel threatened, for the effect of these hallucinogenic agents is transient in normal individuals. The information given during the psychotic drug state would be difficult to assess, for it may be unrealistic and bizarre. On the other hand, from the informant's viewpoint, taking LSD-25, secreted on his person (it is effective in minute dosage), might offer him temporary protection against interrogation, for it is not likely that an interrogator would consider an individual in a psychotic state a reliable source.

The introduction of new drugs like tranquilizers that sedate but do not impair intellectual functioning in moderate dosage (e.g., phenothiazine derivatives and rauwolfia alkaloids) has caused a minor revolution in the psychiatric therapies of agitated psychotic conditions regardless of type or etiology. There is a possibility that these tranquilizers might be of use with selected informants who are highly agitated and disturbed, and who might give information they prefer to withhold in return for the tranquility they experience with such a sedative. Under the influence of this drug, the less emotionally upset informant might find that he can better master his anxieties and keep his resolve to remain silent. These are all speculations which require testing and experimentation.

Addiction is an added vulnerability to influence. The ability of the subject to give information is not notably affected by a mainte-

nance dosage. The motivational effects of obtaining drug supplies, while extreme, are not of a different order for most subjects than those which the interrogator could produce by other more rapid means. The exploitation of addiction probably constitutes a threat to persons previously addicted, or to those who become addicted in the captivity situation as a sequel to other aspects of their treatment, rather than through the deliberate creation of addiction for exploitative purposes.

Another use to which interrogators might put drugs and placebos would involve their ability to absolve the subject of responsibility for his acts. The popular meaning of being "drugged" or "doped" implies that an individual in this state has lost control over his actions and that society will not hold him responsible for them. When the transmittal of information is likely to induce guilt in the source, the interviewer can forestall some of this reaction by the administration of a placebo or drug. In some cases, this will be all that is require4l to remove the barrier to information transmittal. In the avoidance-avoidance conflict between the source's guilt over yielding information and his anxieties over the possible consequences of noncooperation, the "inescapable" power of the drug or placebo serves to justify the source's actions to himself.

What are the over-all conclusions that can be drawn from this review and critical analysis of the use of pharmacologic agents in obtaining information? Are pharmacologic agents of any value to the interrogator in eliciting vital information? The answer is that drugs can operate as positive catalysts to productive interrogation. Combined with the many other stresses in captivity that an individual may be obliged to undergo, drugs can add to the factors aimed at weakening the resistance of the potential informant. However, for many reasons, the use of drugs by an interrogator is not certain to produce valid results. The effects of drugs depend to a large extent on the personality make-up and physical status of the informant and the kind of rapport that the interrogator is able to establish with him. Knowing the pharmacologic actions of a number of drugs, an interrogating team might choose that chemical agent which is most likely to be effective in view of the informant's personality, physical status, and the various stressful experiences he has already undergone. Even under the most favorable circumstances, the information obtained could be contaminated by fantasy, distortion, and untruth, especially when hallucinogenic or sedative drugs are employed.

Are there ways in which the informant can resist revealing vital information under interrogation with drugs? The answer is yes.

Means are available to the informant faced with the prospect of being given a drug to loosen his tongue. The informant should know that a drug of itself cannot force him to tell the truth, although it may make him talkative, overemotional, mentally confused, or sleepy. He should also know that the effects of drugs are quite variable from individual to individual, and that those who may use drugs against him cannot predict with certainty what effects will occur in his particular case. To a victim of such attempts the imperfect predictability of many of the direct effects and side effects of any drug offers many opportunities for simulation. It is likely that most nonfatal drugs will have a transient, time-limited action rather than a permanent one. There is no need for the informant to become panicky at any bizarre or uncomfortable reactions he may experience, for these reactions will probably disappear. Instead of passively accepting the administration of a drug, without challenging the interrogator's right to apply such pressure, the informant should effectively delay it, and thus stall a possibly stressful interrogation under a drug. Finally, since the interrogator wants accurate and factual information, the informant can confound the interrogator as to what is fact and fiction by a number of means. He can simulate drowsiness, confusion, and disorientation early during the administration of the drug. He can revel in fantasies; the more lurid the better. He can tell contradictory stories. He can simulate a psychosis; or, if he cares to go so far, he can even induce a transient psychotic state by ingesting a small amount of LSD secreted on his person. By these devices, he can raise serious doubts in the interrogator's mind as to the reliability of the information given by him.

As a final suggestion, this reviewer is inclined to agree with West (130) that the basic training of military personnel can be helpful in developing techniques of resistance to interrogation. A brief course on the limitations of the use of drugs in interrogation and on the kinds of pharmacologic effects to be expected from the different types of drugs would be helpful. Such training could decrease the fear, hypersuggestibility, and other deleterious reactions that evolve from the uncertain, the unpredictable, and the unknown.

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CHAPTER 4

Physiological Responses As a Means of Evaluating Information

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To almost any stimulus from outside the body responds with widespread changes in its physiologic functioning. Many of the changes are invisible and unknown to the person himself. In some situations, these changes have been found to be valuable for indications of the degree of credence which should be given to a person's statements. This chapter reviews the responses available for such interpretations, the validity of the method, and possible improvements and extensions of its use which may occur in the future.

The use of physiologic responses in police interrogation has become commonplace. Such practices, long based on supernatural principles, have in fact been used since ancient times (35). As long ago as the eighteenth century Daniel Defoe proposed a test of this sort with a scientific rationale (31). Actual experiment on physiologic tests of deception seems to have begun with psychologists in Germany early in the century, with Benussi (2), an Italian with German training, offering the most extensive and promising results. Benussi used breathing changes as his principal criterion. A few years later Marston (29) and Larson (23), on the basis of certain experimental work, reported success with systolic blood pressure changes. These two physiologic variables have been the core of commercial "lie detectors" ever since, with the addition of the galvanic skin response following the work of Summers (33, 34) in the 1930's.

Under a contract with the Office of Naval Research, which was

also supported by the other services, a group at Indiana University undertook a comparison of variables and combinations of variables that was reported in 1952 (17). Meanwhile the use of the "standard" methods has spread widely as an applied art with a certain body of tradition. (Lee (26) gives an account of current practices.) Controlled experiments, however, on which to base actual practice have too often been lacking. An

excellent survey of the current status of the field has recently been provided by Ferracuti (18) in Italian.

The present survey will be organized into the following topics: (a) Evaluation of present practices. (b) Response variables and instrumentation. (c) Interrogation procedures. (d) Data interpretation and operator's decisions. (e) Psychological principles of lie detection.

Evaluation of Present Practices

We may consider "current practices" en masse and ask how effective these have been. This problem is considered by Inbau (20), apparently by comparing "lie detector" results with jury verdicts and confessions. The agreement between detection and the criterion for various sets of data is about 70 per cent, with 20 per cent of the cases discarded as ambiguous.

This figure must be compared, of course, with some percentage of success to be expected by chance. If every case were treated independently, the percentage of success would be 50 per cent. It is, however, common practice to examine a group of suspected persons, of whom it is known that only one is guilty. If the operator then selects one from the group as guilty, his chances of being correct by sheer luck are less than 50 per cent. If, on the other hand, an operator knows, in a particular situation, that most of the examinees sent him are later judged guilty, his "percentage of success by chance" could be much higher.

It would be difficult to analyze field results in greater detail than in Inbau's review (20). The jury decision is an imperfect criterion, of course, and may not be independent of the lie detector results since a prosecutor might be inclined to bring to trial more cases in which the lie detector results were clear. If the test has been used widely for screening, as it is reported to be, many suspects with negative finding on the instrument would not be brought to court. Most of these would be true negatives, and the percentage of success might actually be higher if they were included. The percentage obtained will depend clearly on the group from which it is derived. Further-

more, there is no telling exactly what procedures are used by various examining officers nor just what in the instrument records (or possibly aside from them) influences the judgment as to whether the lie detector test indicates guilt. For determining which methods and conditions give the most valid results, and whether improvement is actually possible, we must turn to experimental comparisons. This experimental

knowledge of factors which are likely to influence the outcome could then be used in future attempts to evaluate uses in the practical situation.

The en masse result leads to the conclusion that psychological methods of detection in the criminal interrogation situations do provide information although the amount is uncertain, and the present problem confronting users is to maximize the information.

Laboratory experiments (17, 23, 33) have generally reported greater percentages of successful detection than the figure given by Inbau for field results. He is, however, skeptical of results obtained from these laboratory experiments. The situations are different in many wayssome of the differences tending to favor the laboratory, some the field situation. Although the severity of consequences in the laboratory is much less, the lying is also likely to be of a simpler sort and conditions better controlled. With some of the very high percentages reported for the laboratory studies, there is some question that the criterion may be adjusted to maximize success on one particular set of data and thus cannot be expected to have general application.

Response Variables and Instrumentation

At present instruments may be classed into three groups: (a) the traditional ones which have both laboratory and field use; (b) those which have been tried in the laboratory, in some cases incompletely; and (c) those which have possible value but have not been tested for lie detection.

In the first group the variables are breathing, blood pressure, and galvanic skin response.

Indices with Field and Laboratory Tests

Breathing

Although this variable was the first put to experimental test (2), the particular feature, the *I/E* ratio, or time of inspiration divided

by time of expiration, seems to have dropped out of sight in practice. Benussi's experimental report was that during lying the *I/E* ratio is increased because of a change in the form of the breathing curve. It is easy to see why the ratio has been neglected in practical work, for it is laborious to compute and the determining points in the breathing

cycle are difficult to distinguish, especially in a record taken at the usual slow speed. In the "Indiana study an attempt to evaluate it was abandoned because measurements were so unreliable. Common practice seems to be to regard any marked disturbtnce of breathing as indicative of deception (24).

The technique of recording the breathing rhythm is rather simple. The common pneumatic system is open to criticism because of the nonproportionality introduced by the compressibility of air, the general inconvenience of keeping the system free from leaks, and the awkward readjustment when S throws the recorder off scale by a movement. A simple electrical pickup and recording system can be substituted (17).

The Indiana study considered two aspects of respiration: amplitude and breathing cycle time (the inverse of rate). In amplitude the response in truth telling was an increase, with the maximum 5 to 10 sec after he delivery of a question. In lying the mean response was also an increase, but in a lesser amount. The fact that a smaller increase in amplitude typically indicates deception requires an operator to make a sort of inverted interpretation on this point. Breathing cycle time increased in both conditions, but more in lying. Thus breathing during deception is shallower and slower than in truth telling. These facts are confirmed by the agreement of the two groups. There seems to be much better discrimination between the two conditions when these measures are used in a long series of questions; i.e., they discriminate poorly at first as compared to other measures, but in the long run are among the best discriminators. It may be that breathing in the early part of a series is made irregular by a reaction to the general situation. After some adaptation it becomes possible to compare the responses to questions in purer form. According to some later work (8) the inhibition of breathing seems rather characteristic of anticipation of a stimulus.

One drawback in the use of respiration as an indicator is its susceptibility to voluntary control. If an S wished to produce a confused record he could probably do so by alternating over and under breathing, if he could keep up this or another program in the face of questions. But this drawback is not present in breathing alone. If an examinee knows that changes in breathing will disturb all

physiologic variables under control of the autonomic division of the nervous system, and possibly even some others, a certain amount of cooperation or a certain degree of ignorance is required for lie detection by physiologic methods to work. Respiration, therefore, on balance in the present state of knowledge seems to be one of the better measures.

Blood Pressure

The systolic blood pressure was first used as a deception indicator by Marston (29) and the method in common use is the contribution of Larson (23). It is evidently the chief reliance of present field practitioners of detection. Inbau (20) and others write that blood pressure is the main channel for the deception reaction in a real situation, although galvanic skin response may have greater power in the laboratory. (It seems unlikely that this is a fundamental difference between the two measures. The manner in which they are used and the length of sitting may be involved. The point would seem to require experimental checking.)

The systolic pressure will typically rise by a few millimeters of mercury in response to a question, whether it is answered truthfully or not. The evidence is that the rise will generally be greater when S is lying than when telling the truth. In using this measure, the operator, consciously or unconsciously, uses some sort of cut-off to separate the two categories. Records are often presented [e.g., (26)] in which a large difference in response to neutral and critical questions makes the decision obvious. However, as might be expected, there are instances which are not so clear. The content of neutral questions will produce variations in the response, and one must then decide whether a response to a critical question is "positive" if it is larger than any other, or if it is larger than average by some amount. It is likely that the criterion is a somewhat variable one in ordinary practice.

The instrument currently in use consists of a pressure cuff similar to that used in medical practice, but equipped with a side branch tube which connects to a tambour through a pressure reducer. The method is to inflate the cuff (on the upper arm) to a point between systolic and diastolic pressure; that is, to about 100 mm of mercury. This may be adjusted from time to time to follow changes in S's blood pressure. Under these circumstances there is a flow of blood to the lower arm only during the upper half of the pulse wave, and there is practically no venous return from the arm since the cuff pressure far exceeds the pressure in the veins, and occludes them. The side branch from the cuff will convey pressure variations to the

tambour and its stylus. Variations produced both by the pulse and by those slower changes are referred to as systolic blood pressure variations.

The method has long been criticized (4) for its technical incorrectness. It does not give a true measure of systolic (or diastolic) pressure. This criticism has made little impression on those who use the method, since they can exclaim, with some justification, "But it works!" It is a more telling objection that the cuff disturbs the blood

supply to the arm a great deal and that it produces many undesirable side effects (7). The practical stoppage of circulation can become, in the course of a sitting, quite painful, and in a long sitting, dangerous. Operators, who are aware of these consequences, release the pressure from time to time to restore circulation. The side effects are such as to produce reactions in the other autonomically controlled variables which one may be measuring, and even in the blood pressure itself.

The Indiana study used a different method, unfortunately also open to these objections to occluding the blood supply. By mechanical means, a steadily increasing pressure was applied to a cuff and the point of complete occlusion determined by means of a pulse detector on the lower arm. The experimental results confirm the opinion that it is one of the better indicators of deception. Again discrimination is poor (almost nil) in the early part of a sitting and improves to a high point later.

Recently the writer (7) investigated the requirements of continuous arterial oressure measurement, and proposed a "closed circuit" method which uses a strain gauge applied to an artery with very little pressure. This device is simple to construct and use and seems well suited to the recording of variations in arterial pressure, although it will not as now developed indicate the base level of pressure. It has been used in a number of tests and experiments to record reaction to stimuli of various sorts (questions, flashes of light, and warning and reaction signals in decision situations). Although it has not been tested in a detection situation, there is good reason to think that it will do at least as well as the occlusion or near occlusion methods.

The Galvanic Skin Response

In the 1930's Summers (33, 34) reported some rather spectacular laboratory results in the detection of deception with the galvanic skin response (GSR). With a certain type of situation he was able to detect lying better than 90 per cent of the time. Since this work, the use of the GSR has increased and apparatus for registering it for detection purposes is made commercially.

The GSR seems to be one of the most easily triggered responseseven slight stimuli will produce the decrease in the electrical resistance of the skin, reflecting activation of the sweat glands (an internal condition, rather than the secretion of sweat). Recovery, however, is typically slow in this variable, and in a routine examination the next question is likely to be introduced before recovery is complete. Partly because of this fact there is an adapting trend in the GSR; with stimuli repeated every few minutes the response gets smaller, other things being equal.

On the other hand, long term changes in skin resistance may have a certain significance. A decrease in resistance which persists for a long period might be more significant of deception than one which has a quick recovery. In any case there is reason to believe that the significance of a change is related to the base level obtaining before it begins (17).

Not all available instruments have a provision for readily determining base level and long persisting trends. The structure of a proper instrument is more complex for the GSR than for the first two physiologic variables, although for modern electronics it is simple. The resistance measuring principle seems most satisfactory; a constant current is passed through S, the I/R drop across him is measured, and its fluctuations recorded.

Such a circuit with a device for automatically setting the recording pen back on scale is described in the Indiana report. For satisfactory recording nonpolarizing electrodes are required, although some commercial suppliers seem to overlook this necessity.

In the Indiana study the GSR was the best of the indicators in a short series though its power of discrimination fell as adaptation progressed. The investigation was concerned, however, only with the short term decreases that follow questions with about a 2-sec latency. There may be still further power in the GSR when it is used differently. The interpretation of the response is certainly made difficult by the confounding adaptation trend, and an interview needs to be planned to allow for such a trend, results being evaluated with regard to it.

Variables Tested Only in the Laboratory

Pulse Rate

Although pulse rate is sometimes referred to in reports of field studies, it is probably little regarded. In fact, at the usual recording

speed pulse rate changes (represented in the blood pressure record) would be very hard to discover.

The rate, in the form of cycle time, was included in the comparison of the Indiana study. The technique was to use a somewhat faster paper speed and make actual measurements of the time occupied by a certain number of beats. Contrary to the usual expectation the predominant response to questions is a slowing of the rate, reaching a maximum after about 5 sec. In lying the heart rate slows down more than in truth telling. This response is in part also the one produced by loud noises (10), threats of shock (17),

and many other types of stimuli not requiring considerable muscular movement. In comparison with the other variables of the comparative study the pulse rate variable discriminates moderately well. Apparently it suffers from the same handicap as GSR — with adaptation, it loses power.

To be interpreted immediately the rate would need to be recorded by a tachometer such as the one described in (13) or that manufactured by the Yellow Springs Instrument Company. These tachometers translate time into a lateral deflection of a recording pen. Since these instruments are operated by the electrocardiogram, they are a bit uncertain if S is not in a shielded room. They are more complex than the GSR instrument and might present problems in the hands of an inexperienced operator. Nevertheless, heart rate may turn out to be a very good adjunct in detection.

Volume Pulse

The volume pulse has been studied in a number of experiments in the Indiana laboratory in a variety of situations (8, 9 ,10) and it was included in the comparison made in the Indiana lie detection study. The physiologic function is the pulsatile change in the volume of some part such as the finger. The reaction to stimuli is typically a decrease in the amplitude of the pulse wave, which is a manifestation of constriction of the arterioles in the region. This reaction is produced by questions in an interrogation and is greater when S is lying than when telling the truth. Under certain circumstances in a moderately long series of questions the response differentiates well between truth and lying.

The function is measured by some type of plethysmograph. The electrical impedance plethysmograph has the considerable advantage of convenience in attachment. Such an instrument is moderately complex to build but fairly simple to operate.

The constriction recorded by the plethysmograph is closely related

to a rise in blood pressure recordings. As a fundamental phenomenon, it may have an advantage in lie detection.

Pressure Pulse

The pressure pulse is distinguished from the volume pulse in method of recording; a pickup device with a very high resistance to movement is used. The effects recorded are variations of the blood pressure rather than local conditions at the site of pickup. The pulsatile variations are the difference between systolic and diastolic pressure.

A measure of this sort was tested in the Indiana study with rather poor results in detection of deception and more recent studies of other conditions (9) also suggest it is a rather unsatisfactory variable. Probably systolic and diastolic are correlated positively to a substantial degree, but as one or the other has a greater increase, the pressure pulse goes one way or the other.

Electromyogram (Muscular Tension)

This variable is in a different class from the previous ones in that it is under the influence of the central nervous system rather than the autonomic division (respiration is affected by both). Although muscular tension can be recorded by other means than electrical, the operating difficulties of the electrical method are less with suitable equipment and the records more interpretable. The EMG can be compared in several places if one desires.

For recording EMG an amplifier is needed, with sensitivity in about the range of the usual electroencephalograph. The output of this needs to be integrated in one way or another to make it easily read (17). The electrodes attached to S are simple metal disks.

The Indiana study included one experiment using EMG in lie detection, but this was carried out independently rather than as part of the battery in which various measures were compared. Results were extremely satisfactory so far as they went. However, the test must as yet be considered exploratory and needs repetition for statistical reasons.

Convenient, portable EMG apparatus is now available, though it is somewhat expensive, and with a little experience an operator could learn to run it. An important technical limitation is the necessity for having S in a shielded room (for example, grounded fly screen), which could be easily provided only in some central laboratory.

Of course, the skeletal muscle can be activated intentionally by S. If *S* wished he could contract the measured muscle upon each ques-

tion and thus confuse the record, although the strategy would probably not occur to him. Such a movement would also have the effect of disturbing all the usual measures of lie detection, and evidently is not a common occurrence. The use of the method has some interesting possibilities since conflict between two responses can be recorded (17).

Ocular Movements

Somewhat similar in operation to the EMG the ocular movements permit the study of a choice of responses. If two or more visual targets are provided the eyes may unconsciously turn toward one or another in response to a question. The method lends itself well to the map or picture exploration method (see the following).

A substudy of the Indiana lie detection research tested the power of the ocular movements as a detector with good results. At least under special experimental conditions good discrimination can be obtained. This method, however, has the handicap of being rather cumbersome and slow. It involves photographing the eye movements with art ophthalmograph and evaluating the record after it has been developed.

Proposed Variables Not Yet Tested

Velocity of Pulse Wave

Speed of transmission of the pulse wave along an artery has been proposed by the group at Washington State University (5) as a possible indicator of deception. The variable measured is primarily the pressure increase in the artery that follows a heart systole and is propagated through the fluid in the artery in a manner fairly well described by a known equation. (This propagation of pressure wave is quite a different matter from the flow of blood.) If the pressure wave is picked up at two points a known distance apart, its velocity can be calculated. The Washington State group has worked on a device that would do this automatically.

The velocity, according to the equation, depends on the level of blood pressure, and it would seem that in the same individual, variations in pressure would be the principal source of variation in velocity. Consequently, the scheme would be an indirect measure of blood pressure.

Since the pickups would be activated by pulse pressure, and since pulse pressure is quite variable itself, it seems probable that such

a device would require a good deal of monitoring of sensitivity to give suitable readings. The scheme is also rather complex and seems to be an alternative to the simpler method of recording pressure described previously.

Gastrointestinal Reactions

Recent instrumental developments (11, 12, 36) make possible the use of the gastrointestinal reactions as a means of detection. According to one method, gastric or intestinal activity is recorded from surface electrodes attached to S, one on the abdomen and one on the arm. Stimulus effects upon GI activity have been demonstrated (11), though much remains to be discovered about them. A probable handicap of the method is the extreme slowness of response and recovery in this sector; it might be necessary to space questions several minutes apart. Nevertheless, the variable might turn out to be highly discriminative.

The Electroencephalogram

The EEG is a possible response variable for use in detection although it has never been tested. The problem expected is that under interview conditions the alpha rhythm would probably be blocked most of the time, and there would be very little opportunity for it to exhibit the "arousal" or "alerting" reaction. In other words, the variable may be too sensitive to all sorts of stimuli and reach its maximum response, as it were, too readily, but no one can be certain this would happen without a trial. Equipment for recording the EEG is basically the same as that described for the EMG. An integrator is not generally used in connection with it, though such a transformation might in fact be useful.

Interrogation Procedures

Certain general facts and a few known particulars indicate how prior conditions may affect detection results.

Adaptation Effects

A general effect that needs to be taken into account is the rule of adaptation. Almost all the response variables discussed are known to become less responsive with repeated stimulation, some at a greater,

some at a lesser rate (10). Beyond influencing the choice of variable this fact should also regulate procedure. Interrogation would be expected to become progressively less effective as it proceeds, and the diminishing returns would limit length of session: one cannot detect a difference between responses that are practically nonexistent. In other

words, instrumental detection would not be expected to combine well with a "wear-them-down" procedure. Profitable sessions would then probably be an hour or less.

Furthermore, questioning or stimulation of other sorts before the instrumental session would undoubtedly also produce a deadening of response. For example, there is considerable transfer of adaptation from one stimulus to another in the GSR. Immediately following a period of highly disturbing events it is possible that an S might be induced to tell the truth, but the situation would be a poor one for instrumental methods, since S is already in such a high state of excitement that increments in the response variables would be small. This can be inferred from experimental results, but it would be well to have direct confirmation.

For similar reasons, possibly because of the same adaptation mechanism, a condition of fatigue or prolonged sleeplessness would be unfavorable in discriminating truth from falsehood. Physiologic reactions are likely to be reduced in such circumstances. This suggestion accords with the common experience of being "too tired to care one way or the other." The stimulus threshold is raised and the person eventually falls asleep — a state of relative indifference to all ordinary stimuli. By the same token one would expect alcohol and barbiturates, and perhaps tranquilizers, to be unfavorable to detection.

Because of these considerations there may actually be a contradiction between trying to secure an admission and detecting lying by instruments. For instrumental detection one needs an *S* with a lively autonomic (or sometimes central) nervous system, whereas fatigue might favor contradictions and admissions. It would seem that an examiner must determine whether he intends to use instrumental methods as a means of detection or merely as a stage property for intimidatin the subject.

Indoctrination of the Subject

The importance of a state of alertness in S is demonstrated by one of the Indiana studies. A visit to the Chicago Police Laboratories had brought to light the practice of convincing S of the power of the

instrument by "detecting" which card had been selected from a stacked deck. In a situation which also required a certain deception by the experimenter, the Indiana experiments compared the instrumental detections with and without prior demonstration of the effectiveness of the technique. There was a large margin in favor of the "no demonstration" procedure. Apparently when S is convinced that the instrument is infallible, he is resigned and ceases to be excited about the critical questions. A certain

amount of contest in the situation seems favorable to detection. The experiment may be taken to show that even for the police officer, honesty is the best policy.

Pretesting of Ss

There is a very attractive possibility of weighing in advance the testimony of the instruments. If certain Ss are characteristically "detectable" when telling falsehoods and certain others are not, it should be possible to assign people in advance to the one class or the other. The practical advantage is clear; by deciding at the outset that certain cases are "inoperable" one's percentage of successful detection and confidence in his results for the remaining cases can be enormously increased. (See discussion in the Indiana report (17).) Exclusion of the inoperable cases would be especially advantageous if their number is small. The possibility of this classification depends on the consistency with which individuals respond differentially to critical and neutral questions.

Two experiments in the Indiana series were carried out to test that proposition, one being included in the report, the other being completed too late for inclusion. Both studies, based on the galvanic skin response, found a high degree of consistency among Ss, especially for those on whom detection failed on the first series of questions. The second set of questions also failed to detect deception. The results of the second study, on a larger group, confirm this finding. The implication is that using one or two pretests in which S is lying by instruction on known occasions would serve to distinguish persons susceptible to instrumental methods from those who are not. On the "susceptible" Ss, the certainty of the detection diagnosis will be greatly improved. One point needs further investigation: whether or not a pretest with one set of questions will pick out individuals who are susceptible to detection with a different set of questions. In the experiments mentioned the same questions were used for both pretest and test.

Required Response of the Subject

It is possible to query S without demanding replies from him at all, to require yes-no answers to appropriately framed questions, or to ask questions which require explanatory statements from S. Some experimental results (14) lead to the general proposition that if some overt response is required there are greater autonomic and muscular reactions to a stimulus. With larger responses one would expect differentiation between truth and falsehood to be easier. One experiment in the Indiana study confirmed this expectation for lie detection. Subjects who were required to reply "Yes" or "No" to questions gave more differential responses on the instrument (GSR). It also seems probable that requiring a strong verbal or motor response to questions would further increase Ss' recorded reactions and make them easier to differentiate. However,

"explanatory" answers should probably be avoided for purposes of instrumental detection. Inasmuch as the overt response required does seem to influence the physiologic records, responses of uncontrolled length would tend to confuse the interpretation.

Relationship of Operator and Subject

The possibility of an interviewer and subject having effects upon one another has been brought out in several studies in a psychiatric situation (15, 27). Physiologic reactions apparently occur in each in response to the other. Although no study has been made of such interaction in a police-type interrogation, the occurrence seems quite likely. In any such interview the manner of the operator while asking a question is probably subject to unconscious variation. If, in turn, the interrogator's manner is influenced by the S-if he gets angry or feels sympathetic, for example-the results could be extremely confused. Actually presentation of a set of questions on "flash cards" or in a "memory drum" device may be indicated.

Plans for Interrogation

Lie detection experiments have generally dealt with just one plan of questioning: the presentation of a series of supposedly neutral questions with certain critical ones imbedded in it at unannounced places. Responses to the two sorts of questions are evaluated as

though they were independent. Field workers, on the other hand, have developed a variety of ingenious plans (20, 26) which seem sometimes to be more effective. A radically different plan is to let S know when a critical question or group of questions is coming. This procedure is accomplished by going through a question series in the same order often enough so that S knows what to expect. A series of responses is then evaluated as a whole: deception being taken as indicated, on the later repetitions, when responses become progressively larger as the critical questions are approached and die out rapidly thereafter. In some variables there is, further, the possibility of observing a mounting base level as questions near the climax. For a situation other than lie detection, experiments (16, 32) have demonstrated the progressive increase in reaction to stimuli as a noxious question is approached. Conditioned responses are said to be formed to the preceding stimuli on the earlier runs through the series. As a method of detecting deception there is much to be said for this organized schedule of questions. Whereas the unexpected question will produce a brief response, with unidentifiable anticipation probably enlarging responses to neutral stimuli and confusing the issue, the organized

schedule permits a detection based on a number of readings, in fact, on the pattern of responses in a whole series. So far, however, an exact method of evaluating the data is not at hand. It would be quite desirable to have an experimental evaluation of this method.

Whatever general scheme of questioning is used, there must be some regard to the adaptative process already described. Size of response to a question in nearly all variables is going to be affected by its position in a series. Current practice evidently recognizes the fact by avoiding the first position for critical questions. A position at the end of a series would be almost as unfavorable, since, other things being equal, the response to a stimulus in that position will be the smallest. Question series of one form or another need to be so planned that the adaptation trend can be discounted in the interpretation.

Data Interpretation and Operator's Decisions

An operator in field work usually has neither the time nor the means to make a statistical analysis of his results or perhaps even to compute the averages of the several responses to all questions. Apparently the successful operator will learn to decide on the meaning

of his results by some rules of thumb which he has difficulty putting into words even to himself. To exactly what set of cues he is responding it is difficult to say, for apparently no one has made an analysis of the exact difference between records which are judged positive and those which are judged negative or inconclusive.

For the experimenter the problem is different, since he is obliged to say exactly how he has arrived at an answer. His procedure, therefore, will usually be, as in the Indiana studies, to settle upon some rather obvious aspect of response that can be definitely measured, and then find out how well he can do at detection with this information about each response. Naturally, he is discarding a good deal of information while he does this, information about other features of the response which might be supplementary or superior to that which he is using. For example, in most GSR work only the maximum amplitude of the response is considered. It may well be that the duration of the response also has a meaning (beyond its correlation with amplitude). In fact, an unreported portion of the Indiana study indicated that this was true. The field operator might allow for this feature intuitively along with other characteristics such as latency, doubleness or singleness of response, rate of rise, etc. Not that the experimenter could not study these things, but he must take them one by one, test them singly and according to various rules of combination and weighting, a laborious and lengthy process. His hope, of course, is

that in the long run he will be able to tell the field operator just what he should take into account to secure maximum reliability of decision. Certain suggestions can be offered *a priori* and some from experimental evidence.

The logic of the detection task imposes certain requirements. Basically the assignment is one of differentiating two conditions, truth telling and lying, on the basis of readings which are correlated with them ("prediction" in the statistical sense of the word). The operator or experimenter must proceed by finding, for a given S, the mean response to the critical and to the neutral questions. The alternative, of simply comparing critical responses of an S to those of other persons, will not be satisfactory because Ss differ in their level of responsiveness to any stimulus. By representing the responses to critical questions by R_o and those to neutral questions by R_n, we may say the first quantity to be considered is $R_c - R_n$. We must then decide on the basis of data which sign of the result is indicative of lying, if either. We might, under some circumstances, then determine from data how many persons will be correctly classified when the difference is of a certain degree. The number of detections would

be maximized by using a low number as the dividing point, but the number of errors of calling true answers false would be reduced by using a higher number.

Evaluation of this sort would be premature under many circumstances. It may well be that the questions asked are not of equal stimulating power even to those giving true answers. A critical question dealing with a crime or other "sensitive" information would doubtless elicit a larger response than, say, a question about an inconsequential matter. (It is a routine GSR demonstration that words such as "mother," "sex," "hate," etc., produce more response than, for example, the names of common articles of furniture.) Hence it is necessary to complicate the comparison before the decision of truth or falsity can be made. The value $R_c - R_n$ for each S should be compared with that for a group of Ss responding to the same questions. The function to be used is therefore $(R_c - R_n)_{Subject1} - (R_c - R_n)_{Average\ Subject}$. This function the experimenter would then need to evaluate for its detecting power; the field operator needs to arrive at an approximation of this function to reach a proper decision. Having this, the field operator should ideally be provided with a table showing the probability of correct detection and the probability of error for each value of the function. Such tables do not exist at present.

For good discrimination it is essential that measures to be compared be quite reliable. Each recorded response to a question may be considered as partly determined by the question and partly by "accidents" of the environment and in S himself. For example, there may be some influence of a previous question, of the questioner's tone of voice, of even trivial events, noises, etc., in the examining room. Naturally, the first step in

securing reliability would be the control of these extraneous factors. A good examining room should be provided where outside events are neither seen nor heard and where S cannot see the examiner nor the operation of the instruments. Despite these precautions there will still be "error" fluctuations beyond the operator's capacity to manipulate. These disturbing effects can be set against one another by the usual technique of repeating the observations and considering the average of the series.

When several physiologic functions are recorded, or several features of one kind of response are measured, there is the further problem of how they should be weighted and combined in making a "prediction." Several variables, rather than one, would be expected to provide a more accurate basis for decision. Aside from the usual advantages derived from multiple measures there is the fact of indi-

vidual specificity of response, demonstrated in a number of experiments (22, 28), which would make multiple measures particularly valuable. Individuals tend to react in one physiologic sector or another. One individual may "specialize" in a heart reaction, for example, and another in the GSR. Recording a number of physiologic variables gives, therefore, a better chance of locating each person's special kind of reaction.

The Indiana studies have imparted some knowledge of the methods of combination. In one investigation a large group of physiologic variables were recorded, more, of course, than would be practical in a field situation with the idea of comparing their effectiveness. "Discriminant analysis" was used in the main analysis of the results. This technique is based upon a computation of optimum weights to be assigned to the measures in order to give maximum discrimination when they are added together in standard score form. The weights derived from one group of Ss must then be tested on another before they can. be considered as firm. This elaborate method gave strange results in the Indiana study. First, by use of it on the original group, truth and lying were differentiated no better than they were by the best single measure. This result is rare with variables that correlate with a criterion and only poorly with each other. Second, the same weights applied to a second group did give a very substantial improvement indeed, whereas by the operation of random fluctuation one would expect the second group always to give worse results than the first. It may be that the second set of data was more reliable than the first, or fit the assumptions of the model better.

It is still possible that a set of weights suitable for transfer to field use could be derived in this way. A particular set of weights, of course, would have to be calculated for the particular grouping of response variables intended for field use. On the other hand, it seems likely that a different method of combination might have greater discriminating power.

In the Indiana group for which discriminant analysis improved detection but little, a simpler method gave very good results. It was found, for example, that merely counting the number of variables showing an indication of lying for each question formed a highly successful lying score. In this method one is avoiding the assumption of linear addition, and the good result of this sort of treatment suggests that it is well to avoid that assumption. There is also a great deal gained in simplicity.

There is still another possibility—a combination technique that does not simply add measures together but treats them as alternatives.

This technique remains to be developed, but it is, in fact, the logical approach in view of response specificity. Suppose, for example, there is an S who responds in a highly favored sector, such as heart rate, and very little in another-GSR, vasoconstriction, and other variables. We may presume that each of the response variables is admixed with a certain amount of random fluctuation ("error"). For such a case the heart rate response could be highly differential of truth and lying, but the other kinds of response would be less than average and, if added to the heart rate response as standard scores, or more simply combined, they would tend to offset the positive heart rate indication. It might come about, therefore, that combining measures in the ordinary fashion would involve greater error proportionate to "true" score than a single measure, properly chosen for each person.

An effective plan for this situation would be to determine by experiment what alternative patterns of response are discriminative of truth and falsehood. A record could be examined for such patterns, or, possibly, the pattern to be expected could be discovered by preliminary trials and a record watched for an exaggeration of this particular S's special pattern.

In field use, it is quite possible that interpretations of this sort are actually made, though rather unsystematically; a large response in one physiologic variable may be counted heavily, and the neutral indications of other variables not allowed to offset it. The multiple record would be used in such cases simply for selecting the most revealing variable for a particular S when he has one.

Psychological Principles of Lie Detection

The effectiveness of lie detection procedures is limited by a lack of knowledge of what psychological principles are involved in successful lie detection. There is little examination in the literature of the basic psychological principles at work. Particularly

important is the question: "Just what general properties of a situation provoke the physiologic reactions which make lie detection possible?"

Prima facie it seems improbable that there is a special kind of response peculiar to lying. In the early days Marston (29) recognized that truth and falsity are not psychological categories. Obviously a person can give a false answer merely because he is misinformed. If the answer is true to the best of his knowledge and belief, one would certainly expect no physiologic signs of its falsity. Marston's contention was, therefore, that the physiologic reactions were present

only when there is consciousness of deception. If this is taken to mean that S must know that his statement is untrue, it is probably correct in most cases; that is to say that under some circumstances he would tell the truth. The possibility is not to be dismissed, however, that detection could be accomplished when S had completely suppressed memory of an event or distorted the essential features of it in his own thinking. Evidence of response under these conditions appears in the "subception" experiments (1, 19, 21, 25, 30).

On the other hand, it seems that trivial deception, even when fully known to S, would not provoke much physiologic reaction. A person probably can say he is feeling fine when he is not without the deception coming to light on the instruments.

It is questionable, therefore, whether the idea of "consciousness of deception" makes for an appreciable refinement. If it is true that deception is best with heightened awareness of it, the characteristics of a situation which will heighten that awareness require examination.

The physiologic response in lying, as found in experiments and field trials, is a pattern of changes in the recorded variables. Essentially the same pattern of response occurs when S is telling the truth under interrogation, and detection is possible only because the changes are greater, as a rule, during lying. If the responses are not specific to lying per se, or to the consciousness of lying, then knowledge of just what characteristics of a situation produce them is of first importance.

Three possibilities can be suggested: the *conditioned response theory*, the conflict theory, and the punishment theory. Each of these implies a somewhat different mode of operation in the detection situation.

According to the *conditioned response theory* the critical questions play the role of conditioned stimuli and evoke some "emotional" response with which they have been associated in the past. This principle is known to operate in situations other than lie

detection. Conditioning of the GSR was demonstrated, for example, in the experiment of Diven (16), and it is a familiar fact that words such as those with sexual or other personal association evoke large responses. It would therefore be expected that questions relating to some fairly traumatic experience would produce especially large reactions. If this is the basis of detection, lies about trivial matters would be nearly impossible to detect. Asserting that a barn is a house, for example, would produce little response from the ordinary individual because neither word is connected with any large reaction on his past life. Denying that he took part in a crime might be

expected to produce a large reaction on this theory, because the crime probably produced a large "emotional" disturbance when it occurred. On the conditioning principle it would further be expected that the bodily reaction would be somewhat different, according to the kind of past experience the question was connected with. [Different stimulus situations do have a degree of specificity in the kind of reaction they produce according to certain evidence (6).] Whether, in fact, the physiologic response in lying differs according to the emotional reaction of S to a question is a problem deserving some investigation.

The simple conditioning theory can, however, hardly be the whole explanation of the lying reaction, for in laboratory experiments, such as some of those in the Indiana study, lying about rather trivial matters according to instruction did lead to enough differential reaction to yield a fairly good detection percentage. In fact, percentages of detection were so high as to suggest that lack of too great general stress is favorable to detection.

The theory of *conflict*, following the psychoanalytic lead, would presume that a specially large physiologic disturbance would occur when two incompatible reaction tendencies are aroused at the same time. Whether there is a greater disturbance than the sum of the two separate excitations is questionable (3), but at any rate the two would be greater than one. In the process of deception two reaction tendencies may be expected. Long habit would dispose the person to answer a critical question straightforwardly. On the other hand, when he is lying there are circumstances which arouse in him the tendency to denial. In the Indiana studies one experiment was based explicitly on this principle, but with the plan of distinguishing the two response tendencies by different sorts of muscular activity. The experiment gave good results, but not because it was possible to distinguish the two reaction tendencies. A better plan might have been to associate a "yes" answer with one hand and a "no" answer with the other. The purpose may be served, however, if the two response tendencies merely summate in the same place, and this could well be the mechanism by which the usual detection test works.

On the conflict hypothesis, both reaction tendencies would probably need to be strong for good results. Not much can be done about the tendency to reveal information openly. On the other hand, the tendency to deny it may be subject to some manipulation. This suggestion again leads to a paradoxical recommendation: the situation must be so ordered that S makes a strong effort to conceal the infor-

mation. This strategy, opposite to that which might encourage admissions, may in fact be favorable to instrumental detection. The experiment, already described, which showed better detection when S was encouraged to think he might "beat the instrument" lends itself to this interpretation.

If conflict is the basis of the large reactions that signify deception, then there is some danger of confusion with large reactions produced by strictly personal emotional problems. It is an established fact (see the preceding) that words touching on emotionally sensitized areas will produce large reactions, regardless of deception. A question touching on such an area might provoke a reaction greater than that produced by a mild conflict. Errors from this source would be checked by comparing the reactions of several persons to the same questions and, where possible, by comparing a person's reactions to sensitive questions when he may be lying with those he gives to the same subject matter when there is no occasion to lie.

A third possible basis of detection is the *punishment*, or better, *threat-of-punishment* principle. According to this idea a person will give a large physiologic response during lying because he anticipates serious consequences if he fails to deceive. In common language it might be that he fails to deceive the machine operator for the very reason that he fears he will fail. The "fear" would be the very reaction detected. More analytically put, S is giving a conditioned physiologic response to the operator's question because the content of the question has been associated with the possibility of unfavorable consequences. Lying is technically, then, an avoidance reaction with considerably less than 100 per cent chance of success, but it is the onl'y one with any chance of success at all. The physiologic reaction would be the consequence of an avoidance reaction which has a low probability of reinforcement, but not too low. If the theory has any validity at all it must be supposed that the physiologic reaction is associated with a state of uncertainty. It does seem that a lie told with a complete certainty of its acceptance would be unlikely to produce much reaction; and on the other hand we have the experimental evidence already mentioned that a lie told with no prospect of success whatever is also poorly detected. For good detection a situation may be necessary where S is willing to gamble on a rather long chance with some hope of success.

To make this punishment theory cover the experimental results one needs to take "punishment" in a broad sense, since in experiments S quite often suffers no serious loss if he is detected. He does, nevertheless, lose the game which he is playing and possibly this is

countable as a punishment. There seem to be no experimental observations on the general situation.

On this last type of theory successful detection would depend a good deal on S's attitude both toward the instrument and the situation as a whole, for good results would depend on S trying to "beat the game." If the hypothesis is correct, there would be some advantage to finding out what his attitude is and possibly encouraging him to engage in risk-taking behavior. Once again there seems to be all opposition between procedures designed to secure information and those that would lead to the best instrumental detection.

Present knowledge is not sufficient to lead to a decision on which, if any, of these three theories is correct. Since the theories here discussed are not mutually contradictory, it is quite possible that all the conditions referred to are actually operative in some degree in the detection situation. In that event detection would be best when critical questions are associated with somewhat traumatic past events, when S is threatened with possible but not certain punishment as a result of lying, and when critical questions, perhaps by reason of the uncertain consequences, arouse conflicting reactions in S.

Although direct, practical experience is lacking, some general findings of laboratory experiments are applicable. The relevance of many of the experiments for the criminal detection problem suffers from the fact that they involved no "crime." This makes them more pertinent for broader interpretations, however. Experiments concerned, for example, with discovering a person's birth month, when he has been told to say no to every question, are closer to the intelligence interrogation situation than to criminal detection. The concern in these experiments is with lying rather than with crime. From their success, we may conclude that crime is not essential for lie detection.

The intelligence interrogation, however, has certain peculiarities. Studies directed specifically to these distinctive problems would be required for more reliable conclusions regarding the applicability of findings from previous experimentation to practical employments in intelligence interrogations. One may suppose that the person questioned, typically, will have little personal involvement in information sought. The questions frequently will not be about something he has done or for which he feels

responsible or guilty. He may or may not know what information is important to his interrogator. Perhaps he is not very deeply motivated to conceal the specific items or information, but loyalties and threatened penalties may dispose him

to do so. If the source regards the matter as unimportant, the motivational aspects of the situation would be rather like those in the common demonstration of detecting which card has been picked from a deck, a trick not difficult to do as a parlor game when a "lie detector" is available. However, if the source is highly motivated toward concealment and anticipates reprisals if he "breaks," the situation is rather like crime detection.

Special considerations also arise in the intelligence interrogation situation because of the kinds of people to be interrogated, their physiologic condition, their emotional state, and their attitudes. They differ from both the suspected criminals and the normal individuals or college students used in most experiments. The effect of factors like these is scarcely known for the groups already studied. It is *terra incognita* for the sources of factual interrogations.

A special condition for the intelligence situation is that the subject's cooperation in submitting to the instrumental recording might be difficult to obtain. One naturally speculates about the possibility of devising a few recording instruments that would need no attachment to S and might be concealed from him. Considering the complex problems attending overt electrodes and recorders, the information gained from hidden instruments is likely to be quite meager and unreliable. Furthermore, it is not certain that an S who is not aware of the process would actually respond in the same way as one who is. It would seem necessary that interrogators use the ordinary type of instrument and rely on persuasion or coercion to get subjects into it. There is still the possibility that sophisticated subjects would, under coercion, introduce confusion by moving about and controlling breathing. How often this would happen can only be determined through experience.

Nevertheless, on the basis of the facts known from laboratory and field work one might expect that the physiologic methods can be applied to intelligence interrogations with reasonable success. Most of the considerations already discussed would seem to apply.

Summary

In spite of the early scientific foundations of lie detection in the work of Benussi, Marston, Larson, and Summers (2, 22, 23, 29, 33, 34) there is at present a rather broad gap between current practice and

scientific knowledge. There is, on the one hand, some information from the laboratory, which could be applied, and there are procedures of questioning, developed in field work, which await experimental testing. Although variation in procedure and in selection of cases makes present field data quite difficult to evaluate, it does seem probable that a significant amount of detection is being secured by physiologic methods. Laboratory experiments generally confirm the success of the technique.

Laboratory science can make some immediate contributions to the improvement of detection methods. Developments have made possible better instrumentation for the recording and analysis of variables which currently figure in criminal detection, and suggest the possibility of recording various others which could increase the accuracy of detection. For some of these additional variables, experimental evidence is already available, others have yet to be tested.

Experiments have also yielded certain results that could be applied to interrogation procedures, of which the following are illustrative. The factor of adaption, differential to particular responses, could be allowed for systematically. The attitude of the examinee influences results considerably; they are better when he does not believe the instrument is infallible. Rather, clearer results are obtained when he believes he has a chance of winning the game. Pretesting of Ss in order to drop a few prospects from consideration would greatly improve the confidence users could have in results on those remaining. Making S take an active part by giving some sort of answer also favors detection. Feedback of the operator's visible reactions has an effect on the source's subsequent physiologic responses. Beyond these facts, experimental evidence bears on a number of other practical matters, such as the order and nature of questions. Detailed instruction in these matters to personnel who might become exposed to such manipulations will go far in frustrating any interrogator who seeks to make use of them.

With respect to the evaluation of results, experiments have done more to set the problem than to answer it. Various possibilities of statistical combinations and evaluations o responses have been tried, but the optimum method is not yet known.

Much could be learned from planned experimental studies of the psychological basis of detection.. Precisely what is it that makes the source's responses different in lying and

telling the truth? The difference might depend on a conditioned autonomic response, ona conflict of response tendencies, or on the chance of successful avoidance of punishment, or some combination of these. Knowledge of

these effects might provide a basis for the choice of conditions that would provoke the most discriminating kind of response.

Further development of the method and. the successful extension of it to other areas, such as military interrogation, appears in prospect.

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CHAPTER 5

The Potential Uses of Hypnosis in Interrogation

MARTIN T. ORNE

Introduction

Through the years some lay and professional people have considered hypnosis almost a magical means of influencing others, curative, mystical, bordering on the supernatural. This has been so largely because the phenomenon of hypnosis seems to allow for a high degree of control of the subject's behavior. However, over the years, too, evidence has been accruing to suggest that hypnosis is neither fraudulent as some have maintained nor is it so mysterious as to defy experimental analysis.

Because of the apparent control of behavior during hypnosis it has understandably been proposed as a tool for interrogation. This chapter aims to evaluate these proposals. There is an utter dearth of literature concerning the actual use of hypnosis in interrogation. Either this technique has never been used, or if it has, no one has chosen to discuss it in print. Despite fairly extensive conversations with experts from a variety of countries, the author has found no one who admits to familiarity with its use in interrogation. An approximation to) such usage, however, does exist in isolated instances with criminal suspects.

Since there is no direct evidence on this problem, it becomes necessary to analyze the issues and separately evaluate each question.

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In this way a considerable number of inferences may be made regarding the utility of hypnosis for interrogation.

This report will first consider *the potential use of hypnosis in the interrogation of captured personnel.* Three separate issues are involved here: (a) Can hypnosis be induced under conditions of interrogation? (b) If this is possible, then can a subject be compelled to reveal information? (c) If information is so obtained, how accurate will it be?

The second section will consider proposals advanced for *the defensive uses of hypnosis,* the problem being the feasibility of protecting personnel from enemy interrogation. Three suggestions will be evaluated: (a) the use of posthypnotic suggestions to prevent subsequent trance-induction; (b) the use of posthypnotic suggestions to induce amnesia on capture for sensitive information; and (c) the use of posthypnotic suggestions to make captured personnel more resistant to stress.

In the final section a distinction will be drawn between what the hypnotic trance per se can accomplish and what the hypnotic situation as a social event may make possible.

Some Theoretical Views

Before discussing the possible use of hypnosis for interrogation, we should like to review briefly what is known about the nature of the state itself. Mere description of the subject's overt behavior is an inadequate definition of hypnosis. He is usually described as passive, apparently asleep, and responsive only to the hypnotist's words. It is true that in the absence of specific suggestions to the contrary the subject seems to be extremely passive and to become unusually dependent upon the hypnotist for direction. However, an individual in hypnosis may also appear to be fully awake. No reliable objective criteria have yet been developed which will unequivocally identify the hypnotic state. This is particularly true in regard to physiological criteria. In the absence of reliable objective criteria, it becomes necessary to describe hypnosis in terms of the subjective events which the hypnotized individual experiences. The cardinal characteristic of the state is that a potentiality exists for the subject's perception of reality to be distorted in accordance with the hypnotist's cues. This distortion may affect any and all modalities of perception in regard to both external and internal events. Although this distortion of reality may be extremely real to the subject and his

behavior appropriate to it, considerable evidence suggests that at some level the individual continues to remain aware of the world as it really exists. Another attribute of the hypnotic state is that the subject experiences it as discontinuous from his normal waking experience. In association with this, amnesia for the experience may spontaneously occur. Finally, the subject generally experiences some compulsion to

comply with the hypnotist's requests, along with a striking disinclination even to wish resisting them.

It is inappropriate in this context to review in detail the many theories proposed to account for the clinical observations. We shall briefly consider some of the theoretical views most generally held, since their implications differ markedly regarding the degree to which the state increases the susceptibility of a person to purposeful influence.

Primarily of historical interest are the views of Mesmer (13) and his latex followers, who held that hypnosis, or the Mesmeric trance, results from a flow from the hypnotist to the subject of a force called animal magnetism. This view is important because it is the basis of the lingering lay opinion that hypnosis is in some way an overpowering of a weak mind by a superior intellect. There is no presentday investigator who would defend this position, and in fact it is contradicted by recent evidence.

Since the time of Braid (14) in 1843, the view has been widely held that hypnosis is a state of artificially induced sleep. More recently, Pavlov (56) proposed a similar view when he maintained that cortical inhibition, sleep, and hypnosis are essentially identical. This view is currently held throughout those parts of the world where Pavlovian theory is accepted as a creed. This position implies that hypnosis is a state characterized by a profound neurophysiological alteration and that the subject in trance is somehow passively compelled to respond when appropriate suggestions are given. To the American investigator there appears to be overwhelming experimental evidence against this view. For example, Bass (4) has shown that the patellar reflex, which disappears in sleep, is not diminished in hypnosis. Wells (78) et al. have demonstrated that all hypnotic phenomena can be elicited in a state that in no way resembles sleep, which would lead one to hypothesize that the sleeplike aspect of hypnosis is not intrinsic to the state itself but is rather a result of the suggestion that the subject go to sleep. Barker and Burgwin (3) have shown that the EEG changes characteristic of sleep do not occur in hypnosis, although a true sleep may be induced hypnotically. However, there are two Russian papers (50) which contradict these findings, claiming that the characteristic rhythm of hypnosis resem-

bles that of drowsiness and light sleep. These studies have not been replicated.

The view proposed by Janet, Prince, Sidis, Corot, etc., which was current at the turn of the century, maintains that hypnosis is a state of temporary dissociation analogous to that which occurs in hysteria. Although this position seems reasonable in view of the similarity of the two conditions, it tells us little about the actual nature of hypnosis. The

implicit assumption of this theory-that hypnosis is a sign of pathology — is not generally accepted today.

The Nancy school, especially Bernheim (9), revolutionized thinking about the hypnotic state by introducing the concept of suggestion and suggestibility. This orientation has been supported most notably by Hull (32), who, in a major monograph on hypnosis, concluded that hypnosis is primarily a state of heightened suggestibility. These views focus upon a trait in the subject, suggestibility, which is heightened by hypnotic induction techniques. Hull also relates the phenomenon to a habit, insofar as it becomes increasingly easy for a subject to achieve a state of hypnosis once he has been able to do so. Although the concepts of suggestion and suggestibility provide a bridge between hypnosis and the normal waking state, they do not offer explanations of the causes of the state or of the ongoing processes of hypnosis.

Welch (77) has attempted to explain hypnosis and its induction by an ingenious application of conditioning theory, utilizing the concept of abstract conditioning. He has pointed out that trance induction proceeds from suggestions which are almost certain to take effect to those that are more likely to be resisted. Several suggestions for experimental testing of this theory have never been followed up.

In contrast to the foregoing views, which focus either on the hypnotist or on some trait of the subject, several more recent approaches have been concerned with the interaction between the subject and the hypnotist. Schilder (63), White (83), and Sarbin (61) have all in one way or another emphasized the social relationship which exists in the hypnotic situation and especially the needs of the subject in this context. Also, Kubie and Margolin (40) and Milton Erickson (20) have concentrated on the subject's psychodynamics as being most relevant to the induction of hypnosis. White's view (83) is perhaps the first major formulation of this kind, and it represents a major departure in thinking about the trance state. He emphasizes that hypnosis takes place because the subject wishes to play the role of the hypnotized subject as currently defined by the subject and the hypnotist. It should be noted that the concern is with the subject's

wish to be hypnotized, and this motivation is considered of primary importrace to the induction of hypnosis. All the theories of this group, which might be called the "motivational theories" of hypnosis, emphasize the subject's wish to be in a hypnotic trance. Although other concepts are of necessity evoked to explain various phenomena in hypnosis, the actual occurrence of the trance state is related to the wish of the subject to enter hypnosis. This writer is a proponent of this approach, and the critical comments in this report are undoubtedly colored by this viewpoint.

It is important to recognize that almost no experimental work has been done that would support the validity of these various theoretical views, although there is some evidence already mentioned which tends to refute some of them. The general acceptance of the motivational view is based on the clinical impression of both experimentalists and clinicians that it accounts best for the major portion of the clinical data.

Trance is commonly induced in situations where the subject is motivated *a priori* to cooperate with the hypnotist, for example, to obtain relief from suffering, to contribute to a scientific study, or (as in a stage performance) to become, temporarily at least, the center of attraction. Almost all the currently available knowledge about hypnosis has been derived from these situations, and it is well to keep in mind the source of these data when one attempts to evaluate the possible utility of hypnosis in situations differing from these.

There is a small body of evidence stemming from the criminal cases in which hypnosis has allegedly played a role, which are radically different from those where hypnosis is normally observed. Because these situations may be more relevant to the questions of hypnosis in interrogation, this body of knowledge deserves particular attention and is discussed subsequently.

Hypnosis in the Interrogation Situation

The Induction of Hypnosis

The initial problem in utilizing hypnosis for interrogation is to induce trance. It is to be expected that if the subject wishes to withhold information he will not 'wish to enter hypnosis. Therefore, hypnosis must either be induced against the subject's will or without his awareness. A common conception of hypnosis holds that it may be induced without any prior relationship between subject and

hypnotist and regardless of the subject's needs in the situation, with only the hypnotist suddenly gazing at his victim and commanding him to fall asleep. A motivational view of hypnosis would hold that trance induction depends upon the subject's needs of the moment and his expectation that the hypnotic relationship is to fulfill them. In this section we will evaluate trance induction procedures from the viewpoint of their dependence upon a positive relationship between subject and hypnotist and the subject's wish to cooperate.

The Unaware Subject

There are three situations in which hypnosis has been reported to have been induced without the subject's awareness. In the first, hypnosis is induced while the subject is asleep. Another arises when the subject is seeking psychiatric help and hypnosis is induced in the course of a clinical interview with no explicit mention of the process. The third situation involves a trance spontaneously entered by individuals who are observing trance induction in another subject.

1. *Sleep*. The older literature is replete with statements that hypnosis may readily be induced by giving suggestions to sleeping subjects in a low but insistent voice; the subject becomes gradually more responsive to the suggestions until eventually he enters a somnambulistic state of hypnosis [Bernheim (9), Braid (14), Binet and Fere (12), etc.]. Unfortunately, there are no cases given to support these statements. As so often the case in hypnosis literature, the statements appear to have been carried over from one textbook to another without any critical evaluation.

In a recent study by Theodore X. Barber (2) sleeping subjects were requested to perform standard hypnotic tasks. He found considerable similarity between compliance to suggestions given during sleep and reactions to customary hypnotic techniques. It should be pointed out that, in his study, Barber requested permission from the subjects to enter their rooms at night and talk to them in their sleep. Several of them remarked that this was hypnosis, and one may reasonably assume that most, if not all, of the subjects perceived that trance induction was the purpose of the study. This study, therefore, tells us little about what would happen if a truly naive sleeping subject were exposed to such a situation. No investigation is available on this point. Casual experimentation by the author failed to demonstrate the feasibility of this technique. The sample consisted of only four subjects, three of whom awakened to ask belligerently what was taking place, whereas the fourth continued to sleep.

Perhaps as in sleep learning (which seems to be effective only in a twilight state), response to suggestion may be obtained only in a receptive subject who has agreed to participate in the study and who is neither deeply asleep nor fully awake. Whether any increase in suggestibility over the normal waking state occurs has never been established.

2. *Rhythmic, Repetitive Stimulation*. Many trance induction techniques utilize the fixation of the subject's attention on a rhythmic, repetitive stimulus. Thus, metronomes, rotating spirals, mirrors, and swinging pendulums (75) [even the subject's own breathing (39)] have been used to induce hypnosis. In another context, the trance phenomena seen among primitive people frequently occur in ceremonies involving

prolonged stimulation by rhythmic drums. Many authors have emphasized the importance of monotonous rhythmic verbal suggestions, especially during the induction stage of hypnosis. Recently, Kroger and Schneider (38) have proposed the use of an electronic aid which gives a repetitive signal approximating the alpha range of ten cycles per second as an adjunct. It is not clear whether these techniques directly facilitate hypnosis or whether they tend to produce a state of drowsiness that is interpreted by the subject as "I'm responding to hypnosis" which, in turn, facilitates further responses to suggestions. Certainly, the use of such techniques or even of monotonous rhythmic speech is by no means necessary in order to induce hypnosis.

All sophisticated discussions of hypnotic trance induction recognize that a successful response to a suggestion will facilitate further successful responses to suggestions. Even early descriptions of eye fixation advise the hypnotist to wait until the subject begins to show signs of fatigue and *only then* begin to give suggestions to the effect that the subject's eyes are growing heavy. Ideally, the hypnotist times these suggestions to occur *immediately preceding* the time when the subject begins to experience heaviness. Thus he takes the credit for having induced the state of drowsiness that is an inevitable consequence of eye fixation. Mechanical aids of this type may facilitate induction only to the extent that they bring about an event that is attributed to the suggestive effect of the hypnotist. However, it is also possible, as some of the proponents of these techniques suggest, that a neurophysiological basis exists for the facilitation of hypnosis. In this context it is relevant that road hypnosis and the break-off phenomenon encountered by pilots occurs in individuals subjected to peculiar types of repetitive, rhythmic stimulation *despite a high*

motivation to retain alertness. An intriguing question on which no evidence exists is the relationship of hypnotizability and susceptibility to road hypnosis or the break-off phenomenon. Furthermore, in the context of this discussion, the utilization of rhythmic stimuli as aids to trance induction is particularly relevant insofar as being subjected to such stimulation does not require the individual's cooperation. Whether an actual relationship exists between the drowsiness which can thus be induced and hypnosis is highly questionable and remains to be investigated. What is a somewhat more likely possibility is that drowsiness may be induced even in the uncooperative subject which may be attributed to some hypnotic influences. This would then tend to make the subject more liable to respond to other suggestions. Clearly, it is an area that might fruitfully be explored. No investigation utilizing such procedures in recalcitrant subjects has been made. In a later section on "magic room" techniques, the implications of using this and related tools are explored.

3. *In a Therapeutic Relationship*. Studies by Adler and Secunda (1), Sargant and Fraser (62), Schneck (65), and Rosen (59) have used techniques of trance induction which were aimed at preventing the subject from knowing that he was being hypnotized. These techniques all depended upon the subject's desire to obtain help with his problems from a therapist. It is frequently possible to utilize the therapeutic situation in such a manner as to achieve a hypnotic state eventually. For example, the therapist may talk to the patient about relaxing, and the virtues of relaxing, or the virtues of concentrating, thus obtaining his fixation on one particular object. He may suggest that the patient will be more comfortable if he closes his eyes, that in this way the patient can relax more or concentrate better. Thus, in a suitable subject a deep level of hypnotic trance can be achieved in a relatively brief period of time without ever using the term hypnosis and without the subject ever being aware that hypnosis is taking place. Meares (46) uses the neurological examination in this fashion as a test for hypnotizability.

In all the instances cited it must be emphasized that although the subject does not explicitly consent to enter hypnosis, a relationship of trust and confidence exists in which the subject has reason to expect help from the hypnotist. Furthermore, the hypnotist is an individual of high reputation and high prestige and there is some legitimacy in the subject's expectations. Standard medical practice includes many maneuvers by the physician which are essentially meaningless rituals to the average patient, and to which the patient

complies without hesitation because it is assumed by him that this will eventually benefit him. These situations, despite their outward similarity, differ greatly from those where trance induction is attempted by a stranger, without the subject's knowledge or consent.

4. *Spontaneous Trance*. Subjects who observe hypnosis in a demonstration may spontaneously enter trance. An experience of the author's concerning a psychotherapy patient with whom hypnosis had been used may be cited as an example. The author appeared on an educational television program where he demonstrated various hypnotic phenomena with several subjects. The patient watched the program in a friend's home. She reported that when the author induced trance in the subjects, she went into a trance, coming out of it when the author terminated trance in the television subjects. Spontaneous hypnosis occurred despite the fact that its appearance was a source of embarrassment to the patient since she was in the company of friends.

It is fairly easy to maximize the probability of this occurrence by mentioning the possibility of this phenomenon and conveying one's expectation that this may happen. Here again we are dealing with subjects who are essentially in sympathy with the purposes of trance induction in a situation which is viewed as safe by the individual

entering trance. Again, no conclusions can be drawn as to the feasibility of inducing trance empathically in a subject who does not wish to enter trance. It has been rioted clinically that individuals who have negative attitudes about hypnosis do not enter hypnosis under these circumstances. White's (86) study, in which he has demonstrated that subject's attitudes about hypnosis, as shown on the TAT, are predictive of their hypnotizability, is relevant here.

The Antagonistic Subject

We have been able to uncover only three studies that experimentally test whether a subject can resist the induction of hypnosis. Wells (80) instructed his subject to fight actively against trance induction — the subject was unable to resist. It should be mentioned that this subject had been previously hypnotized by Wells. This study was replicated by Brenman (16) who arrived at the same conclusions.

An even more dramatic experiment is reported by Watkins (74), again dealing with a subject who had previously been hypnotized by the experimenter. A nurse, who was known as a good subject, voiced the opinion to Watkins that under no circumstances could she be hypnotized against her will. He took the challenge and they set up

an experiment. Another nurse and a female psychiatrist were asked to witness the experiment. A dollar bill was placed in front of the subject and she was told that she could keep it if she did not enter trance. However, Watkins is careful to point out that this was a matter of prestige, not of monetary remuneration. Since no restrictions were placed on the subject, she closed her eyes, plugged her ears, talked and shouted. Watkins, speaking close to her ear, suggested that she would feel a pain in her head which would grow stronger and stronger, and that the only relief she would find would be to enter a deep sleep. The subject paused at times, removed her fingers from her ears to hold her head, and said that her head hurt. After six minutes she stopped shouting, tossed the dollar bill at the experimenter, and said, "Here, take it," and went into trance.

In determining the significance of these experiments, we feel that the "demand characteristics" of the situation are relevant. Demand characteristics are defined as those aspects of the experimental situation which implicitly convey the hypothesis of the experimenter to the subject. The author, in another publication (52), has shown that the demand characteristics of an experimental situation may greatly influence a subject's hypnotic behavior. It is clear that at some level a cooperative subject wishes an experiment to "work out," i.e., to help fulfill the experimenter's expectations. If a subject grasps the purpose of the experiment and/or the bias of the experimenter, he is disposed

toward producing behavior which will confirm the experimenter's hypothesis. This is particularly true in a hypnotic relationship.

In all three studies, the subject had previous trance experiences with the hypnotist, which, we may assume, initiated a positive relationship between the subject and hypnotist. Although the subject was instructed to resist entering hypnosis, it was in the context of participating in an experiment to test this issue. It seems possible that in all three cases the subject was responding as if the experimenter were implicitly asking the subject to collaborate with him in order to demonstrate that trance could be induced despite the subject's resistance. The subject's motivation in this situation may be conceptualized as: (a) the overt attitude of resistance requested during the experiment and (b) the more fundamental attitude of cooperation to show that trance can be induced against a subject's will. In our view, the latter attitude was more relevant in determining the subject's behavior.

The author feels that, because of the preceding objections, these three studies offer no conclusive evidence regarding the question of

the possibility of inducing trance in a resistant subject who has been previously hypnotized. An experimental situation designed to test this question would have to take two variables into account: (a) the usually positive relationship between subject and hypnotist and (b) the demand characteristics of the situation. These two factors are necessary since in the setting of interrogation the aims of subject and hypnotist are apt to be at variance. One possible experimental design might involve two experimenters: one with whom the subject has a positive relationship, and the hypnotist with whom he does not. It should somehow be conveyed to the subject that the experimenter with whom he has the positive relationship believes (or hypothesizes) that the subject will be able to refrain from entering trance. Under these circumstances, we hypothesize that the hypnotist will be unable to induce trance in the resisting subject. We further assume that if the hypnotist is able to create a positive relationship, he would then be successful. In other words, whether a subject will or will not enter trance depends upon his relationship with the hypnotist rather than upon the technical procedure of trance induction. Admittedly, these predictions are based on extremely subtle phenomena. A test of these hypotheses would necessitate observers trained in evaluating nuances of feelings in order to be able to judge the nature of the relationship between subject and hypnotist. It is imperative that this factor be controlled if we are to draw any valid conclusions about an interrogation situation, since a positive relationship may come into existence only after it has been carefully nurtured.

The same kind of situation could be utilized in studying the induction of trance in resistant subjects who have never before been hypnotized. No data are available on this question. However, the problem is identical to the one discussed above except, perhaps, that additional resistances would be encountered.

Summary

In summarizing the evidence we are led to the conclusion that despite many apparent indications that hypnosis can be induced without the subject's knowledge or consent, all these situations seem to depend upon a positive relationship between subject and hypnotist. The most favorable of these situations occur when the subject (a) expects to derive benefit from his association with the hypnotist and (b) has trust and confidence in the hypnotist's ability to help. No reliable evidence exists that hypnosis can be induced directly from sleep in an unaware subject, nor is there good evidence that a subject is unable to resist trance induction if thoroughly motivated

to do so. An unexplored area relevant to this problem is the relationship of rhythmic stimulation and environmentally induced states of fatigue to suggestibility. It is also suggested that the question of whether hypnosis can be induced against the subject's will can be tested only by experiments that control the relationship between subject and hypnotist. In a study that utilized a hypnotist unknown to the subject and where the structure of the total situation was clear to the subject that it was desired and expected that he be able to resist hypnosis, current theory and clinical data lead us to expect negative results. No studies of this kind have been done, however.

The Degree of Behavioral Control Which Hypnosis Makes Possible

Assuming an interrogator were able to circumvent the technical obstacles and induce hypnosis in a subject who wants to withhold information, to what extent would the subject remain master of his fate, even in deep trance? This is an area where wide disagreements prevail among authorities and where experimental evidence is highly contradictory.

Throughout this discussion no differentiation will be made between behavior that results from direct suggestion and that induced posthypnotically. Erickson and Erickson (21) maintain that posthypnotic behavior is performed in a self-limited hypnotic state. All phenomena elicited by means of posthypnotic suggestions may also be seen in trance, although the reverse is not always true. In line with Erickson and Erickson, we feel that the subject carrying out posthypnotic suggestions is in an hypnotic trance state,

although at times a less intense one. The difference between the two states, if any, seems to be a difference in degree rather than kind.

Young (84) reports that subjects resist specific hypnotic suggestions if they have decided in advance to do so. Wells (79), on the other hand, reports contrary data. He found that none of his subjects was able to resist the predicted command or, indeed, any other. This contradiction exemplifies the controversial nature of the question of behavioral control in hypnosis. The problem has generally focused on the more specific question of whether a person can be induced through hypnosis to violate major social prohibitions which he has internalized or to commit some self-destructive act. It is the usual practice to use the term "antisocial acts" to refer to such behavior, but in this chapter terms more descriptive of the subjective significance of the act for the person are preferred.

Behavior Violating Internalized Prohibitions

The question is usually phrased in terms of whether an individual will commit antisocial or self-destructive acts in response to direct suggestion. Behavior considered to be antisocial is that which is so defined by the culture in which the individual has been raised. However, the question is complicated by the fact that some behavior is defined as antisocial in one context and as socially required in another, for example, murder vs. the soldier's obligation to fight. One of the major research difficulties is that some behaviors are considered taboo under normal circumstances, whereas they are felt to be legitimized in an experimental setting. The extent to which behavior is legitimized in this manner will depend largely on the subjects orientation both to the behavior in question and toward experimentation. All the material in the following discussion must be viewed in terms of the major difficulty of creating a situation which is contrary to the individual's internalized controls and which cannot be legitimized by the situation in which it is tested. Heron (31), Kline (35), Marcuse (43), Weitzenhoffer (76), etc., have discussed the problem of definition in evaluating the literature on hypnotically induced antisocial behavior.

The early view in this controversy over the elicitation of "antisocial" behavior, which answered the question in the negative, had been generally accepted until recently. Still, such classic authors as Forel (23) and Moll (48) believe that hypnosis is potentially capable of allowing sexual assault.

Laboratory Experiments

Supporting the negative view is the classic experiment reported by Janet (34). He asked a deeply hypnotized female before a distinguished group of judges and magistrates to stab people with rubber daggers, to poison them with sugar tablets, and in this fashion to commit several "murders," all of which she did without hesitation. As the company dispersed, the subject was left in charge of some of the younger assistants who, intending to end the experiments on a lighter note, suggested to the subject that she was alone and would undress. This promptly caused her to awaken. It should be noted that the "murders" were committed in such a way as to be play acted, whereas undressing would have certainly been real to the subject. In this classic instance, at least, she had no difficulty in discerning the difference. If, then, hypnotic subjects do not lose contact with the

"real" situation, can they be induced to violate internalized prohibitions? Several modern investigators claim that this is indeed possible.

Wells (80), in an experimental demonstration, induced a subject by means of a posthypnotic suggestion to take a dollar bill from the hypnotist's coat which was hanging on the wall and to accept it as his own money. Thus, in effect, the subject stole a dollar bill. The subject was unaware of this "crime" and denied vehemently that he had committed it. Wells maintains that failures to induce a subject to commit certain acts do not negate this possibility since the subject may not have been hypnotized deeply enough or improper techniques may have been used; whereas even one success demonstrates the possibility of achieving this result.

Brenman (16) conducted a series of experiments involving minor aberrant and self-injurious acts. Thus, in repeating the Wells study, she had a subject remember falsely that she had taken $2 instead of $1. The subject returned the $2 to the experimenter. She also was able to induce one subject to go through other people's pocketbooks, and to have another subject insult an acquaintance.

Schneck and Watkins in two separate reports cite evidence that behavior ordinarily constituting a crime can be produced by hypnosis. Both these reports deal with military situations. Schneck (64) inadvertently caused a soldier to commit a military offense by carrying out a posthypnotic suggestion and thus deserting his duty. It must be remarked, however, that Schneck himself was a medical officer in the army at the time he was conducting this experiment. Although the soldier may have neglected his duty, it was implicitly at the order of the medical officer and Schneck later made certain that no harm came to the soldier because of his military offense.

Watkins' (73) experiments, also conducted in this setting, are of particular relevance to us. Watkins induced a soldier to strike a superior officer by suggesting that the officer was a Japanese soldier and, according to the report, the soldier had to be restrained from inflicting serious injury to his officer. In another more relevant instance, Watkins was able to obtain information from a WAC under hypnosis which she had previously said she would not reveal and which was classified SECRET. The experimental demonstration took place before a professional group. Before the induction of hypnosis the WAC was asked how she would respond to interrogation by the enemy; she replied that she would reveal only her name and serial number. The hypnotist asked the subject to pretend that he was a German military intelligence officer and then proceeded to induct

trance. When the WAC was in hypnosis he represented himself as her First Sergeant and proceeded to question her about classified matters, She answered all of his queries, whereupon an officer stopped the proceedings "in the interest of military security."

Although these demonstrations appear convincing, they are open to the criticism that Watkins was an Army officer and although offenses were apparently committed, no serious damage could possibly result in this setting. At some level, at least, the individuals in question must have been aware of this fact.

A different type of experimental situation was constructed by Rowland (60) and also by Young (86). Two experiments were performed; one required that the subject throw acid at a research assistant, the other that he pick up a rattlesnake. Rowland's original experiments employed an invisible glass which protected the research assistant from the acid, and an invisible wire screen which prevented the subjects from picking up the rattlesnake. Although there were only two subjects in each experiment, all four carried out the hypnotist's commands. No attempt was made to conceal the fact that, in one case, this was a highly corrosive acid, and in the other, that this was a poisonous snake.

Young (86) slightly changed the conditions of the experiment by using a harmless snake which looked almost identical with a water moccasin and replacing the acid with tinted water while the subject was not looking, thus obviating the need for screens or invisible glass which might be perceived by the subject. The similarity of the colored water to the acid was dramatically shown by the fact that in one instance the experimenters themselves became confused and acid was thrown at the research assistant, necessitating the immediate use of first aid. Again the subjects performed both the homicidal and the self-destructive acts in the laboratory. Both experimenters report that normal control subjects in the waking state refused to pick up the rattlesnake or throw the acid when requested to do so.

Although these experiments seem to be extremely convincing, we must take into account the setting in which they were conducted. All the situations were clearly experimental ones, and were perceived as such by the subjects. The hypnotists who request the homicidal or self-destructive behavior are known to the subjects as reputable men. It is highly probable that the subjects, at some level, were convinced that in the experimental situation no serious harm would be permitted to come to anyone. This kind of situation is similar to that of a stage magician who asks a volunteer from the audience to cut off some individual's head with a guillotine which has been

convincingly demonstrated. Under these conditions volunteers from the audience will readily trip the appropriate lever. This could be be construed to be a homicidal act were it not for the fact that the volunteer from the audience knows full well that some kind of trick is operating that will prevent any harm from occurring, even though he cannot see the mechanism of the trick or know how it works. The question may be raised why control subjects in the waking state refused to perform these acts. One wonders whether the expectation that they ought not to do this was somehow communicated to them. Ways in which these objections might be met experimentally are discussed later.

By far the most sophisticated attempt to deal with this problem of the possible recognition of the situation as unreal has been undertaken by Kline (35). Unfortunately, only one subject was involved. He performed an antisocial act, however, which was "not only antisocial but punishable by law." Furthermore, while the subject had agreed to participate in a study to test the legal implications of hypnosis, the act was undertaken in a setting outside of the laboratory which was, to all intents and purposes, "real" (personal communication). The act, which is not detailed in the paper "for reasons of legality and recognizability," was clearly opposed to the internalized inhibitions of the subject. By most reasonable normative criteria, it would be viewed as highly objectionable. Four experimenters, competent hypnotists, failed in their attempts to induce the subject to perform the act. When the subject's perception of the reality situation was altered, however, he was willing to perform the action for three of the four experimenters. The experimenter for whom he refused revealed later that she herself was upset by the nature of the requested act and by the deception. In a further experiment the subject was reassured that the action was all right but no perceptual alteration was used. Under these conditions he was willing to perform the action for only one of the experimenters. It was also possible to induce the subject to perform the act by first requesting him to visualize its performance before directly requesting the action.

This study is particularly interesting in that the subject was willing under some situations to perform an action for the experimenter with whom he had the best rapport

but not for the others. He refused to perform this action in the waking state despite the experimenters' attempts at persuasion.

Probably the most convincing aspect of this study is that with varying conditions, all, some, or none of the experimenters could

induce the subject to perform the act. The limitations of the study are that only one subject was employed and that the subject was himself interested in investigating the legal implications of hypnosis. In this context, it is interesting both that the subject had amnesia for his action and that after he was finally informed of his behavior he felt that the need to demonstrate the point made the experiment legitimate. Further investigation along this line, especially utilizing subjects less ego-involved in the purpose of the study, would seem necessary in order to draw a more definitive conclusion.

Speaking for the negative in this controversy is an experiment reported by Haupt (30). The subject was a student who was in hypnotherapy with Haupt. The posthypnotic suggestion was given that the student would, upon awakening, pick up Haupt's notebook, leaf through it, and read it. This is an action which the author feels the student would never have dared under normal circumstances. After waking, the student rose, went to the table, looked at the open notebook and asked: "Here you write your notes, don't you?" He made no attempt to pick it up or read it. When memory for the posthypnotic suggestion was restored, the student reported that he had felt a drive to read the notebook but restrained himself. Haupt observes that the subject's behavior was a compromise between the suggestion and what was socially acceptable and that since this minor infraction was not performed, it is not possible to induce more deviant behavior by means of hypnosis.

A fairly elaborate study by Erickson (19), reporting some thirty-six individual experiments, supports the view that violations of social prohibitions *cannot* be achieved in hypnosis. This study is open to question in view of the reported results in laboratory settings by others. Erickson is known to his subjects as a responsible investigator. The fact that he did not have any positive results would lead one to wonder if he did not implicitly convey his expectations of refusal. In view of the relationship between subject and hypnotist in both the Haupt and Erickson studies, it may be that the subject would act in accordance with the hypnotist's implicit expectations.

In a review of the literature on this subject Weitzenhoffer (75) attempts to reconcile the contradictory evidence on inducing socially prohibited behavior. He points out that attempts which have been successful are those in which the subject was given a hallucinated pseudo-situation which redefined the behavior as socially acceptable. An

instance of this would be the Wells' (80) demonstration. He induced the subject to "steal" a dollar bill by being told it was his own money. Thus, from the subject's viewpoint he was no longer

committing a transgression. Weitzenhoffer attributes failure to induce subjects to perform "antisocial" acts to those situations in which the subject perceives the transgressive nature of his behavior. This explanation, although seductive at first glance, does not appear to do justice to the literature. Erickson attempted in some instances to create this type of situation and obtained negative results. On the other hand, Schneck was unaware of the normative implications of his posthypnotic suggestion at the time it was given. Nor was there any attempt to disguise the dangerous nature of the situations in the Rowland or Young experiments.

It seems appropriate, in this context, to note that frequently subjects in hypnosis appear to show an increase of super-ego-type inhibitions. This has been pointed out by Gindes (27) and has been observed by the author. Bramwell (15) reports a case that clearly illustrates this point. A patient suffering from pulmonary disease was treated by hypnotic suggestion by her physician in the presence of a nurse. Before trance was terminated, the physician remembered that he had not examined the patient that week, and asked her to bare her chest so that he could examine her. Much to his amazement, the patient refused to do so despite the fact that this was a routine procedure to which she had never objected in the past. After the patient was awake, the physician again asked her and she permitted him to proceed with the examination without any objection. The nurse asked the patient sometime later why she had refused in hypnosis, and the patient expressed disbelief that she had done so. Under some circumstances, at least, behavior normally prohibited but appropriate to the situation will not be carried out in hypnosis. Apparently, under hypnosis the subject may interpret interpersonal motives and intentions differently from when they occur in the waking state.

Experimental Requirements

To satisfy the requirements of an adequately controlled investigation of violations of internalized prohibitions in hypnosis, a number of conditions would have to be met. These have not been dealt with in any experimental study to date.

As has been pointed out previously, the experimental situation legitimizes much behavior which the subject, in other contexts, views as contrary to his internalized prohibitions. It is desirable to determine whether the behavior is also legitimized in the experimental setting by subjects who are not hypnotized. One way in which this can be determined economically 'is to utilize a control group of

subjects who are highly motivated to simulate hypnosis in order to deceive the experimenter. If the experimenter is not aware that the subjects are simulating, he will treat them as he does real subjects. If these controls perform the antisocial act, we may assume that the experimental situation itself has legitimized behavior that appears to be antisocial. A refusal of the control subjects to perform the given action would lend support to the hypothesis that the behavior cannot be legitimized solely by the experimental situation.

An additional possibility must be considered. Abundant evidence exists that under some circumstances of social legitimization, individuals indulge in behavior that is ordinarily viewed as antisocial; for example, lynching behavior, or extreme exhibitionism and sexual license in association with drinking or marijuana. In some instances, hypnosis may provide the legitimization for behavior which the person wishes to perform but which he feels he cannot do under normal circumstances. It is not clear whether it is hypnosis per se or the hypnotic situation which is instrumental in the production of these acts. Clinical evaluation of each experimental subject thus becomes necessary for an understanding of the motivations involved.

If we assume that the subject, even in deep hypnosis, retains an awareness of his surroundings and at some level a grasp of the actual realities of the situation no matter how subjectively real his hallucinated environment is, it becomes necessary to take into account the total situation in order to evaluate the true meaning of the subject's behavior. Thus, no set of experiments which asks the subject to violate a social prohibition in a psychological laboratory of a university, and which is conducted by individuals known to be reputable investigators by the subject, can provide definitive answers. The only purpose for which a psychologist would ask a subject to throw acid at another individual would be to contribute to science or new knowledge. And even these aims would be precluded by a concern for the safety of the individuals involved. Thus the behavior, however antisocial on the surface, is not contrary to the subject's values in its total context.

A better test of the question would be an experiment performed by someone who is not known to be a university professor. For example, a carnival hypnotist might suggest to a subject obtained as a volunteer during a demonstration that he return after the performance. At that time during a reinduced trance he would suggest that he should rob the local jewelry store and bring him, the hypnotist, the stolea jewelry. This kind of an experiment would be psychologically totally different from anything which has ever been attempted in

a laboratory. The following conditions would have been met: (a) the behavior would be in fact criminal, (b) the motive of the hypnotist would be clearly for personal or financial gain, (c) the hypnotist would not have a reputation as a serious responsible investigator, and (d) the relationship between the subject and the hypnotist is of brief duration and would not in itself in any way justify the type of action being undertaken by the subject for the hypnotist.

It is possible to approximate closely this type of situation in a college environment. Thus, a graduate student assistant might utilize a subject in an "unauthorized" trance-induction, and request that the subject enter one of the senior-professors' rooms and appropriate a Ph.D. examination paper, which the subject knows to be confronting the graduate student. The arrangements required to make this kind of a study feasible would be more practical and the test of the hypothesis almost as severe. "Simulating" hypnotic controls would be necessary to determine whether the situation is still perceived as experimental by the subject.

Nonlaboratory Instances of Criminal Behavior

What appears to be more relevant for the subject of interrogation are those reported instances of criminal behavior that were allegedly induced by hypnotic means. Considerable interest has been expressed by the legal profession in this problem, and it has generally been held that a crime committed under hypnosis would be the responsibility of the hypnotist rather than that of the subject. For this reason the plea of hypnotic influence has at various times played a role in legal defense. There are a fair number of cases on record prior to 1900, particularly among the German-speaking peoples (29). Unfortunately, it is hard to evaluate these cases objectively at this late date. For the most part, they deal with sexual offenses and we must point out that hypnotic influence is often claimed to justify behavior which might have been quite desirable to the subject at the time of its occurrence. It has never been clearly demonstrated that hypnosis has played a significant role in these cases, and it seems in several instances that the relatives, rather than the subject, claimed hypnotic influence.

We will discuss briefly the three documented cases which have been reported within recent years in which hypnosis has allegedly played a role in criminal behavior. Each of these three cases was studied extensively by psychiatrists. One was studied by Walther Kroener (58), another by Ludwig Mayer (44), and the most recent case by Paul Reiter (58).

In the case he studied, Kroener reports that a sensitive, young, unmarred, male schoolteacher came under the hypnotic influence of a "frieadly" neighbor. The

relationship began with neighborly hospitality and proceeded to the point where, by means of hypnotic suggestion, the neighbor induced the schoolteacher to give or lend him small sums of money and goods. In order to test his power over the schoolteacher the hypnotist gave him a posthypnotic suggestion that he (the victim) would shoot himself in the left hand. The schoolteacher actually did shoot himself in his left elbow joint, subjectively perceiving the event as an accident. By means of a posthypnotic suggestion the hypnotist induced his victim to confess to crimes that the hypnotist had committed. Throughout the entire affair, which lasted for five years, the schoolteacher had no recollection of the hypnotic sessions. The schoolteacher was convicted, but began to suspect the nature of his relationship with his neighbor on the basis of a chance remark. After many appeals he was recommended for examination to Kroener, who eventually uncovered the true state of affairs by re-hypnotizing the schoolteacher and thereby causing him to remember all the hypnotic experiences with his neighbor.

The study by Mayer (44), usually called the Heidelberg case, involves a twenty-four-year-old housewife who was victimized by a man who posed as a doctor treating her. Ostensibly he systematically trained her in hypnosis for seven years. At first he swindled money from her under the pretense of curing her of various complaints which he himself had induced by hypnotic suggestion. Later, presumably by means of his hypnotic influence, he compelled her to have sexual relations with himself and with his friends. Also as a result of his suggestions she made six attempts on her husband's life and several attempts upon her own. The hypnotist was arrested and convicted despite his consistent plea of not guilty.

The third case, investigated by Reiter (58), deals with a man who was sentenced to prison for helping the Germans during the last war. At this time he was in an extremely depressed and disillusioned frame of mired. While in prison he met a man who especially fascinated him because of his apparent knowledge of religion, mysticism, and occultism. The two became friends and experimented extensively with Voga and hypnotism. They were alone in the same cell for nearly eighteen months, besides being together in the workshop every day. After awhile, the hypnotist informed his victim that he (the hypnotist) was an instrument employed by the guardian spirit, and that the guardian spirit was speaking to the victim through the medium of the hypnotist. From that time on the victim felt that

he had to carry out all the orders of the guardian spirit. After they were released from prison the men continued their relationship — and the guardian spirit continued to make demands. The guardian spirit ordered his victim to turn over his wages to the hypnotist; he found a girl for the victim to marry and ordered him to do so, which he did; he ordered him to procure money in order to establish a political organization

through which they could create a better society and unite the Scandinavian countries, the goal being the salvation of mankind. It was toward the latter end that the guardian spirit, through the medium of the hypnotist, pointed out the bank that the victim was to rob. The robbery was accomplished, and a year later orders came for another bank robbery. During the execution of this task the victim committed murder and was apprehended.

In all three cases a common element was present. In some manner the subject was dissatisfied and the individual who later became the hypnotist provided gratification. In the first case, the schoolteacher lived alone, and appeared somewhat isolated because of insufficient social contacts. The neighbor provided friendship and initially performed many minor services for him. In the Heidelberg case the subject initially met the hypnotist in a situation where he presented himself as a physician who could relieve a symptom that was causing her acute distress. The subject appeared to have had psychosomatic symptoms before contact with the hypnotist, which might have reflected tension in her marriage. Furthermore, the hypnotist appeared to be a sexually attractive psychopath and hypnosis may have provided the opportunity for the gratification of some of the victim's needs. In the last case the subject was dejected with intense feelings of worthlessness, as an aftermath of collaboration during the war. The hypnotist became a friend prior to the beginning of the hypnotic experiments. The intensity of this relationship can be inferred from the fact that the subject at the time began to feel considerably more comfortable. Thus, in each case the relationship between subject and hypnotist was such that the former derived need gratification from the association.

Frequently relationships exist between two individuals that have no connection with hypnosis but are marked by intense feelings and a strong tendency on the part of one individual to comply with whatever requests are made of him by the other. The transference relationship seen in psychotherapy is a case in point. If this type of relationship exists between two individuals, it would seem unnecessary to employ hypnosis to explain behavior on the part of one person which benefits the other. Only in the absence of this kind of pre-

existing relationship is it meaningful to speak of hypnosis as being a necessary prerequisite for the behavior.

Undoubtedly, hypnosis played some role in the cases we have discussed. However, if we are to make inferences from these data to the situation of hypnosis in interrogation it is necessary to keep in mind that the relationship between the interrogator and the subject is not often comparable to the long-term relationships which existed in the cases cited.

Summary

In summing up the evidence on behavior violating internalized prohibitions as it is applicable to an interrogation situation, we find ourselves in the unfortunate position of having no study available that is not vulnerable to serious criticism. The experimental laboratory studies suffer from the defects of a pseudo-reality situation where the "nansgressive acts" cannot be defined as such in the context of the total situation, and from the defect of the mutually shared wishes and motives of experimenter and subject. The only three cases of criminal acts apparently involving hypnosis which are reliably reported in the recent literature all involve an intense emotional relationship between hypnotist and subject. Such a relationship may be difficult to establish in the interrogation situation. In the absence of meaningful evidence, any conclusions reached must be of a conjectural nature. Experimental tests of the question are feasible, but would require camouflage of the institutional responsibilities of the investigators. The author would postulate that only in rare interrogation subjects would a sufficiently deep trance be obtainable to even attempt to induce the subject to discuss material which he is unwilling to discuss in the waking state. The kind of information which can be obtained in those rare instances is still an unanswered question.

Recall and Accuracy of Information Obtained in Hypnosis

Despite the previously discussed technical problems, it may be possible for an interrogator to obtain information from a hypnotized subject. Also, a subject may willingly enter hypnosis. In either case the interrogator must evaluate the veridicality of the elicited material.

A great deal has been written, especially in the press, about the unfailing accuracy with which subjects in hypnosis will recall past events. Statements have frequently been made about individuals

having perfect memory in hypnosis, about their ability to recall anything that has happened to them even while infants, and, according to some, even prior to birth (37).

Two separate issues have to be examined: (a) is the subject in hypnosis able to recall historically accurate information which he cannot remember in the waking state and (b) is information obtained from a subject in hypnosis necessarily accurate when it has been suggested to him that he cannot lie?

Is Information More Accessible to Recall Under Hypnosis?

A mechanism frequently used to facilitate recall is that of hypnotic age regression. The subject is "regressed" or taken back in time to the situations toward which recall is directed. For example, if a subject in deep hypnosis is given the suggestion that he is, let us say, six years old, he will begin to act, talk, and to some extent think in the manner of a six year old. He will hallucinate the appropriate environment and will give such details as the people sitting next to him in school, teachers' names, color of walls, etc. The subject's actions under these circumstances are exceedingly convincing, and it has frequently been assumed that an actual regression to the suggested age takes place, with many of its psychologic and physiologic components. It is often assumed that the information obtained under these circumstances is accurate.

Platonov and Prikhodivny (57) published two studies which claim to prove the reality of age regression by means of intelligence tests. One of the most striking studies is by Gidro-Frank and BowersBuch (25), who demonstrated that the infantile type of plantar response appeared in subjects who were regressed in age to approximately five months. Unfortunately they did not investigate whether the subjects were aware of the type of plantar response to be expected in infancy. The subject population included medical students and nurses, and it is reasonable to assume that they were not entirely naive. Single case studies which claim to demonstrate "real" age regression have been reported by a variety of investigators: Spiegel, Shor and Fishman (69), Schneck (66), Mercer and Gibson (47), LeCron (41), Bergman, Graham, and Leavitt (8), and Kline (36).

Despite these studies, which are based mostly on single cases, there is little evidence for the validity of hypnotic age regression. Young (85) in a study using a number of subjects has demonstrated that their performance on intelligence tests was not appropriate to their suggested age. Unhypnotized control subjects were more suc-

cessful in simulating their age than were subjects in deep hypnosis. There was no correlation between the apparent depth of hypnosis and the extent of regression.

Orne (51) conducted a study of hypnotic age regression in ten subjects employing the Rorschach test and drawing samples, and was able to demonstrate that, while some regressive elements appeared, it was clear that nonregressive elements were also present. Furthermore, the changes toward regression did not show any consistency from subject to subject. The drawing samples in age regression were evaluated by Karen Machover who characterized them as "sophisticated oversimplification." They did not resemble the drawings of six year olds. For one subject his drawings at age six were available, but there

was not even a superficial resemblance. In this context it is particularly significant that subjects often gave their teacher's name with great conviction. Later inquiry disclosed that the names were inaccurate and did not refer to first grade teachers at all, but to the subjects' teachers at a much later time.

Finally, there are studies by True and Stephenson (72) and McCraitie, Crasilneck, and Teter (45) who investigated EEG's taken during hypnotic age regression. Neither study demonstrated any change in the direction of a childhood EEG. It is also of interest that these studies do not report an increased heart rate (present in infants) nor changes in EKG tracings.

To summarize, the literature on hypnotic age regression fails to demonstrate that the phenomenon is anything more than an extremely convincing form of role-playing, as suggested by Sarbin (61), Young (85), and Orne (51). There is little evidence in any of these studies to indicate that recall for nonernotional material is significantly improved.

It is important for our purposes to distinguish between emotionally neutral material and emotionally charged events, which are subject to active forgetting or repression. There is abundant evidence that emotionally laden material that is not normally accessible can be recovered by hypnosis. Probably it is this phenomenon which has led to the erroneous assumption that all types of material may be recalled in this fashion.

Two specific studies deal with memory in hypnosis: Stalnaker and Riddle (70) asked subjects in hypnosis to recall the poem "The Village Blacksmith." At first glance, hypnosis appeared to increase their recall of the poem. Much of the apparent improvement was due to appropriate confabulation of poetic material in the manner of Longfellow. The significant point is that subjects in hypnotic

trance show a marked tendency to confabulate with apparent verisimilitude. White, Fox, and Harris (82) demonstrated that hypnosis does not improve memory for recently learned material, but appears to improve memory for meaningful material, such as poetry, slightly. They do not make any statements about the accuracy of reproduction.

The Accuracy of Information Obtained in Hypnosis

Considerably less material is available about the veracity of the material furnished by a subject in hypnosis. As the preceding discussion indicates, subjects in deep hypnosis tend to confabulate in the direction of what they perceive to be expected of them. We should like to examine the extent to which subjects in hypnosis can purposely misrepresent material, although it has been suggested to them that they cannot do this.

As we have already indicated, Young (84) has shown that subjects can resist specific suggestions if they have decided in advance that they will do so. Wells (79) had demonstrated the opposite. Earlier quoted comments on demand characteristics apply to both these studies. The issue remains to be resolved by an adequate empirical test.

Beigel (6, 7) reports three cases of hypnosis used in an effort to ascertain the facts in marriage counseling situations. In a personal communication, he maintains that people in hypnosis may lie, refuse to answer, or wake up when asked direct questions on sensitive matters. However, he claims to have successfully elicited information which subjects were reluctant to reveal in the waking state by means of a hypnotic reliving of the situation. The crucial factor, in Beigel's opinion, is the indirect nature of this method, i.e., the subject is unaware of revealing information since his major concern is the reliving of an experience. However, this approach utilizes a form of age regression, and is, as such, subject to the criticisms already made with regard to this technique. Another objection derives from the fact that the subject's motivations are not adequately taken into account. Beigel's subjects were, for the most part, therapy patients. It is, perhaps, not too far fetched to assume that psychotherapy patients "want," at some level, to reveal information to their therapist. Nor is it unreasonable to believe that they "need" to do so. Confessions to a therapist satisfy multiple needs of patients in psychotherapy.

In reviewing the existing literature we have found only one author who deals with prevarication under hypnosis (Beigel). However, our own clinical work has amply convinced us that subjects are

fully capable of deliberately lying when motivated to do so. Although this report deals specifically with hypnosis, it may, at this juncture, be useful to consider also the question of prevarication under the influeuce of drugs commonly used in narcosynthesis. Its relevance is confirmed by the findings of Grinker and Spiegel (28) and others who, in the treatment of traumatic neurosis by narcosynthesis, obtainod results which closely paralleled those observed by hypnotic treatment of these neuroses (17). Individual differences in response to treatment are found both in narcosynthesis and hypnosis, whereas treatment techniques show marked similarities. Friedlander (24), Schilder (63), and others have described trance-induction techniques utilizing sleep-inducing drugs. With these similarities in manner we feel that it is appropriate to mention here some of the work done on the question of prevarication under the influence of these drugs, which as treated in more detail in Chapter 3.

Muehlberger (49), for example, who considers narcosynthesis as a useful technique, admits that nevertheless, "Unless supporting evidence is obtainable, the reliability of results of 'truth serum' tests are open to serious question" (page 524). In a study of

malingering soldiers Ludwig (42) reports that they remained negativistic and uncommunicative while under drugs.

In a thorough discussion of drug-induced revelation, Dession et al. (18) conclude that:

> In some cases correct information may be withheld or distorted and, in others, erroneous data elicited through suggestion. Nevertheless, narcoanalysis, when correctly used, may enable the psychiatrist to probe more deeply and quickly into the psychological characteristics of the subject. For these reasons, the results should not be regarded by the psychiatrist as "truth" but simply as clinical data to be integrated with and interpreted in the light of what is known concerning the dynamics of the subject's conflictual anxieties, motivations, and behavioral tendencies.
>
> Thus the bare results of an interview under the influence of drugs should not, standing alone, be considered a valid and reliable indicator of the facts. As a sole procedure, narcoanalysis is not sufficiently reliable.

We feel that these conclusions apply not only to narcoanalysis but to hypnosis as well.

If, as we have proposed, an individual under the influence of these drags is in a state akin to hypnosis, then the results of these drug studies support our theory that some subjects may lie, confabulate, or withhold information while in trance. This poses a special problem for the military interrogator. Even those informants who believe they are telling the truth may in fact be offering a composite of delusion, fantasy, and reality. Thus, the convincing delivery of

information obtained under hypnosis may easily lead an interrogator astray.

Summary

A mechanism frequently used to facilitate recall is that of hypnotic age regression. There is no evidence to indicate that this technique is anything more than a convincing form of role-playing, real only on an emotional level. Thus it probably does not greatly facilitate the recall of past events. Hypnosis does not improve recall for nonmeaningful material, and does so only slightly for meaningful material. However, there is evidence that emotionally laden material that is not normally accessible can be recovered in hypnosis. It has been demonstrated that subjects can be under both hypnosis and drugs.

It is possible that information may be obtained by hypnosis. Such information may be either accurate or inaccurate. Inaccuracies may be the result of deliberate prevarication, or of an unwitting confusion of fantasy and reality. The determination of the truth or falsity of information obtained in hypnosis would have to be based on outside criteria.

Defensive Uses of Hypnosis

Simulation of Hypnosis

An interrogator who employs hypnosis may find that his subject apparently enters trance and gives the desired information. It is possible that the subject may not be in trance but may be simulating. The literature on the problem of simulation is extremely misleading. The classical view holds that subjects are unable to deceive experienced hypnotists because hypnotic behavior "looks different" in a number of ways. Furthermore, claims have been made that in order to detect fraud the hypnotist need only suggest anesthesia to the subject and test for it with a painful stimulus.

However, there are some indications in the literature that the detection of simulation is not a simple task. For example, Pattie (55), a thoroughly experienced investigator, felt that it was necessary to request his subjects sign forms reading as follows:

> I, realizing that the experiment performed on me will probably be published in a scientific journal, solemnly declare that I was not faking or imitating the hypnotic trance but that I was genuinely hypnotized and do not remember the events of the experimental periods.

When discussing this problem with a number of clinicians, one invariably finds that they report anecdotal evidence of having been deceived at one time or another. Orne (52) has conducted a series of studies investigating simulation. He has been unable to discover any physiological indices which differentiate simulators from deeply hypnotized subjects. In addition he also found that the overwhelming majority of apparently naive subjects are capable of simulating well enough to deceive even experienced hypnotists. Regarding pain, Orne (2) found and Shor (68) has confirmed that the simulating subjects generally tolerated higher levels of electric shock than did subjects in deep hypnosis. Using a fairly wide spectrum of behavioral tasks, they found it was not possible to differentiate unequivocally between real and simulating subjects. However, certain kinds of behavior were observed only in the true hypnotic subjects, although not in all of them. Orne (53) has termed this behavior "trance logic." It is

characterized by a mixture of hallucinations and perceptions from the real world. Typically, this mixture controverts the rules of logic normally operating in the waking state. For example, a subject might describe an hallucination of an individual sitting in a chair as "I can see Mr. X but I can see the chair through him." The appearance of trance logic in naive subjects is always indicative of hypnosis. However, trance logic helps discriminate neither those real subjects who do not manifest this behavior nor those simulators who have been taught to demonstrate it.

Considerable research remains to be done on the recognition of simulating behavior. At our present state of knowledge it is vital to bear in mind that the deep hypnosis is essentially a clinical diagnosis. Although under some circumstances this diagnosis can be made with a high degree of reliability, definitive signs of deep trance have not yet been identified. Until such pathognomic signs are developed, a subject trained to employ trance logic may not find it too difficult to deceive an interrogator.

Training in Hypnosis in Anticipation of Future Interrogation

Three related suggestions have been made for what may be called the defensive use of hypnosis. Thus, Estabrooks (22) proposed that hypnosis might be useful in (a) preventing subsequent trance induction in captured personnel, (b) causing personnel possessing sensitive information to develop amnesia for this material in case of capture, and (c) enabling captured personnel to resist stressful and painful

interrogations by training them to develop anesthesia and analgesia when required.

These suggestions are ingenious and appealing as defensive measures. Any objective evaluation of these proposals is made difficult by the paucity of relevant studies, and we are forced to extrapolate from the meager evidence available. In judging the practicality of these suggestions it is necessary first of all to take into account that only approximately 20%, of the military population can be expected to go into a sufficiently deep somnambulistic state conducive to such training. Furthermore, both the full cooperation of the military personnel involved and the availability of competent hypnotists would have to be taken for granted. In addition, training soldiers in this manner would be a time-consuming process.

Preventing Trance Induction

*Training Soldier*s to Resist Subsequent Trance Induction upon Capture. Here we are immediately confronted with the question of whether trance can be induced against the individual's wishes and whether posthypnotic suggestions are effective in preventing

trance induction. The first question has been discussed previously. Although the crucial experiment has not yet been done, there is little or no evidence to indicate that trance can be induced against a person's wishes. The proposal to train individuals not to do something they are able to avoid anyway appears to be of doubtful utility. It may be sufficient to warn them of possible techniques of trance induction and inform them that they are able to resist, if they so desire. In fact, the question ought to be raised whether training in hypnosis may not precondition an individual for subsequent trance induction, regardless of suggestions that they ought to resist hypnosis. There is no evidence that training in hypnosis predisposes subjects toward trance induction with or without their cooperation. However, there is considerable evidence that training in hypnosis makes subsequent trance induction easier with only token cooperation by the subject.

*Effectiveness of Posthypnotic Suggestions Designed to Prevent Subsequent Trance Induc*tion. As a matter of routine, subjects are given the suggestion that they will enter hypnosis only with a competent psychologist or physician, and only if they desire to do so. It is the writer's practice to suggest further that they will begin to laugh if one of their friends or a stage hypnotist attempts to induce hypnosis. Nevertheless, in several instances these experimental subjects have permitted themselves to enter hypnosis with individuals whom they

knew to be inexperienced. At times they have reported compulsive laughing jags just before falling asleep, in line with the posthypnotic suggestion, which did not, however, prevent their entering hypnosis. Two subjects trained in this manner entered hypnosis while watching a stage demonstration from the audience, again despite suggestions to the contrary. This observation has been confirmed by Sutcliffe (71), who has had similar experiences. Furthermore, the writer has himself hypnotized three subjects who had received specific suggestions from other hypnotists that they would be unable to enter trance with anyone else.

Spontaneous Trance. The spontaneous appearance of trance warrants some consideration. It has been noted during psychotherapy that patients who have had considerable hypnotic experience will sometimes use the trance state as a defense mechanism in order to avoid awareness of painful material. Such material will emerge during spontaneous trance and will subsequently be repressed when the patient emerges from the hypnotic state. The writer has observed this several times in clinical situations and it has been reported in personal communications by several other therapists. Since hypnosis may occur spontaneously in therapeutic situations as a means for avoidance of stressful situations, it may well occur equally spontaneously in other stress situations, and could be utilized by an alert interrogator.

We have been able to terminate hypnosis in several instances when trance had been induced by inexperienced hypnotists who were unable to terminate it. In these instances it was necessary to establish a hypnotic relationship with an uncommunicative subject in deep hypnosis. Contrary to popular belief, this can be accomplished readily and rapidly usually in less than half an hour. These findings are relevant to the dangers of spontaneously occurring trance during interrogation. Thus, although the interrogator may not have induced the trance, he could assume the role of hypnotist and communicate with the subject.

Conclusion

In view of the foregoing considerations, it appears not only fruitless but potentially dangerous to train subjects to resist subsequent trance induction. If the hypnotist has sufficient skill and experience, he might well be able to utilize the very suggestions given against entering hypnosis as the necessary wedge to induce hypnosis. Thus, if the suggestion has been given that the subject will not enter trance but

will laugh, and the hypnotist observes the subject beginning to laugh, he might suggest that the subject will begin to laugh more and more and will laugh so hard that he will become exhausted and go to sleep. In the same manner a posthypnotic suggestion of a headache or any other subjective experience which aught to prevent hypnosis can be utilized as a means of inducing it. Another danger of the hypnotically trained soldier is the greater likelihood of spontaneous appearance of trance in a stressful situation such as interrogation. Hence, the use of trance as a means of preventing subsequent trance induction by a potential captor has inherent dangers.

Induction Of Amnesia

More appealing perhaps than the previous suggestion is the possibility of causing captive subjects to forget whatever sensitive information they may have learned. Here again we encounter several technical problems. A blanket suggestion to forget all sensitive material will frequently fail to take effect. It is well known that the effectiveness and permanency of a hypnotic suggestion are directly related to the concrete definition of a specific task. As a rule, general suggestions such as blanket amnesia have unpredictable effects even in very good subjects. It may be possible to suggest that a soldier only remember his name, rank, and serial number in the event of capture. However, this raises not only the serious question of whether this could be accomplished but also of whether it might deprive the soldier of information which may be vital to him during captivity. A state of severe psychopathology would be artificially induced, which may be adaptive in some respects but extremely disturbing in others.

The decision of what to say during interrogation would be made for the soldier beforehand. The inevitable impoverishment of knowledge and loss of ego control would furnish the interrogator a very effective way of controlling his captive. The captive would be seriously distressed by the feeling of loss of self-evident and necessary information, and the interrogator would be a able to assume the role of a helpful individual ready to assist the recall of memory. Such a quasi-therapeutic relationship would inevitably produce an alliance between captive and interrogator with concomitant formation of a strong positive relationship. Recall would eventually take place, as in the treatment of amnesia under normal circumstances. The captive's defense would be lowered so that, as recall takes place, information would tend to be shared with the helpful interrogator.

In other words, the induced psychopathology may be sufficiently

disturbing to the captive to make him the easy victim of any technique aimed at relieving his discomfort. He may become a willing and cooperative subject for hypnosis, legitimized now as a treatment technique. Sodium pentothal may also be used, and is generally successful in leading to rapid recall. Since under these circumstances, control over the information is no longer an ego function of the captive nor his responsibility, he would feel little constraint in sharing his knowledge as it comes to him. Only after re-establishment of complete recall would he became aware of betraying vital information.

In summary, then, it does not appear feasible to cause a potential captive to forget sensitive information selectively. Such discrimination would require that, in giving the posthypnotic suggestion, the hypnotist would have to be aware of all types of present and potential future information that the subject has or will have, and that he make allowance for all eventualities. The alternative, to cause the soldier to forget everything about himself other than his name, rank, and serial number, would work only in a small minority of people. However, even for them a potentially vulnerable situation would develop, more vulnerable in fact than if no suggestion had taken place. The artificially induced pathology could easily be broken down, if recognized as such by the interrogator, who could secure the cooperation of the soldier by presenting interrogation as treatment of a sick person. It may be far safer to rely on the soldier's own ego control to decide what information ought not to be revealed to an enemy than to make this decision for him by posthypnotic means. Artificially induced amnesia would deprive the soldier of his ego functions and put him at the mercy of his captors. This method also has other serious defects; offensive action, such as escape or cooperation with fellow prisoners to obstruct interrogation, would be severely handicapped.

Hypnosis as a Means of Resistance to Stress

The final suggestion that we should like to discuss in this section concerns the use of posthypnotic suggestion in training individuals to resist stress, particularly pain. Extensive information is available about the use of hypnosis as a means of suppressing pain. Major surgical operations have been performed with hypnosis as the sole anesthesic.

Laboratory experiments have demonstrated that with hypnotic analgesia subjects do not report experiencing pain but continue to respond physiologically much as they do in the waking state (Shor, 68). Beecher (5) has shown that patients' reactions to placebos

(a suggestive phenomenon analogous to hypnosis) is far greater under situations of great stress and high anxiety than in the laboratory. It appears that hypnosis and placebos are most effective in situations of high anxiety and it is probable that their major effect is on the anxiety component of pain. During interrogation this component is most threatening to the individual, and thus hypnosis seems to be a particularly appropriate method of protection.

Whether such a procedure is feasible depends on a number of considerations. As stated in preceding sections, only a relatively small number of individuals will enter a sufficiently deep somnambulistic state permitting the development of the profound analgesia necessary for this purpose. Furthermore, the author is not aware of any instance where a major surgical procedure was undertaken during posthypnotically induced analgesia. Although we are certain that in some individuals this is potentially possible, clinicians working with hypnosis generally believe that the hypnotic state itself is more efficacious in inducing analgesia than posthypnotic suggestions.

Another question that arises concerns the type of suggestion which ought to be given to the subject. It would seem manifestly inappropriate to attempt to suppress any and all pain sensations that the individual may experience subsequent to hypnosis. First, we seriously doubt the effectiveness of such a suggestion. Second, if it should take effect, it may be dangerous since pain serves a useful function as a physiologic warning signal. It would be more appropriate to focus the suggestion on the inability to feel pain at the hands of captors. However, if the subject were captured and felt any pain at all, the entire suggestion would rapidly break down. This is likely to occur in all but very few instances. (It is due to this need for repetitive reinforcement of suggestions of analgesia that major surgery is undertaken in hypnosis rather than posthypnotically.) It is generally known that any one failure of a hypnotic suggestion will diminish the effectiveness of subsequent suggestions. Such failure will tend to eliminate almost completely the

suggestion concerning the modality where it failed. Here again, the soldier who is taught to rely on hypnosis as an analgesic and finds it ineffective in certain situations may be considerably worse off than if he had not trusted this mechanism in the first place.

It seems, then, that the use of hypnosis in withstanding stress, and particularly pain, is impractical. Few individuals are able to enter a trance sufficiently deep to permit profound analgesia. Furthermore, the analgesia would have to be produced posthypnotically, a less effective method than that produced during trance. The post-

hypnotic suppression of all pain may also be dangerous to the individual. Finally, if such posthypnotic analgesia were possible and it should break down, it would leave the individual more vulnerable than if he had not relied upon this mechanism at all.

Motivating Instructions

Our findings with individuals who have had instructions to simulate hypnosis are particularly relevant. Much of our current research employs simulating subjects as controls and, as we have pointed out previously, these subjects are willing and able to tolerate extremely painful stimuli. In fact, in a recent study Shor (68) found that simulators uniformly tolerate a higher level of painful electric shock than do subjects in deep hypnosis. These findings indicate that appropiiate motivating instructions are as effective as hypnosis in enabling individuals to tolerate laboratory situations of pain. Whether this also holds true in situations which represent real danger to the organism, such as major surgery or the threats encountered during interrogation, remains to be demonstrated. This suggests that motivational sets might be devised which would effectively protect personnel against breakdown under stress. How enduring such motivating instructions are remains to be studied.

Autogenous Training

One of the main defects of the three proposals discussed is that each involves a lessening of ego control. There is an application of hypnosis which might be explored fruitfully since it relies largely upon the responsibility of the subject for his actions. This is the technique of autogenous training developed by Schultz (67). Instead of the usual procedure in which the hypnotist suggests the occurrence of various events, the subject is taught that he is capable of inducing them in himself by proper concentration. He is taught the technique by a series of graduated steps. These are so designed that each is mastered before the subject is permitted to go on to the next one. For example, in the initial exercise the subject is taught to concentrate on his right hand becoming heavy and he is shown the most advantageous posture. After being shown the exercise by the

teacher, he is instructed to repeat the procedure by himself between three and five times a day for a two-minute period each. Within a period of two weeks or so a large proportion of the subject population is able to achieve a considerable degree of subjective heaviness. He is then

taught to induce a feeling of warmth and eventually goes on to control of respiration, relaxation of the body, and if desired selective anesthesia. The interesting feature of this technique is that the subject eventually becomes fully capable of producing these phenomena through his own efforts rather than by the suggestions given him by the teacher (hypnotist). Probably, the hypnotist is internalized by the subject in this process, and thus becomes an ego resource. Such a technique would also be useful in solitary confinement for controlling anxieties that otherwise might be overwhelming. The major distinction between this use of hypnosis and those commonly advocated is that the procedure would be one more technique of mastery available to the captive without sacrificing any degree of ego control. There is some anecdotal evidence that individuals trained in this manner found it useful during confinement in concentration camps.

It is difficult to determine whether the technique of autogenous training is in itself the effective mechanism or whether it merely represents a form of pseudo-mastery which can become an ego support. Both factors probably play a role. Thus, an increased degree of control over pain can undoubtedly be achieved. Equally important is the illusion of mastery that the individual may be able to create without recourse to external aids. Thus, if he is deprived of his clothing and his dignity he would still have at his disposal a technique which depends strictly upon concentration and which cannot be taken from him. When the individual feels at the mercy of an apparently all powerful captor, it may well be as important to him to be able to demonstrate to himself that he can control his respiration or can make a limb heavy as the actual ability to decrease physical pain.

Biderman (11) has discussed the importance to the interrogation subject of maintaining the feeling of control through either real or illusory devices. As long as the individual is able to induce subjective changes at will he may maintain a feeling of control which cannot be taken away. Anecdotal evidence obtained in personal communication from an individual subject to extensive interrogation by the Gestapo may illustrate the point. This subject found that he was able to control the point of passing out during interrogation. He would decide not to pass out just yet but perhaps some 60 sec later. Whether in fact he had control of this kind or whether he had the illusion of control is unimportant because the subjective feeling helped to maintain his mastery of the situation throughout several months of intensive interrogation. It is possible that autogenous

training may be a technique for providing the potential captive with an untouchable and effective technique of mastery in a situation where he is physically totally at the mercy of his captors.

Summary

The suggestion that hypnosis be utilized as a means of enabling potential captives to withstand enemy interrogation appears impractical. At best, it could be utilized with an exceedingly small percentage of subjects. Prevention of subsequent trance induction, by a posthypnotic suggestion to that effect, seems unlikely. The posthypnotic induction of amnesia and anesthesia for the event of capture would leave the captive in a more vulnerable position than he would have been otherwise, if indeed it is feasible at all. The training in hypnosis necessary to achieve these phenomena might well make the subject more accessible to attempts at trance induction by an enemy interrogator.

Our primary objection to all three of the proposed suggestions is based on the inevitable result of diminishing the individual's responsibility for his own actions by placing reliance on mechanisms outside his ego control. It is preferable and safer to utilize techniques designed to increase the soldier's ego control and potential mastery of unpredictable circumstances than to place faith in a semiconscious mechanism. Information about what the soldier might expect under conditions of captivity, about the techniques of enemy interrogation, about the kind of reactions he might experience in himself would all be desirable in terms of increasing his ego control and therefore his mastery of a potentially difficult situation. Two specific techniques designed to enhance ego control were suggested: the use of motivating instructions and the technique of autogenous training.

Defense Against the Use of the Hypnotic Situation in Interrogation

The technical reasons for the limited utility of hypnosis as an instrument of interrogation have been discussed here at some length. It is highly questionable whether it is possible to induce a trance in a resistant subject. Furthermore, even if trance could be induced, considerable evidence indicates that it is doubtful whether a subject could be made to reveal information which he wished to safeguard. And finally, it has been shown that the accuracy of such information, were any to be obtained, would not be guaranteed since subjects in hypnosis are fully capable of lying. However, it is possible that both

hypnosis and drugs, such as pentothal, scopolamine, sodium amytal, etc., may nonetheless be applicable to interrogation procedures. It would be well to differentiate between the effectiveness of hypnosis as such and the hypnotic situation. The latter seems to offer greater potential applicability for interrogation purposes.

The psychological meaning of the situation to the captive during interrogation is one which varies widely from individual to individual. It is not our purpose here to review the meaning of capture and interrogation from a psychodynamic viewpoint,[1] but only to consider briefly why individuals will undergo extremes of physical and mental suffering to prevent the interrogator from obtaining the desired information. The answer seems to lie in the extreme guilt such a person would experience were he to collaborate with the enemy while he is in control of his faculties. His self-image would suffer especially in terms of his values and his identification with comrades, country, etc. For interrogation purposes it would be extremely useful if it were possible to alleviate the guilt of an informant.

Let us consider the captive who is in fever and delirious, and who in this condition divulges vital information. Neither he nor his comrades would hold him responsible for the disclosure. By the same token a soldier who leaves his post as a guard is subject to court martial, but if he collapses because of illness he would not be committing a punishable offense. Parenthetically, it may be noted

[1] Parenthetically, it may be noted that conditions of interrogation are sometimes conducive to a regression on the part of the source. The interrogator can exercise complete control of the source's physical being — his primitive needs such as elimination, eating, and sleeping, and even bodily postures. He is also in a position to reward or punish any predetermined activity on the part of the captive. This tends to create a situation where the individual feels unable to observe any control over himself. This extreme loss of control is handled in a variety of ways, one of which is a regression to a childlike state of dependence on and identification with the aggressor. A discussion of the similarities and differences between this type of situation and hypnosis is given by Gill and Brenman in their recent book (26). It is doubtful that this type of situation is conducive to the induction of hypnosis as we know it. This question could only be tested in such coercive situations, however. Obviously the creation of an experimental situation even vaguely approximating that of punitive interrogation is well nigh impossible within the legitimate ethical limitations imposed on experimental work.

Biderman (11), discussing the compliance of prisoners of war with interrogators, believes that some prisoners adopt a cooperative role because of the need to reassure themselves that they retain some control over their behavior in the coercive situation. Complying "voluntarily" for such cases is less threatening, and may be regarded by them as less shameful, than losing control completely over their actions. This "self-defeating" defense may also play a role in the responses of an antagonistic subject to a hypnotist he fears.

that in many cultures physical illness would not be accepted as an excuse. For example, in the old German army a soldier who fainted would be punished. At any rate, contemporary United States culture clearly excuses the individual when he is incapacitated. A sophisticated discussion of the relationship of illness to social responsibility is given by Parson (54).

This principal has been extended to mental illness. Although considerable controversy exists about mental illness as a defense in criminal cases, the fact remains that our courts have become progressively more liberal in this respect. Insanity is accepted in our courts as a valid plea which modifies both verdict and sentence.

The captive in interrogation is apprehensive of a dangerous and painful ordeal. If he is provided with a situation where he is no longer held responsible for his actions, he may well be "willing" to collaborate with an enemy. Both hypnosis and some of the drugs inducing hypnoidal states are *popularly* viewed as situations where the individual is no longer master of his own fate and therefore not responsible for his actions. It seems possible then that the hypnotic situation, as distinguished from hypnosis itself, might be used to relieve the individual of a feeling of responsibility for his own actions and thus lead him to reveal information. The hypnotic situation is more complex than indicated here. A simplification of it is undertaken since a more complete discussion would be inappropriate in this context.

Social Measures

A number of social measures would increase the prisoner's feelings of helplessness if such an approach were employed. For example, the prevalence of rumors that semimagical techniques of extracting information are being used over which the informant has absolutely no control might operate in this way. A group of captives who had collaborated, and who could verify that the individual has no control over his actions, would enhance this indoctrination of the new prisoner. The prisoners who did not reveal information might be transferred rather than punished, with vague rumors filtering back as to what had happened. This would have the advantage of maximizing anxiety while not directing hostility at the immediate captors. In any case, a captor seeking to exploit the hypnotic situation would prevent consensual validation of the prisoner's feeling that he could control himself during interrogation. The captor might treat the captive who gives information somewhat like a sick individual in

order to avoid any notion that there is an element of choice involved in his behavior.

The Magic Room Technique

The trance induction itself might be initiated through the use of drugs since this would clearly convey to the prisoner that he is unable to prevent himself from responding. The second stage of "trance induction" might utilize a situation which the author has described elsewhere (53) as the "magic room." This procedure involves convincing the subject that he is responding to suggestions. An example of this would be the case of the prisoner who is given a hypnotic suggestion that his hand is growing warm. However, in this instance, the prisoner's hand actually does become warm, a problem easily resolved by the use of a concealed diathermy machine. Or it might be suggested to the prisoner that when he wakes up a cigarette will taste bitter. Here again, he could be given a cigarette prepared to have a slight, but noticeably bitter, taste. The prisoner's own cigarettes, as well as any lying about the room, would have been especially prepared, and the hypnotist would also smoke these as though nothing were unusual. In this manner, the idea could be conveyed to the subject that he is responding to the given suggestions. It can easily be seen how, with sufficient ingenuity, a large number of "suggestions" can be made to work by means unknown to the subject. The vital issue here would be that the subject became convinced that he was responding to suggestions and, for example, that the cigarettes really do not taste bitter, but that he experiences them as such because he cannot resist the suggesion.

An unresolved question is the classification of the state in which a prisoner who collaborates under these circumstances finds himself. We feel it helpful to recognize that it may or may not be hypnosis. The crucial variable is the creation of a situation where the individual is legitimately able to give tip responsibility for his actions and therefore is permitted to avoid a threatening situation. It is probable that these manipulations occasionally would elicit some form of trance phenomenon, but the crucial aspect would be the situation, not the presence of a hypnotic state.

Although the hypnotic situation as a tool of interrogation might yield information, the interrogator would have no more assurance of its accuracy than with the elicitation of information by hypnosis proper. The same cautions which have been stated with regard to hypnosis remain applicable here. Furthermore, for the success of the

technique the interrogator would have to act, in his relationship with the captive, as though the information must be correct. Unless the interrogator is certain that the information is false, any doubt he betrayed would increase the subject's feeling of control and decrease the effectiveness of the hypnotic situation. Consequently, the interrogator would be denied the use of techniques of cross examination upon which much of his success in deriving accurate information ordinarily depends. In constructing a pretense

that the prisoner has lost responsibility for his behavior, he is also relieved of any responsibility for giving accurate and pertinent information. On the other hand, the interrogator could utilize to advantage any information he has that the subject does not know he has. For example, the informant could be given a hypnotic drug with appropriate verbal suggestions to talk about a given topic. Eventually enough of the drug would be given to cause a short period of unconsciousness. When the subject wakens, the interrogator could then read from his "notes" of the hypnotic interview the information presumably told him. It can readily be seen how this technical maneuver fits into the general concept of the "magic room," and how it would facilitate the elicitation of information in subsequent interviews.

Although there is no direct evidence that such techniques have been or will be employed by interrogators nor any evaluation of their effectiveness, they represent simple extensions of hypnosis to traditional interrogation practices as described by Biderman (10).

The effectiveness of the polygraph as a lie detection device is sometimes employed, apart from the use of the machine, to create a situation where the subject feels incapable of preventing himself from revealing the truth. According to Inbau and Reid (33), many of the confessions obtained with the lie detector are obtained before the actual use of the polygraph. This is clearly analogous to our estimate regardiug the possible use of hypnosis, i.e., separating the hypnotic situation from the effectiveness of hypnosis per se.

The hypnotic situation has been discussed in detail in order to point oat the defensive procedures which can be taken to protect personnel from this type of interrogation. With lie detection, to use this parallel once more, the most effective defense has been a high level of sophistication of the subject. Similarly in the hypnotic situation, knowledge seems to be the most effective defense. Even one or two lectures on hypnosis might be highly effective in conveying the information that an individual cannot be hypnotized against his will, but that a situation can be devised where he could be tricked into believing that he has been hypnotized. Furthermore, demon-

strating that the individual is able to lie under hypnosis and cannot be compelled to speak the truth, or to follow suggestions really contrary to his beliefs, would probably be extremely effective.

Summary

If it were to be used on interrogation subjects, hypnosis itself may be quite innocuous, but it is entirely possible that the utilization of the hypnotic *situation* for this

purpose could be a serious threat. Such a situation would alleviate the informant's guilt by relieving him of the responsibility for his behavior, and would supply him with an alternative to a dreaded and potentially stressful situation. A method of "trance induction," similar to what we have called the "magic room," could be employed to produce a hypnotic situation. The use of the hypnotic situation, as opposed to hypnosis, would make this interrogation technique applicable to a greater percentage of potential informants. Defensive measures to protect personnel from those techniques depend upon the knowledge and confidence of the subject.

Summary and Conclusions

This report has attempted to evaluate the utility of hypnosis in interrogation procedures. Various theoretical views as to the nature of hypnosis were briefly reviewed. The author aligns himself with the "motivational theorists" who maintain that an understanding of the phenomenon of hypnosis is to be found in a consideration of both the subject's motivation in the situation and his relationship to the hypnotist.

Because of the dearth of evidence bearing directly on the question of the use of hypnosis in interrogation, the problem was broken down into a series of component questions, with each considered separately. A review of the available literature bearing on the question of whether trance can be induced in resistant subjects led us to conclude that such a possibility is extremely doubtful. It seems that while trance may be induced without the subject's awareness, this generally requires the existence of a positive relationship between hypnotist and subject, a requirement not always met in the interrogation situation.

Assuming that a trance may be induced in a potential informant, what degree of behavioral control does hypnosis allow? This question generally focuses on the possibility of inducing a subject to violate social prohibitions. Although many laboratory experiments have

been directed at this question, they suffer from the criticism that they are only, after all, "contrived" situations and the subject, in all probability, perceives them as such at some level. Although the author doubts that proscribed behavior can be induced against the subject's wishes, he must admit that the crucial experiments have not been performed, and the resolution of this question must await this event. There are three documented cases of "real, nonlaboratory" situations involving the use of hypnosis for compelling criminal behavior. However, close scrutiny of these instances reveals that in each case an intense emotional relationship existed between hypnotist and subject. The bearing of

these cases on the question at hand is consequently in doubt. One need not invoke hypnosis to explain behavior on the part of one individual to please another, be it criminal or not, when an intense emotional relationship exists between the individuals involved. One element which hypnosis introduces is the subject's lack of awareness of his own motivation; a motivation which seems to derive not from hypnosis but from the emotional relationship between hypnotist and subject. Again, the interrogation situation does not readily evolve such a relationship.

The question of the accuracy of information obtained during a hypnotic trance has been considered. It seems clear from the evidence that such information need not be veridical; the subject remains fully capable of distortions, despite hypnotic suggestions to the contrary.

These various proposals lo utilize hypnosis as a defense against interrogation have been discussed: (a) to give hypnotic suggestions designed to prevent further trance induction, (b) to increase resistance to pain and psychic stress by appropriate posthypnotic suggestion, and (c) to induce amnesia posthypnotically for sensitive information in the event of capture. All these proposals involve diminishing the subject's mastery of the situation. They function as artificially induced repressive mechanisms and suffer from the same drawbacks commonly seen in repression: a loss of ego control and a consequent lessened degree of flexibility in dealing with reality. Captured personnel are already threatened by loss of ego control, and we feel that proposals which would further impoverish the ego are extremely hazardous and would make the individual more vulnerable than he already is. We have suggested alternative defensive measures which would not sacrifice ego control, namely, appropriate instructions and the technique of autogenous training.

The distinction has been drawn between the use of hypnosis per se and the hypnotic situation. The hypnotic situation could be used quite effectively for interrogation purposes. The common belief that

an individual in hypnosis is not responsible for his actions, although probably incorrect, could be exploited. The hypnotic situation, by relieving the subject of responsibility for his actions, alleviates guilt and thus allows the captive to divulge information which he might not otherwise yield. Ways in which an interrogator might seek to maximize the effectiveness of such a situation include the use of drugs, the use of a technique we have called the "magic room," various social measures, etc. Defensive measures necessary against such a technique would involve the dissemination of appropriate information.

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CHAPTER 6

The Experimental Investigation of Interpersonal Influence

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Introduction

Interrogation is basically a situation of attempted interpersonal influence. A number of disciplines have long been concerned with the discrepancies between the actions, opinions, and judgments an individual displays when he is alone and those he displays when he is interacting with others who behave differently. This chapter will review experimental investigations of the conditions under which individuals change or resist changing their behavior to accord with that of others with whom they are interacting.

Consideration will be given here to shifts of behavior in the direction of the frame of reference of others ("conformity"), absence of movement or shifts in a different direction ("resistance"), and to the observance of some explicit request or prohibition ("compliance"). Although experimental work has largely been confined to observations of differences between behavior in an interpersonal influence situation and that in a prior private situation, those few studies which have measured the persistence and stability of the change will also be considered. Continued display of conformity behavior when the person is no longer interacting with the source of influence may be termed "conversion." In the interrogation situation the source may reveal information unwittingly and unintentionally, he may furnish it

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reluctantly in compliance to direct questions, he may conform and yield to pressures for information as long as they exist, or he may search for ways of being helpful once some degree of conversion has taken place.

The change from the person's prior position which is required for conformity with the group in these experiments rarely if ever involves the intensity of conflict which is assumed to characterize the interrogation of a resistant source. The relevance of this review for the problem of the volume rests on the validity of the assumption that the dynamics of influence operate beyond the range of intensity of conflic. which has been studied experimentally. At the conclusion of this review we will consider the problem of extrapolation by briefly assessing the implications of the current knowledge of the dynamics of interpersonal influence.

Several types of investigations have been excluded from this review: (a) anthropological reports in which conformity behavior has been noted but has not been subjected to experimental analysis; (b) investigations of audiences or meetings of larger assemblages where acceptance of or resistance to influence does not result from direct interaction among those composing the situation; (c) investigations dealing with shifts in reaction from knowledge or awareness of norms *attributed* by the experimenter to groups whose members are not psychologically present; (d) influence aspects of reference group behavior which contain variables that differ in kind and complexity from those inherent in influence exerted under face-to-face conditions; and (e) programmatic research reports and theoretical discussions of various aspects of the problem that are available in a number of other sources (2, 17, 29, 39, 46, 65, 90, 91, 99, 121, 126).

Characteristics of the Experimental Situations

Material and Instructions

Experimental situations used to study conformity, compliance, and conversion are described here according to the following characteristics: (a) types of stimulus materials employed; (b) contexts or background conditions in which pressures are exerted; (c) personal dimensions used to assess the contribution of individual differences to conformity and conversion behavior; and (d) methods of measuring the impact of conformity pressures on a critical subject.

A variety of tasks and performances figured in the studies which

have been reviewed. Instructions and stimulus materials have been used to produce the following types of responses: (a) expressions of opinions, attitudes, preferences, and interpretations, (b) perceptual and factual judgments, (c) attempts at logical analyses, and (d) behavior in relation to a direct request or an explicit prohibition.

Expression of Opinions, Attitudes, Preferences, and Interpretations

The stimulus materials used to evoke expressions of attitude, opinion, or preference have included attitude scales such as the Thurstone Scale of Militarism (10, 18, 20, 60, 61), attitudes toward Russia (52), toward feminism (79), and toward a variety of campus, political, and economic items (129). Others have reported findings for a number of attitude statements without giving complete descriptions of their composition (8, 34, 64). The expression of opinions or attitudes regarding typical cases or problem issues has also been used (27, 81, 92, 114, 120, 134). Typical discussion topics include federal aid to education (47), labor-management relations (40, 48), nationalism vs. internationalism (82), divorce (54), and the handling of a juvenile delinquency problem (37, 41). Ratings of personality and social characteristics of both self and others also have been used as stimulus tasks (24, 57). The expression of personal preferences has included such items as line drawings (8, 34), food preferences (38, 73, 95), ranking of camping equipment for a hypothetical trip (55, 56), and ranking men in order of desirability as President of the United States (108). Pictures that are subject to personal interpretation as the basis for composing a story (4), or unclear drawings that are named by the subject (88, 90, 131, 132, 133) comprise another type of problem. Making such judgments as the truthfulness of a person defending himself against charges of revealing a fictitious crime (25), the intelligence of people from photographs (49), the better one of two paintings (97), the driver at fault from a picture of an auto accident (129), or revealing of discrepancies in examination grades (93) constitute other tasks that have been used.

Tasks Requiring Logical Analysis

Tasks eliciting responses that are predominantly logical in character include the solution of puzzles and games (32, 33), constructing objects (67), sending messages over telegraph keys (12), mental arithmetic problems (18, 94), the solution of a problem of football strategy (41), artillery range problems (13), and the ordering of patterns of thumbtacks according to perceptual criteria (127).

Direct Requests and Probibitions

Influence may be exercised directly through requests and prohibitions. Examples are requests for volunteers (9, 112, 113, 117) and for the endorsement of a petition (19); prohibitions, such as a poster forbidding entry to a building (45); a stoplight regulating pedestrian traffic (83); a sign prohibiting drinking from a fountain (78); a traffic light where turning signals are legal (5), or a command to stop a designated activity (53). The task involving the cutting of squares or other geometric forms under pressure from

others to change the rate of production contains some elements of the direct request or prohibition stimulus (109, 110, 120).

Judgments of Perceptual and Factual Materials

Perceptual materials have included estimations, procedures requiring the subject to match a standard stimulus to variable stimuli, and discrimination problems. The first group includes the autokinetic problem (16, 21, 23, 30, 36, 42, 58, 69, 75, 79, 84, 85, 91, 101, 111, 121, 122, 124, 125, 130), estimation of the number of dots on a card or slide (37, 43, 74, 100), the number of beans in a jar (70), the length of rectangles (22, 65), the distance between rectangles (65), the length of lines (98, 102, 18), the length of a slot of light (11, 97), the distance traversed by a moving light (118), the number of flashes of light in a standard time interval (76, 77), the number of clicks of a metronome (18, 103, 105, 123), the weight of a series of standard objects (60), size estimation of unspecified objects (72), and recognition of simple visual objects (115). matching procedures have been limited to the comparison of a straight line to lines of variable lengths (1, 3, 6. 7, 15, 35, 50, 105, 114), matching of stimuli differing in brightness (3), and matching of rectangle sizes and other geometric forms (8, 34, 71). Discrimination tasks include judging which is the shorter of two lines (87, 89), whether there is an odor in a bottle of odorless water (28), and which square has the largest number of dots (74). Common information types of items (31, 126), and memory tasks (80, 113), have also been used.

Framework or Social Background

Properties of the situation other than stimulus materials and instructions for reacting to them contribute to the particular adjustment that occurs. The effect of context or framework in modifying the response that designated stimulus materials produce is well known

in sensory and perceptual research. The analogue of context or framework is often provided by the reactions of others to the same or comparable stimulus materials.

Social background may vary from simple awareness of the reactions by others to direct efforts by others to exert influence on the critical subject. An example of the latter is the judging situation where others present give uniformly incorrect reports before the response of the critical subject. A response conforming to the social background provides an index of conformity, whereas a response consistent with the stimulus material provides an index of resistance to the influence exerted by others.

Direct influence also is exerted in the situation requiring group members to agree on a single option from among a set of alternatives, with the influence usually exerted in the direction of converting the deviant member. Prohibition situations also contain context factors. Observing a transgression may free the subject to resist the prohibition.

Discrepancies between the Reactions of the Critical Subject and the Response of Another Person or Persons, without Direct Interaction Between Them

A frequently used method of exerting influence is that of presenting stimulus materials and letting the critical subject hear reports of others before giving his own response. For some of the studies the discrepancy is "spontaneous" or "natural" (28, 36, 52, 84, 111, 118, 121, 124, 125), e.g., two naive subjects react to the autokinetic task (121), estimate line lengths (118), or judge attitude statements (52). The degree of convergence toward the responses of another person constitutes an index of conformity. In other experiments the reports of instructed subjects are controlled by the experimenter. Face-to-face and other methods of communicating the reports of others to the critical subject have been employed.

In the face-to-face situation the subject joins a group. He is given a fixed position in the sequence of responding, with responses of others prearranged by the experimenter (1, 3, 4, 6, 7, 11, 21, 23, 24, 30, 35, 38, 43, 48, 50, 51, 57, 58, 64, 69, 71, 75, 80, 87, 88, 89, 90, 91, 96, 97, 98, 100, 101, 102, 105, 107, 114, 115, 122, 126, 128). Responses may be uniformly correct or incorrect. Incorrect ones may diverge from the correct or appropriate answer in varying amounts. Reports by others also may be at variance with one another, with some correct and others incorrect by varying degrees. In other situations, one instructed assistant engages in the designated action prior to the

subject and serves as a model for him (5, 19, 45, 53, 72, 78, 83, 86, 94, 95, 112, 113, 117, 130).

A modification of the face-to-face situation is the simulation of a group through the use of tape recordings (10, 18, 20, 31, 61, 63, 91, 103, 106, 109, 110). A naive subject participates under the impression that he is a member of a group composed of several persons, each of whom, like himself, is alone in adjoining rooms. All are interconnected by a communication system. The subject hears the instructions of the experimenter, experiences the stimulus materials to be judged, and hears the responses by the others. He reacts at the proper time by writing his responses in the blank spaces left for his reports. With the exception of the naive subject's responses, the entire experimental

protocol usually consists of tape recordings. The simulated situation provides a *standard* social context for all subjects.

Another variation of the basic face-to-face situation is one where several people are tested together, with partitions or booths separating them from one another. Each has a panel with a row of signal lights that record the responses of others (8, 34, 35, 71). The task is constant for all members, and usually consists of materials presented by slides projected on a wall so that all subjects can see them simultaneously. The experimenter controls the presumed responses of the other subjects through a master switchboard. The effect is that each subject acts as a critical subject. All respond at the same time, with their responses recorded at the central control panel.

Also used is the requirement for requesting or relinquishing pieces of a puzzle or game by one member when members exchange parts to complete the puzzle. The participant understands that he must complete his puzzle or task before the group goal is achieved. Members are given a standard portion of the task at the beginning. Then they interact by requesting necessary pieces from one another in order to finish. Both the Group Squares Puzzle (33) and a Bingo game (32) have been used in this manner. Social interaction is indirect. The experimenter is able to arrange the responses of "other" members to requests for pieces or parts. After a subject has correctly completed his individual task, he is subjected to pressures from some other member to yield a part so that someone else may complete a puzzle. The index of resistance to social pressure is the number of trials in which the subject refuses to yield.

Influence without direct interaction is employed by the experimenter who communicates instructions to the subject on ways to change his performance so that he can contribute more appropriately

to the group task. This type of pressure has been applied in studies of slowdown in production of cutting paper objects (109), in utilizing information on an artillery problem (13), and in sending messages on telegraph keys (12).

Experimenter's Announcement of Group Norms

Still another version of inducing influence consists of individual responses given in private and collected by the experimenter. The experimenter either computes a norm actually representing the responses of members and reports it (22), or appears to compute a norm, but actually announces, according to a prearranged design, an incorrect norm for the reactions of the group (26, 49, 64, 66, 75, 77, 129, 131, 132, 133).

Group Discussion

Actual discussion, where members have the opportunity to exert influence on one another, has been employed in numerous studies (4, 9, 27, 48, 54, 55, 56, 70, 79, 81, 82, 92, 94, 108, 134). Interaction is direct, without control by the experimenter. The individual may be asked to indicate his position on a particular issue in private prior to the group discussion, at various points during its course or at the end of the discussion. Comparison of initial position with later positions provides a measure of susceptibility or resistance.

Interaction in a group has been controlled through notes, ballots, or votes passed among members. Each participant writes notes to others in the group, which may be delivered so that "discussion" among members is uncontrolled (25, 41, 47). Under other conditions prearranged notes, ballots, or votes are substituted (40, 74, 116, 120, 127). Comparison of positions before and after exchange of notes provides an index of change.

Properties of the Person

Another set of factors associated with conformity inheres in the "state of the person" at a particular time. Such factors can be identified through reference to individual differences in previous experience, personality characteristics, or physiologic states. Contrasted with a novice, a specialist in dealing with a certain type of materials is more resistant to shifting.

Individual differences in acceptance of conformity pressures related to properties of the person that have been investigated include experimentally created prior experiences, measures of physiologic states, and

indices of psychological experiences subsequent to behavior in the pressure situation.

Experimentally Induced Prior Experiences

Experiences have been created prior to the subject's exposure to conformity conditions to permit determination of the extent to which the experimentally defined experiences contributed to the adjustment elicited. These experiences include differences in the degree of familiarity with the stimulus materials prior to the influence situation (49), differences in the characteristics of a prior task in which social influence has also been exerted (88, 90), experiences with other members, including cooperative efforts in which a response consistent with the false one reported by another in the situation is rewarded (76, 87, 90), individual experiences of success or failure (20, 58, 72,

75, 98, 100, 115), and experiences designed to increase insecurity (124) or decrease self-evaluation (119).

Physiologic Measures

Two physiologic characteristics have been related to susceptibility. One series of studies contrasted subjects of different ages (11, 38, 89); another compared men and women (25, 34, 79). Differences in physiologic states that have been evaluated include: degree of thirst (78); strength of food preferences (95); degree of sleep deprivation (42); and anxiety states as measured by degree of palmar sweat (64, 82). In several studies, it is impossible to determine whether the measure is regarded as a physiologic index or whether a physiologic difference represents a scale of psychological differences.

Personality Measures

A variety of measures have been used to assess personality characteristics of subjects prior to the pressure situation. Standard measures used are the A-S Reaction Study (10, 63, 72), Guilford-Martin Inventory of Factors, GAMIN (23, 75), California F-Scale (10, 34, 54, 101, 128), Fiedler AS Inventory (125), Likert Scale of Attitude toward the Negro (23), Levinson-Sanford Scale of Attitude toward Jews (23), Minnesota Multiphasic Personality Inventory (4, 33, 50), Cattell 16 PF (115), Barron-Welsh Art Scale (74), Welsh Figure Preference Test (32), Terman Concept Mastery Test (32, 34), Idea Classification Test (32), Rorschach Test (85), Thematic Apperception Test (65, 105), and other measures of emotional instability (10, 27), problem-solving (106), and age of independence training (80). Other measures used are checklists and ratings procedures (6, 11, 33, 34, 70), and clinical

diagnoses (36, 84, 125). Measures of originality have been constructed to determine individual differences in this dimension (8). Needs, such as achievement (80, 115), dependency (69), anxiety (82), conformity (64, 131), self-approval (104), conventionality (10), and affiliation (54, 115), have been used as measures of personality in more recent conformity research.

Several different types of measures have been used to determine if degree of susceptibility to some type of outer anchoring, whether social or perceptual, is a general characteristic of individuals, which will permit predicting their behavior in conformity situations. Dependence on the perceptual field has been measured by the Tilted Room, Tilted Chair, and the Embedded Figures Test (86). Personal dependence on the social field (18, 34, 90) and susceptibility to direct influence attempts (62, 133) have been measured through experimentally created situations.

Interaction among Factors

Specific adjustments toward or away from conformity are determined by interactions among the three classes of factors. The impact of each must be considered in relation to the others if accurate prediction of adjustment is to be achieved. For example, under conditions where (a) the stimulus materials are difficult to judge, (b) the reactions of others constituting the social background are only slightly divergent from the correct response, and (c) the individual is characteristically conforming, the prediction is that his behavior can be easily influenced in the direction of conformity. To understand conformity, it is necessary to specify the interrelations among the concrete nature of the stimulus materials, the properties of the social context or framework, and the state of the person at the time of his reaction.

Indices Used to Evaluate Conformity, Resistance, and Conversion

Numerous indices have been employed to evaluate the extent to which influence has been exerted in conformity situations. The phrase "shifting of responses" refers to any of the several ways used to measure the effects of social influence.

Progressive Changes with Trials

A standard procedure is that originally employed by Sherif (121). Numerous trials are administered under group conditions, with progressive shifts in responses evaluated as a function of differences

between trials (36, 51, 58). The procedure has been used with the autokinetic task (121), in judging the length of slots of light (97), and in estimating the number of dots (37). A change in responses to accord with those given by other members is regarded as conforming. No change or changes in an opposite direction are regarded as independent or resistant.

Change Scores between Pregroup and Postgroup Conditions

A widely used procedure is that of evaluating performance of a subject under private conditions and then under pressure conditions (12, 24, 27, 30, 48, 49, 52, 54, 60, 67, 69, 72, 73, 76, 84, 92, 94, 98, 100, 101, 115, 116, 129, 130, 132, 133), allowing interpretations either in terms of conformity or resistance. Occasionally, the subject's performance on the same task has been measured once again under private conditions (4, 21, 25, 37, 40, 41, 42, 43, 47, 48, 55, 56, 70, 79, 82, 94, 108, 111, 120, 131, 134), with the magnitude of shift in behavior from combinations of scores from the pre-pressure to

the post-pressure conditions constituting the index. When changes due to pressure persist in the post-pressure situation, the index is a measure of conversion. When the individual gives a conforming response in the pressure situation and returns to his independent position in a later testing situation, the shift can be interpreted as temporary conformity. An interpretation of independence or resistance can be made when an individual acts in a consistent manner from the pre-pressure to the post-pressure situation. A "sleeper effect" is said to occur when an individual maintains independence in the pressure situation, but shows the effects of the pressure situation in the post-pressure private situation.

Deviation from Correct or Modal Responses

Error scores for factual or logical materials that are answered correctly by the subject under private conditions are used to assess the effects of conformity piessures. Performance of a comparable group of subjects tested under control conditions has provided standardization data as a basis for judging the degree of influence exerted by pressure conditions (31).

Under conformity conditions, persons other than the subject give responses differing from the correct or preferred one. The number of times an individual gives a response either in the direction of the correct score or of the erroneous judgments constitutes his conformity score (1, 3, 8, 11, 18, 31, 34, 35, 48, 61, 71, 74, 77, 80, 87, 88, 89, 90, 96, 102, 103, 105, 106, 114, 119, 125, 126, 127, 128). The conformity

score distribution has been used to compare the personality characteristics of conformers and resisters (6, 7, 50, 65, 85, 86).

Discrepancy Between Others' and Subject's Responses

Another technique consists of taking the stated opinion of others participating in the experiment as the baseline to evaluate the magnitude of the discrepancy in the response made by the critical subject (10, 20, 23). Responses closer to the position represented by the background are interpreted as indicating a greater degree of conformity than more divergent responses. A modification of this method is establishment of a range of confederate responses so that if the critical subject reacts within that range, he is regarded as having conformed to the established pattern (16, 91, 122).

Differences in Average Scores and Magnitude of Variability Between Groups

Another measure consists of comparison of performances of groups of subjects confronted with pressures in varying degrees. The criterion of change is the average performance of the group on a single trial, or scores massed across trials, without regard for the serial order of changes. Variability has been similarly measured to determine the extent of decreases in the range of individual responses (11, 22, 63, 75, 81, 118, 121, 124).

Action Criteria

A standard method consists of predesignating, as evidence of conformity, a specific action that is identical to responses by other persons present in the experimental situation. The frequency with which such a response occurs constitutes an index of conformity (5, 9, 19, 28, 38, 45, 53, 78, 83, 92, 93, 112, 116, 117). Unreadiness to yield under other conditions constitutes an index of resistance (13, 32, 33, 109).

Summary

A variety of experimental situations have been employed in the study of conformity, resistance, and conversion. These have been reviewed, together with various ways of measuring the impact of the social context on the critical subject, including those which constitute indices of conformity or conversion.

Stimulus materials with certain characteristics have been employed most frequently. Relative simplicity and case of measurement of

elicited responses is one factor accounting for the choice of materials. They rarely have involved the type of activities that are subjected to conformity or conversion pressures in our daily lives. Generally, the materials used provoke little intrinsic interest. The situations often have a quality of artificiality that makes it difficult to draw general conclusions for use in interpreting reactions in more vital and real lifelike situations.

The types of influences exerted have not been of an extreme emergency, or life and death character. The interaction often consists only of the subject's hearing a report on the adjustment being made by others to the situation. To approximate more closely the life conditions of conformity, it will be necessary to design experimental situations in which the maintenance of resistance to conformity pressures places an individual in

jeopardy of relinquishing valued status, prestige or membership, or where conversion is a means to attain important utilitarian objectives.

Personality tests have been the most popular means of assessing the role personal characteristics play in conformity behavior. Most tests have been used in only one or two studies, with the result that relatively little direct comparison of findings is possible.

Among six types of conformity indices, the change of scores between pregroup and postgroup conditions has been the most widely used measure. The deviation from correct or modal responses also has been a frequently used index of change.

Factors Associated with Conformity Behavior

A variety of factors have been shown to arouse conformity and resistance behavior. This Ieview of findings includes sections on results of differences in the shifting of responses attributable to: (a) the nature of the stimulus materials employed to evoke conformity; (b) characteristics of the social situation; and (c) the contribution of personal factors in determining the adjustment made under conformity-producing conditions. Also included is a summary of studies of interaction effects among factors that increase or decrease conformity behavior.

Differences in Shifting of Responses Attributable to Stimulus Materials Employed

Several studies have evaluated those differences in conformity behavior that are associated with the nature of the stimulus materials

and the conditions of their presentation. Evaluation involves four considerations: the nature of the material judged, whether factual, attitudinal, or expressive of personal preferences; differences in selections from the same materials, whether easy or difficult, clear or ambiguous; conditions of presentation, whether permitting judgments to be made by the subject with ease or with difficulty; and the experimenter's instructions to the subject, whether strong and definite or weak and vague.

Qualitative Differences in the Materials Judged

Reactions to materials that can be answered on the basis of logic or "fact" appear to be more resistant to conformity pressures than those for which responses depend on social experience. Helson, Blake, and Mouton (61) studied the frequency of shifting as a

function of the content of the task. Greater shifting of responses from the correct or modal report toward the erroneous responses expressed by others was observed for attitude statements than for materials involving knowledge or ability.

Festinger and Thibaut (41) employed two different discussion problems as stimulus materials, and reported results consistent with those by Helson, Blake, and Mouton (61).

Crutchfield (34) presented a variety of stimulus materials to a test sample under social pressure conditions. Since he describes results obtained for some but not all the materials, it is impossible to determine if response shifts are a function of the character of the stimulus materials.

The materials most subject to conformity effects appear to derive meaning or validity from a social frame of reference, such as attitudes toward war or general social problems.

Difficulty

Degrees of shifting vary with differences in properties of the same materials. One source of variation is the difficulty experienced by the subject in reacting to the materials presented. The hypothesis tested holds that the more difficult the materials, the more easily the individual is influenced.

Blake, Helson, and Mouton (18) had male college students respond to arithmetic items and the metronome click counting problems under simulated conditions. For the arithmetic items, shifting increased toward the erroneous response of the simulated group as the difficulty of the problems increased. Results for the metronome are interpreted as indicating that variations in rate were not sufficiently great

for shifts from social pressure related to difficulty to appear in a statistically clear manner.

Coleman, Blake, and Mouton (31) have demonstrated a significant relatiorkship between task difficulty and susceptibility to conformity pressures. The results are interpreted as indicating that an individual certain of the correct answer is more able to resist pressures because he is more able to respond in terms of internal cues.

Asch (3) used the experimental task of matching a standard to three variable. lines. Differences between the variable lines and the standard were small for one set of trials, and larger for another set. Fewer errors Nere made by subjects when the discrepancy

between lines was greater. These results support the hypothesis that difficult stimulus milterials lead to a greater degree of conformity.

Bereada (11) used child subjects for two different tasks, and investigated frequency of shifting as a function of the difficulty of items. The gretatest shifting for both tasks occurred in those trials that produced the highest frequency of errors under private conditions. Goldberg and Lubin (51) tested and confirmed the hypothesis that social itifluence on a subject's judgments is a positive linear function of his errors for similar judgments under private conditions.

In a study by Wiener (132), the task consisted of selecting one of two naules for each of ten ambiguous designs, and indicating the degree of certainty of each judgment on a four-point scale ranging from "absolutely certain" to "absolutely uncertain." Results indicate a greater percentage of change for designs rated on the uncertain end of the judgment scale, and for higher ambiguity designs within each category of certainty.

Kelley and Lamb (73) in an experiment on taste used phenylthiourea (PTU), which is tasteless to some individuals but extremely bitter to others. The results suggest that the tasters' greater resistance to majority influence springs from the greater intensity of their opinions about PTU.

Fisher, Williams, and Lubin (44) confirmed that a measure of the subject's self-certainty regarding the stimulus situation consistently constituted a fair degree of predictive power for conformity scores: the more certain a person is of his judgment, the more resistant he is to influences toward conformity.

Pressures have been maintained at a constant level in some studies of the relationship between ambiguity of the materials and conformity. Caylor (26) defined the ambiguity of the stimulus materials as the number of equally probable reactions perceived as appropriate in response to the Stouffer questionnaire approach to conflict in norms.

Conformity was measured as the difference between private and public responses in the direction of perceived group norms. Conformity was found to be positively associated with the more ambiguous stimulus materials.

Wiener, Carpenter, and Carpenter (131) failed to confirm the relationship reported by Caylor (26). Explanation of the failure is not apparent in the published report.

Conditions of Presentation

Several studies have employed varied conditions of presentation of the task in terms of difficulty of discrimination. The general hypothesis tested is that susceptibility is greater the farther removed stimulus materials are from direct examination.

Deutsch and Gerard (35) employed two conditions to present the same materials. The materials for one were present for visual examination at the time the subject made his judgments. Materials for the other were removed 3 sec prior to the subject's report. Significantly less influence was exerted by other persons when stimulus materials were present.

Raven and Rietsema (110) studied conditions of presentation and susceptibility as a function of the clarity of the task and found that the subjects who understood the requirements conformed more to the needs of others even though this placed them at a personal disadvantage.

Luchins (87) investigated susceptibility under conditions permitting some subjects to test objectively their experience with the stimulus materials. Child subjects permitted to test the accuracy of their judgments were less influenced by the confederate.

These studies generally agree in confirming the prediction that susceptibility is less when subjects have the opportunity to employ an objective frame of reference.

Orientation to the Task

Instructions used to orient subjects to stimulus materials have been shown to be correlated with susceptibility. Shifting in the direction of endorsement of a petition as a function of the strength of the request has been investigated by Blake, Mouton, and Hain (19). An increase in compliance attributable to increases in strength of the request was found for influence created by the compliant model, and a decrease when the model resisted. These results were confirmed by Rosenbaum (112) using a similar request to solicit volunteers.

Freed, Chandler, Mouton, and Blake (45) assessed the reactions of male college students to three degrees of strength for a sign forbidding entry to a classroom building. The frequency of compliance was found to be positively or negatively related to the strength of the prohibition stimulus in the same manner as in the studies just summarized.

Summary

The effects of conformity pressures have been demonstrated to vary with (a) the nature of the stimulus materials to which subjects react aad (b) the conditions of their presentation. Reactions are evoked more easily when pressures are exerted on attitudes toward social issues; factual matters and personal preferences seem to be most resistan to change. This generalization is important for its implication that susceptibility is highest in areas dealing with political ideology, social attitudes, and expressions of opinions.

Unambiguous materials evoke more resistance to change than ambiguous ones. A situation where it is difficult for the subject to check on the accuracy of his response results in a decrease of resistance. Greater susceptibility has been shown to occur with increases in request strength when pressures are created by a compliant model as well as the converse.

Conformity Behavior and Social Context

Conformity pressures may be created when a person is confronted with reactions differing from his own. Individual reactions under private conditions have been compared with reactions to the same problem in a social context. Properties of social contexts singly or in combination have been studied to determine their effects on increases or decreases in susceptibility.

Effect of Reactions of Another Person or Persons

The studies summarized in this section are those designed to show the influence of a social situation in modifying an individual's response.

Opinion and Attitude Expressions

Wheeler and Jordan (129) investigated the effect of knowledge of majority viewpoints on changing opinions. Knowledge of group opinion during the third administration of an attitude questionnaire

produced frequency of shifting in the direction of agreement with the majority three times greater than that in the control condition, with disagreement reduced to approximately one-half of chance expectancy.

Gorden (52) evaluated shifts in responses from an initial individual administration of a twelve-item scale of attitudes toward Russia to responses given in the presence of other members. Over half of the subjects shifted toward group opinion, and approximately a third shifted away from it, with no change in the total shift score for approximately an eighth.

Helson, Blake, Mouton, and Olmstead (63) reported that naive subjects expressed significantly different degrees of agreement or disagreement with statements matched for degree of militarism as a function and in the direction of prearranged responses by other subjects.

Horwitz, Piana, Goldman, and Lee (67) found significant differences in expressions of attitudes toward their teacher by ROTC students following reported unanimity of group attitude. Duncker (38) reports that children, responding after one, two, or three other subjects expressed their food preferences, had a selection rate of 81 per cent for foods chosen only 26 per cent of the time earlier in private.

Action Studies

A series of experiments employing situations that either restrict or prohibit an action, or else are designed to produce compliance with a request, have consistently indicated that direct knowledge of the reactions of others can produce shifts in behavior.

Grosser, Polansky, and Lippitt (53) found that a significantly larger number of naive child subjects engaged in unauthorized activities under the influence of perceiving violations by a model in the experimental rather than in the control conditions. Freed, Chandler, Mouton, and Blake (45) have reported similar results in a prohibition situation (see foregoing), as have Barch, Trumbo, and Nagle (5) who observed the behavior of motorists in turning lanes to determine conformance with or violation of a state law requiring turn signals. The behavior of a person following a lead car was significantly related to that of the lead car driver. Blake, Mouton, and Hain (19) obtained similar results for endorsement of a petition (see the foregoing).

Frequency of acceptance of a request for volunteers as a function of the perception of acceptance by another person has been investigated by Rosenbaum and Blake (113) and by Rosenbaum (112). Both studies demonstrate a decrease in acceptance frequency when subjects

see an experimenter's assistant refuse the request as well as the converse.

Schachter and Hall (117) found that group influences produced greater frequency of volunteering when half the class had been preinstructed to volunteer. Confirmation of these results for public versus private conditions has been reported by Blake, Berkowitz, Bellamy, and Mouton (15).

Judgmental Tasks

The effect of the group situation in influencing judgments was demonstrated by Munsterberg (104) in an early period of psychological experimentation. Students first were asked individually to identify which of two cards contained the largest number of dots. Initially, 60 per cent reported the correct answer. After a preliminary show of hands, correct judgments on an individual basis increased from 60 to 64 per cent. Significance of the differences obtained was not evaluated, but findings are consistent with those of later investigations. Clark (28) has reported that 20 per cent of students perceived the "odor" of a bottle of odorless water in the presence of other persons, compared with only 11 per cent in private.

The classical experiment in this area is by Sherif (121). He employed the autokinetic situation to demonstrate the influence of another's response on judgments by naive subjects. The convergence under group conditions of initially divergent responses showed the operation of social influence. Schonbar (118) duplicated the essential experimental conditions of Sherif's study and reports similar results.

Matching a standard line with three variable lines was the task employed by Asch (1) to investigate the influence of erroneous reports on naive subjects. Less than 1 per cent of the responses for the same trials in private was incorrect. By prearranging for reports by seven accomplices to be uniformly incorrect on certain trials, Asch was able to show a significant tendency for naive subjects to shift toward the incorrect position taken by others.

Blake and Brehm (16) investigated the effect on naive subjects of hearing the recorded responses of five accomplices. Amount of movement reported for the autokinetic task was varied in magnitude, divergence, and convergence. Pressures created under simulated conditions produced conformity effects apparently similar in character to those created under face-to-face conditions. McConnell and Blake (91) have confirmed this finding, as have Olmstead and Blake (107) for both face-to-face and simulated group conditions.

Summary

The studies just summarized are in general agreement. Knowledge of the reactions of another person in the same situation can influence the subject's response in the direction of the other person's behavior, with susceptibility found for a wide variety of tasks.

Composition of the Social Context

Differences in susceptibility have been related to various features of the social context, including the number of others present, degree of unanimity in their reactions, and the magnitude of the discrepancy between the subject's own position and that of others.

Number of Others Present. There is evidence that the presence of *several* other persons giving uniform responses may produce increases in conformity behavior beyond those attributable to the effect of a single other person. The general proposition is that conformity pressures increase with number of other persons present as a negatively accelerated function.

Asch (1) varied the number of accomplices giving erroneous reports from one, two, three, four, eight, to sixteen. He reported direct but unequal increments in shifting for increases from one to two to three accomplices but no significant increases for a larger number.

Helson (60) arranged for one, two, or three other persons to report their judgments prior to the critical subject. The effect was found to be directly proportional to the number of accomplices giving prior reports. Luchins and Luchins (89) report that, of the group judging after three accomplices reported, 80 per cent showed conformity effects, whereas only 10 per cent shifted their responses after one other accomplice reported.

Group size has been investigated "in reverse" by Ziller and Behringer (134). They varied the number of naive subjects present relative to one instructed subject. The confederate was more effective in two- and five-person groups than in three- and four-person groups. Conditions of this experiment have not been described in detail.

Hare (55) investigated the influence of group size on the attainment of consensus, and found that participants in groups of five changed their opinions more toward the group consensus after discussion than those in groups of twelve. This finding disagrees with those just reported. No accomplices participated; discussion time was constant,

thus giving each member *less opportunity* to exert influence on others in the larger groups.

Three investigators reported no differences in shifting as a function of the number of others participating. Sherif (121) reported no significant differences in the degree of convergence for subjects responding to the autokinetic task in the presence of one or of two other members. Degree of unanimity was not prearranged; the study thus is not comparable to those employing controlled responses by others. Goldberg (49) varied the number of subjects working together in judging the intelligence of persons in nine photographs. Judging in the presence of others produced responses differing significantly from those given under private conditions. No differences in shifting were found for subjects who judged initially in the presence of two or of four other persons. Data. were not given for results from three-man groups. Use of imputed, falsified norms may in part account for his findings.

Kidd (76) varied group size from one to two to four to six, and supplied fictitious, imputed norms for each group. No significant differences in shifting were found for differences in group size.

Unanimity. Asch (1), in one condition, arranged for the instructed "naive" subject to respond correctly and the instructed majority of six other persons to respond incorrectly. The degree of shifting toward the majority view was comparatively slight. When the person who had been giving the correct report began to agree with the incorrect majority, the frequency of shifting was found to be comparable to that under the condition of routine unanimity.

Mouton, Blake, and Olmstead (103) have confirmed one aspect of Asch's finding. Little shifting from correct reports occurred when, of four other persons reporting prior to the critical subject, two gave correct and two incorrect responses. A significant increase in shifting occurred when all four uniformly gave an incorrect answer.

In Hardy's study (54) of unanimous contrasted with near-unanimous groups in a discussion of divorce, unanimity of opposition was not related to susceptibility but was significantly related to changes in attitudes expressed after exposure to the group pressure situation, in the direction of conformity pressures. He suggests that the differences between his results and those reported by others may be attributable to the distinctive features of the tasks employed.

Magnitude of the Discrepancy Between the Correct Report or the Subjects' Own Position and Reports by Others. The effect of the perceived discrepancy on shifting a critical subject away from his

private position, and the extent to which the subject shifts toward full agreement with reports by others have been evaluated.

Jenness (70) used initial individual judgments of the number of beans in a jar to assign students with initially divergent estimates and those with initially similar estimates to groups of three members and four members respectively. After discussion to arrive at a group estimate, the variation among individual judgments was reduced more in the three-member than in the four-member groups.

Festinger, Gerard, Hymovitch, Kelley, and Raven (40), using a labor dispute problem, prior to and during interaction measured the opinions of undergraduate students of the same sex in groups varying from six to nine members; the interaction was controlled by fictitious notes distributed after ten minutes of apparent interchange. Those who perceived themselves as initially disagreeing changed more than those who perceived themselves as initially agreeing with others present.

Goldberg (49) has reported significant differences in conformity related to degree of discrepancy, but not for ratio of actual conformity to discrepancy (see foregoing).

Wiener (132) reports a relationship between amount of discrepancy from norms and susceptibility, whereas Helson, Blake, and Mouton (61) confirm a positive relationship between the magnitude of discrepancy and the amount of susceptibility (see previous discussion).

Under one condition of the autokinetic situation used by Whittaker (130), a confederate estimated that the distance that light moved was one inch more than the subject's largest judgment. For other conditions the confederate's prior reports were two, eight, or twelve times as large as the subject's largest, earlier judgment. Greater shifts occurred for the two conditions using the smallest discrepancies between responses. The author suggests that larger discrepancies have a negative effect on the subject by tending to influence him in an opposite direction.

Harvey, Kelley, and Shapiro (57) investigated the relationship between the reaction of an individual to degree of discrepancies between his opinion of himself and others' opinions of him, and found a significant shift toward lower self ratings, with change in an unfavorable direction greatest for the most unfavorable, fictitious evaluations by acquaintances than by strangers.

Harvey and Rutherford (58) found that "unsuccessful," naive college subjects with one-half as many pretrials on the autokinetic task were more ready than the same size, "successful" group to shift

in response to consistently and uniformly divergent pressures than to initially agreeing and increasingly divergent pressures.

Evidence for the greater impact of small discrepancies on judging easily discriminated materials has been presented by Blake, Helson, and Mouton (18) and by Asch (3) (see above).

Since results obtained by Olmstead and Blake (107) and by Mouton, Blake, and Olmstead (103) (see the preceding) are not in complete agreement with those just summarized, further clarification is required.

Wiener, Carpenter, and Carpenter (131) report failure to confirm the work of Asch (3), but do not explain their failure. The per cents of college students who disagreed with subjects' choices of names for ten ambiguous designs were entered next to the design for half the trials. No relationship was found between number of changes and per cent of disagreement.

*Su*mmary. In four studies of the composition of the social situation and its relation to conformity, size of the group has been demonstrated to be a critical factor, with progressive increases in shifting for increases from one to two to three persons, and little or no evidence of greater influence by a larger number. Three other studies fail to confirm this relationship. All studies agree in finding no further increments in conformity associated with increases in number of divergent reports. Currently available evidence suggests that increments beyond those attributable to three other persons may be associated with a decrement in amount of influence exerted toward conformity.

Findings clearly indicate that conformity influences are significantly decreased when other members are not in unanimous agreement. With objective, discriminable stimuli, subjects tend more to agree when the discrepancy is small. For socially anchored materials, more subjects shift when the discrepancies are large.

Characteristics of Other Members

Studies of pressures as a function of personal characteristics have evaluated such factors as age, sex, prestige, degree of acquaintance, and degree of comparability in ability and interests.

Age. Duncker (38) found that the presence of another child, but not an adult, significantly shifted food preferences above a control condition, and younger children were more influenced by older children than the reverse.

In a study by Berenda (11), the teacher serving as the accomplice influenced younger children (seven to ten) more than older children

(ten to thirteen), and other children as accomplices significantly influenced both age groups, with younger children more influenced. Postsession interviews demonstrated that giving a correct answer contradicted by eight peers was seen as a violation of the group for which "majority" correctness was assumed. Jacubczak and Walters (69) report contradictory results for the autokinetic effect. In their experiment, the order of exposure to adult and child peer proved highly important. The availability of an abstract only makes it impossible to evaluate completely the findings.

Sex. Luchins and Luchins (89) report that greater influence was exerted when the prior report on a discrimination task was given by women than by men college student confederates. Statistical significance for differences was not reported; the number of experimental subjects was small.

Prestige. A number of investigations have tested the hypothesis that the higher the status of the other person, the greater his influence.

Lefkowitz, Blake, and Mouton (83) introduced four variations in a traffic situation for two-thirds of the trials, one for each sixth, including a confederate dressed in high status attire who (a) obeyed or (b) violated the traffic signal; and a confederate dressed in low status attire who (a) obeyed or (b) violated the signal. The confederate was absent for the remaining one-third of the trials. Significantly greater frequency of violation occurred under the influence of a violator. An additional significant increase in the frequency of violations was found when the confederate appeared in high status attire.

Mausner (96) arranged for the confederate to give the wrong answer in all trials on the Maier Art Judgment Test. The mean increase in wrong answers was significantly higher when the confederate was introduced as an art director than as a fellow student.

Cole (30) varied expertness of the confederate in a four-man group making judgments in the autokinetic situation. Subjects were more influenced by his prearranged, extreme judgments when he was given expert status. When the task was described as an intelligence test and the confederate introduced as highly intelligent, the mean movement score of subjects tended to shift away from that of the confederate.

In another study, Mausner (97) created success and failure for confederates participating with undergraduate students in twenty trials of using a stylus to reproduce

the length of a slot of light. A greater degree of shift occurred when the critical subject judged with

a confederate perceived as successful on the prior task. A similar design was used by Mausner and Bloch (100), with results corroborating those by Mausner (99).

Raven and French (109) varied the status or prestige of a person under two conditions: the person initiating the influence was seen either (it) as elected by the group and having its support or (b) as not elected or supported by the group. The elected supervisor was able to exert more influence.

*Acq*uaintances vs. Strangers. The effect of acquaintances or strangers on the expression of attitudes has been investigated by Lambert and Lowry (81). Male undergraduates filled out comparable forms of the F scale alone, in groups of five without discussion and in groups of five after discussion. Some of the groups were composed of "high acquaintances," and others included individuals who were relatively unacquainted. Results show a reduction in variability of scores in the case of together and discussion conditions for high acquaintance subjects, with low acquaintance subjects apparently unaffected by either pressure condition.

Harvey, Kelley, and Shapiro (57) have reported a significant shift toward lower self ratings under influence created by acquaintances and by strangers (see above).

Kidd (76) created and controlled the degree of acquaintance by restricting the duration of prior participation to 1, 2, or 3 hr. Subsequent judgments were not significantly influenced.

Minority Group Membership. To evaluate the effect of minority group membership on susceptibility, Bray (23) used Gentiles as critical subjects, whereas the confederates were presented as Negro, Jew, and Gentile. Since results are contradictory, only replication and refinement will make it possible to comprehend the relationships.

Homogeneity-heterogeneity. In all but one study of the homogerteity-heterogeneity dimension, heterogeneity is artificially created by experimenters' remarks.

Festinger and Thibaut (41) found for discussion of football but not juvenile delinquency significantly greater readiness of homogeneous groups to shift opinion as a function of receiving notes from others.

Gerard (48) created homogeneity and heterogeneity similarly for discussion of federal aid to education, and found changes in opinion to be unrelated to the homogeneity-heterogeneity dimension.

Festinger, Gerard, Hymovitch, Kelley, and Raven (40) report no differences in opinion change among groups told that "experts" were

present compared with control groups. Since there were no influence attempts directly traceable to "experts," this variation appears to have been a manipulation of homogeneity-heterogeneity in the proper sense rather than a variation in the prestige dimension (see above).

Summary. Differences in susceptibility are related to characteristics of the persons creating the influence. Age differences found include greater influence exerted on children by children than by adults, and on younger children by older children than on older by younger children. Several studies have reported greater susceptibility to pressures created by acquaintances than by strangers. Other differences reported do not reveal a clear pattern.

Greater influences are exerted when the other person has a higher status than the subject. This finding is obtained consistently. Uniform results have not been obtained from experiments designed to evaluate the influence of homogeneity-heterogeneity among members.

Personal Accountability and Commitment

Two related dimensions of influence exertion are evaluated in tests of these hypotheses: conditions permitting anonymity should decrease the extent of influence; and personal commitment in a prior, private performance should increase resistance.

Anonymity. Mouton, Blake, and Olmstead (103) found that influence was significantly greater when college subjects disclosed their personal identity than when conditions permitted anonymity (see above). Deutsch and Gerard (35) and Asch (3) obtained similar results (see above).

Reduced susceptibility to pressures under conditions of anonymity has been clearly demonstrated; this explains use of the secret ballot as a basic instrument of personal expression.

Commitment. Of two studies varying the personal commitment factor, one by Deutsch and Gerard (35) introduced three variations. The highest frequency of shifting occurred when recording was not required, with lowest frequencies resulting when the responses were recorded, personally signed, and given to the experimenter.

Fisher, Rubinstein, and Freeman (43) used a tachistoscopic presentation for the task of indicating the number of dots exposed on a trial-by-trial basis. The conditions were: first, judging without partners; second, judging only *after* the partner; third and fourth, judging both prior to and following the partner. No differences in the frequency of shifting were found for the experimental conditions

except for the last ten trials of the second, when the confederate's judgments were five standard deviations above the mean of the standardizing group: subjects' responses were significantly higher than those under commitment conditions. For the fourth condition, most influence was found on the intertrial basis when the confederate's report was one standard deviation above that of the critical subject. Although subjects did not shift significantly for any one trial, judgments given prior to the confederate steadily increased. These results demonstrate the stabilizing influence of personal commitment on a within-session basis, with the partner's influence exerted in an anticipatory fashion.

Summary. Anonymity and commitment have opposite effects on an individaal's reaction. An individual who makes a definite commitment prior to being subjected to pressures resists and maintains his position more strongly. The degree of public commitment is positively related to the degree of resistance to influence.

Interaction with Other Participants Prior to the Experimental Series

Several studies have evaluated susceptibility as a function of the kind of relationships existing between the leader and other members or among the members themselves. Variations in leadership styles are of two different types: leader centered vs. group-centered classroom teaching methods and a participatory style vs. the supervisory style. Variations in relations among members that have been studied are perceived independence on a partner to attain a goal, and perceived success jointly with the partner in working toward a goal.

Leader-Centered vs. Group-Centered Interaction. Approximately half the subjects in the study by Bovard (22) participated in "leadercentered" classes, i.e., routine lecture and question-answer type interaction and the others in "group-centered" classes with frequent interaction among members. Individual judgments showed significant convergence toward the announced group norm in all groups. No differences were

observed for judgments made on the first day. Both the dispersion of initial judgments and degree of convergence after the announced group norm and during the last week of the course were significantly greater for group-centered classes.

Participatory vs. Supervisor Leadership Behavior. Maier and Solem (94) arranged for half the groups to have leaders instructed to encourage member participation, and the other half, observers free

to participate only in member roles. No differences in initial judgments were found. After an eight-minute discussion of the Maier Horse Trading Problem, groups with leaders significantly increased their per cent of correct answers.

Preston and Heintz (108) had students first give *individual rankings* of the names of twelve prominent men for their desirability as President of the United States; next, a *group ranking* of the twelve names in four- to five-person groups having either participatory or supervisory leaders; and a *final individual ranking.* Final individual rankings of participatory leaders and followers correlated significantly higher with the group rankings. There also was more shifting from initial to final rankings for those working under participatory leaders.

Hare (56) replicated the experiment by Preston and Heintz (108), and reports similar findings.

Interdependence among Members. Berkowitz (12) had partners send and decode messages transmitted by telegraph keys to each other. Subjects who believed they would gain a prize worked fastest on improvement trials; those who believed only their partners would gain a prize worked faster than subjects who knew nothing of the prize. Facilitation from perceived dependency on another for attaining a goal constitutes a significant influence factor.

Success-Failure. Kidd and Campbell (77) varied reported success of the group on a preliminary anagram task. Members who had had prior experience of success with one another conformed to a significantly greater degree to the attributed group norm for a later task. Conformity for control subjects was similar to that under the failure condition.

Summary. Greater susceptibility occurs when the leader's behavior is intended to increase interaction among members. This may be because individual differences become more evident and greater possibilities exist for the exertion of pressure. Findings also indicate that greater pressure exists when one member recognizes that another

member is dependent on his performance for success, and that greater susceptibility occurs among members who have shared success.

Cohesion and Valuation of Group Membership

Cohesion is a variable in the group situation. One hypothesis tested is that a subject's behavior is more influenced when he has

evidence that he is liked by others or feels that the group is attractive. Back (4) varied cohesion by the experimenter's remarks among like sex pairs. Both subjects wrote a story about three sets of pictures, differing primarily in details, and then discussed them with each other. Greater change occurred toward features in the partner's story under the high rather than under the low cohesion conditions.

Festinger, Gerard, Hymovitch, Kelley, and Raven (40) report similar findings, as does Berkowitz (13).

Schchater, Ellertson, McBride, and Gregory (116) created high and low cohesion among undergraduate women subjects in three person groups. During interaction each subject worked alone, but communicated with fictitious other persons through a series of notes controlled by an experimenter. Positive influence induction consisted of notes encouraging increased production for half of the subjects under each condition, and negative influence for the other half. No effect was attributable to cohesion under the positive induction condition. Under negative influence, high cohesion subjects significantly decreased their productivity; the low cohesion group showed no changes.

In a study of children by Grossner, Polansky, and Lippitt (53), the collaborator was friendly with half the subjects and encouraged their working together; with the other half, he acted withdrawn and worked separately. The critical subject more frequently chose the same toy as the friendly collaborator.

Gerard (48) used instructions to vary cohesion. High cohesion subjects shifted their opinions toward the group recommendation significantly more than those under the low cohesion condition.

In the study by Dittes and Kelley (37), group members were given false ratings of the degree to which others present liked them and wished them to remain in the discussion. Those in the very low acceptance group, who had the lowest index of private conformity, showed the highest degree of public conformity. Those participating under average attraction conditions exhibited the greatest degree of shifting toward the group view,

indicating a consistency in private conviction and public expression. The finding implies that the person of indeterminate or average acceptance is probably least secure and most susceptible.

Jackson and Saltzstein (68) varied both the congeniality dimension and experimentally induced acceptance and rejection. The four conditions were: (a) psychological membership, in which the member felt highly accepted and the group held high attraction for him; (b) psychological nonmembership, in which the person had low

acceptance and the group was not attractive to him; (c) preference group membership, in which the person had low acceptance by the group but high attraction to it; and (d) a marginal group relationship characterized by high acceptance and low attraction. Subjects worked in four- or five-man groups under two different orientations to the task: a *normative* condition, competing with other groups, and *modal* conditions, in which they were compared as individuals. Conformity was greater in the normative than in the modal situation and in the high attraction than in the low attraction situation. However, conformity for the low attraction condition was uniformly higher than had been predicted. The combination of telling subjects that their performance was inferior and that they were least accepted apparently led to feelings of rejection *and* anxiety and to higher conformity.

In the study by Kelley and Shapiro (74), the hypothesis that more highly accepted members would conform less because the wrong answer would be detrimental to attaining the group goal was *not* confirmed. The results are consistent with other studies varying the acceptance dimension.

Thibaut and Strickland (127) varied pressure by high, moderate, or low confidence expressed by others in the subjects working under either the set to solve the problem or the set to maintain group membership. Under group membership orientation, conformity increased as other members, by ballots, showed increased confidence in the judgments of subjects. For subjects given a task set, conformity decreased as pressures increased. The study demonstrates the greater susceptibility of individuals motivated to maintain group membership.

Each of the studies agrees in showing that subjects in high cohesion groups are more susceptible to conformity pressures.

Pressures toward Uniformity

The effect of increasing pressures toward uniformity has been investigated in several studies.

Festinger and Thibaut (41) found a significant increase in shifting as pressure toward uniformity increased (see above).

Jones, Wells, and Torrey (71) found that correct feedback was more significant in increasing independence than incorrect feedback in increasing conformity. Differences between partial and total reinforcement were not significant. A second study, in which subjects were told they would participate in later sessions with the same group members and be evaluated by them, revealed an increased amount of conformity.

Gerard (47) created pressures toward uniformity by indicating that a second discussion of the same issue would follow with local politicians participating. A significantly greater change from pre- to postdiscussion occurred for the high pressure condition, but only for subjects participating also under attributed homogeneity.

Festinger, Gerard, Hymovitch, Kelley, and Raven (40) found that significantly more shifting occurred among groups told there was a "correct" answer (see above). Brehm and Festinger (24) tested and confirmed the hypothesis that greater pressures toward uniformity occur when the task is described as important.

Blake, Mouton, and Olmstead (20) emphasized the importance of accuracy, and implied team penalties for mistakes by individuals on a metionome-counting task. Subsequent shifting was greater for the group subjected to high pressure. Accuracy requirements reinforced by fear of penalty increase the readiness of individuals to shift their opinions. Deutsch and Gerard (35) used a similar design, and obtained parallel results.

Summary. Increases in pressures toward uniformity have been shown to be related positively to increases in frequency of conformity behavior. Emphasis on rewards for successful performance and the importance of accuracy or penalties for mistakes also have been found to be related to susceptibility.

Psychologic and Physiologic Properties of the Person

Personal characteristics of the subject may be psychologic, physiologic, or differing amounts or types of prior experience.

Experimentally Created Differential Experience in Subjects

Individual differences have been created experimentally by different amounts of familiarity with the task, prior experiences of success or failure, differences in anxiety and insecurity, variations in properties of the prior task, and pretraining with reward.

Degree of Familiarity. The assumption tested is that subjects with greater amounts of experience should be more able to resist pressure exerted by others.

Goldberg (49) provided all subjects with three degrees of experience. The hypothesis was not confirmed (see above).

Harvey and Rutherford (58) found that subjects with fewer pre-

trials showed significantly greater readiness to shift in response to pressures (see above).

Prior Success or Failure. Several studies have tested the hypothesis that failure results in decreased reliance on one's own judgments.

After creating individual, private experiences of success or failure for undergraduate psychology students, Mausner (98) arranged interaction for success-success pairs, failure-failure pairs, and success-failure pairs. Those who had experienced failure showed a significantly greater tendency to shift toward the answer given by the partner. In the success-failure pairings, the unsuccessful member shifted toward the successful one, but the successful ones did not shift from their prior estimates. In the failure-failure pairings, members' responses tended to converge.

Similar results have been reported by Mausner and Bloch (100) and by Blake, Mouton, and Olmstead (20) (see above).

Kelman (75) used the autokinetic task to investigate the effects of success and failure. By comparison with the control and the ambiguous conditions, shifts toward the confederate were significantly higher for the failure group and significantly lower for the success group. Similarly, differences in responses between the interaction situation and the postindividual session showed that the successful group shifted away from the

confederate's report, and the failure group shifted toward it. The data suggest not only that failure experience increases susceptibility but that success decreases it.

Keisler (72) found no differences between the success and failure groups in imitation of a model in the pressure situation when his behavior was not labeled correct or incorrect. "Successful" subjects who perceived a model obtaining chance scores followed him significantly less often than "unsuccessful" subjects judging after a successful model.

In the study by Schroeder and Hunt (119), subjects wrote selfevaluations after disapproval by a neutral source. Those who gave more self-devaluating responses yielded to a significantly greater degree in the pressure situation.

When an *individual* has a prior *alone* experience of failure, he is more susceptible to pressures on a second task. However, subjects are less susceptible following a group experience of failure than of success.

Degree of Anxiety or Insecurity. Sherif and Harvey (124) varied familiarity with the experimental setting and with the manner of the experimenter. Subjects judged the autokinetic task initially in

private; two to seven days later, they judged in pairs. Comparisons were made of ranges and medians of judgments for private and pair sessioiis. The greater the uncertainty induced under private conditions, the more individuals fluctuated in the ranges and medians of their judgments, with dispersion significantly reduced in the pair sessions for those experiencing maximum uncertainty. No differences occurred between private and. group judgments for those experiencing lesser degrees of uncertainty. The findings are interpreted as indicating that subjects served as "anchors" for one another when field anchorages were reduced.

Properties of the Prior Task. Pretraining has been provided on tasks with properties differing from those of the tasks used to exert pressures. Luchins (88) used the task of naming the percept in a series of twelve drawings. By comparison with a control group, the erroneous response was given more frequently by those who had had pretraining with a confederate whose identical response was labeled "correct" in the preliminary series and "incorrect" in the second series. When the confederate's preliminary response was not supported by features of the drawing, no differences were found between the experimental and the control groups for another condition.

Luchins and Luchins (90) varied the responses of the confederate to the preliminary series of pictures. Half the subjects judged pictures of clearly delineated objects, and the other half an ambiguous set of lines. Conformity was higher when the preliminary series

was ambigaous and when the confederate's responses to the preliminary series were congruent with those of a control group judging privately.

Reward Pretraining. In some studies, independence has been rewarded, whereas in others conformity to a false group position has been reinforced. In the study by Luchins and Luchins (90) just reviewed, the experimenter called the naive subject's responses "right" when they agreed with those of the confederate. Subjects showed greater susceptibility on a subsequent test series. Feedback has a stabilizing effect even when the information is incorrect. Comparable conditions in another study by Luchins (87) produced similar results (see above).

Crutchfield (34) reports that conformity increased on a task involving perceptual judgments when the experimenter called the erroneous reports of others "right," but that subsequent responses to attitude statements by the same subjects were not influenced.

Conformity effects following pretraining with reward for erroneous responses appear to be related to the content of the tasks.

McQueen's (93) study involving the return of examination papers with correct and incorrect scores revealed that deceptions decreased significantly under the two pressure conditions.

Scott (120) found that college debaters who were rewarded showed a significantly greater average change in the direction of their positions. Differences between losers and control subjects were not significant.

SUMMARY

A prior individual experience of failure on the task that later is subjected to conformity pressures consistently has been found to render an individual less resistant. A direct correlation has been reported between the degree of experimentally produced anxiety experienced prior to the pressure situation and susceptibility, with those experiencing the greatest degree of anxiety being least resistant. Properties of a prior task on which a confederate gave a false response have been found to be related to the degree of susceptibility to pressures exerted by the same confederate in a later, different task. Pretraining with reward for incorrect responses also has been shown to render a person more susceptible.

Differential Historical Experience in Subjects

Different childhood experiences, as revealed biographically or through questionnaires and projective measures, and their effects have been investigated.

Childhood Experience. Conformity tendencies have been related by Mussen and Kagan (105) to perceptions of parents as shown in fantasy. Male college students wrote responses to eight TAT cards on an individual basis. Then they participated in judging lengths of lines as the fourth person in a group of five. TAT stories were scored for presence or absence of parental punishment themes. A significantly greater per cent of extreme conformists perceived parents as harsh, punitive, restrictive, and rejecting.

Krebs (80) tested the hypothesis that the later the age of independence training during childhood, the greater the resistance to opinion change. Male college students were classified as either early or late in independence training, according to Winterbottom's questionnaire. Greatest conformity occurred for individuals classified as late in independence training.

McQueen's (93) investigation of deception in an examination situ-

ation found that students classified in the dominant life style according to McGuire's Index of Value Orientation reported significantly more errors (see above).

Physiologic Characteristics and States of the Person

Age and sex of the subjects, differences in amount of sleep deprivation, strength of food preferences, and degree of anxiety have been related to susceptibility.

Sex. Burtt (25) asked college women and men in groups of four to twenty-six persons to judge the truthfulness of a person recounting an intaginary crime, once prior to and once after the discussion. Analysis of the data revealed only small and insignificant differences between men and women in degree of shifting as a function of discussion, with a tendency for women to shift more than men. Jenneis (70) reported similar results (see above).

Crutchfield (34) has summarized unpublished results by other investigators who have tested women on the same battery of items that he has employed with men. By contrast with college men, responses by college women showed a significantly higher degree of conformity, and that, by comparison with adult men, a sample of college women alumnae in their early forties showed significantly lower conformity scores. The

highly selected composition of the alumnae group means that the findings cannot be easily interpreted as indicating that older women are less compelled to conformity than men.

Kirkpatrick (79) has compared frequency of shifting by men and by women toward responses given by the opposite sex. The BeliefPattern Scale of attitudes toward feminism was administered individually to college students, then to one man and one woman as a committee, and again individually. Although women changed their positions less than men in the group situation, they were less inclined to revert to their original position.

The finding by Coleman, Blake, and Mouton (31) (see foregoing), indicating differential susceptibility of men and women as a function of the material being judged, makes it mandatory that the nature of the task be considered in future work.

Age. Differences in susceptibility have been related to age. Duncker (38) has reported that children under two and two-thirds years of age did not respond to food preferences expressed by others, thus demonstrating a lack of susceptibility for the task employed.

Berenda (11) found that children aged seven to ten gave erroneous responses as a function of the incorrect reports by others with significantly greater frequency than children ten to thirteen years old (see preceding).

Luchins (89) used ten- to thirteen-year-old children as subjects in one series and male college students in another series. Attempts to increase conformity as a function of the assistant's erroneous reports were more successful with children.

Physiologic States of the Person. Fisher and Rubinstein (42) found that subjects who had been awake continuously for 48 to 52 hr showed significantly greater changes in autokinetic judgments, both between trials and within trials, than control subjects.

Kimbrell and Blake (78) experimentally created two degrees of inducement to thirst: strong and moderate. Subjects then were asked to wait for the remainder of the experiment near a drinking fountain with a sign forbidding its use. Under conditions of moderate thirst, the naive subject was significantly influenced by the confederate who violated the sign. No differences were found for the strong thirst condition.

Four- to six-year-old kindergarten children were placed by Marinho (95) in two groups, one showing a preference for one of two kinds of fruit paste, and the other, with indefinite preferences. Half of each group served as control and half as experimental

subjects. Susceptibility to a confederate's selection was found in both groups, although predominant preferences were more difficult to shift.

Lawson and Stagner (82) tested the hypothesis that attitude change during group discussion is accompanied by increases in anxiety, and that amount of change is proportional to the amount of anxiety. Male undergraduate college students were preselected by attitude scales to represent extreme positions toward nationalism or internationalism. Anxiety was measured by palmar sweat both before and after each subject participated in the pressure situation. Two naive subjects interacted with an instructed majority who took the opposite point of view. Attitude shifts were found to be accompanied by *decreases* in palmar sweat, particularly for those initially holding nationalistic opinions.

Hoffman (64) used selected items from the F-scale to differentiate students with high and low inner conformity needs. In the pressure situation, GSR readings were taken as each subject responded orally to social attitude items after hearing erroneous group norms that alternately agreed or disagreed with responses subjects had given six

weeks earlier. Unexpectedly, both groups shifted significantly toward the false norms, with conformity producing less anxiety than resistance, although the differences were significant for high conformity subjects only.

Summary

The findings regarding sex are inconclusive, with minor evidence that men may be more resistant. to social pressures than women. A consistent finding is that younger people are more responsive to social pressures than older individuals. Loss of sleep appears to render a person more susceptible. Definite food preferences render the individual more resistant to change. Two studies report that shifting is accompanied by a decreased amount of anxiety.

Psychologic Properties of the Person

Psychologic dimensions investigated have included ascendancysubmission; lack of nervous tension and self-confidence; authoritarianism; dimensions described by the Minnesota Multiphasic Personality Inventory; the Rorschach Test; the Thematic Apperception Test; intelligence; complexity-simplicity; originality; dependence on the perceptual field; pathologic tendencies of the person; and characteristics assessed by self-ratings and self-descriptive check lists.

Ascendancy-Submission. Several different personality measures have been employed to assess the effects of individual differences in ascendancy-submission. Helson, Blake, Mouton, and Olmstead (63) used the Allport-Allport *A-S Reaction Study* to classify subjects and then had them judge eighteen statements from the Thurstone Militarism Scale. Submissive people were more influenced to shift their responses (see foregoing). Mouton, Blake, and Olmstead (103) also employed the *A-S Reaction Study* as a measure of ascendancysubmission. Under name disclosure conditions only, submissive subjects were found to conform more often as a function of the erroneous reports; of others (see preceding).

Beloff (10) also used the *A-S Reaction Study.* Both male and female subjects responded to the Thurstone-Chave War Scale initially in private and later as the fifth person in the simulated group situation. Others, gave strongly agreeing, neutral, and strongly disagreeing responses, in random order and balanced, to the anti-, pro-, and neutral attitudes toward war statements. He found a negative rela-

tionship for men only between ascendancy and conformity. For women, a positive relationship was observed, with more submissive women conforming less than those in the ascendant. Beloff provides no basis for interpreting the divergent results.

Kelman (75) classified subjects on the ascendancy scale from the Guilford-Martin Inventory of Factors GAMIN. Subjects low in ascendancy, who had participated under the failure, ambiguous, or control conditions, were found to be more susceptible to influences. Under the success condition, increased susceptibility was found for those higher in ascendancy.

The ascendancy scale of the Guilford-Martin Inventory of Factors GAMIN also was used by Bray (23) to classify subjects who later responded to the autokinetic task. For the anti-Semitic subgroup judging with a Jewish confederate, higher ascendancy subjects were more susceptible; no relationship was found for the subgroup classified as not anti-Semitic judging under the same conditions. For the subgroup classified as not anti-Semitic judging with a Gentile confederate, high ascendancy correlated significantly with shifting, with no difference found for the anti-Semitic subjects under the same conditions. Low ascendancy was correlated with increased susceptibility for the subgroup classified as not anti-Negro that judged after a Negro confederate. These complicated relationships do not fit a systematic pattern.

Ascendancy-submission has been measured by teachers' ratings in studies by Berenda (11) and Jenness (70). Neither independencesubmission nor ascendancy-submission was found to be related to susceptibility (see above).

The evidence indicates that a basic association exists between these two sets of variables in the direction of greater susceptibility as a function of greater submissiveness. The relationship has been confirmed for male subjects only, with an inversion of relationship reported for women in one study.

Lack of Nervous Tension and Self-confidence. Kelman (75) and Bray (23) related two additional scales — I, self-confidence and N, lack of nervous tension — from the Guilford-Martin Inventory of Factors GAMIN to susceptibility. Kelman found that subjects scoring either low in self-confidence or showing lack of nervous tension had significantly higher suggestibility scores except under conditions of prior success. Bray reports the same findings for lack of nervous tension. However, when the total sample was subdivided for prejudice on the Levinson-Sanford Scale of Attitude toward Jews or the Likert Scale

of Attitude toward the Negro, most of the correlation was contributed by the prejudiced subgroups only.

As measured by the Maudsley Personality Inventory, Beloff (10) found conformity to be positively related to neuroticism for men negatively related for women (see preceding).

Autlioritarianism. Susceptibility was related by Wells, Weinert, and Rubel (128) to scores on the Gough version of the F-scale. The students who gave incorrect answers under influence had significantly higher mean scores on the F-scale, indicating a tendency to more susceptibility by higher authoritarian scores. Crutchfield (34) reports a significant correlation of +.39 between higher scores on the F-scale and more yielding to others on a twenty-one item test. For the same subjects, the correlation between yielding and staff observer ratings of authoritarianism in a psychodramatic situation was found to be +.35. Beloff (10) reports a positive relationship between authoritarianism on the F-scale and susceptibility for both men and women. Hardy (54) found no relationship between F-scale scores and public and private conformity.

Minnesota Multiphasic Personality Inventory. Goldberg, Hunt, Cohen and Meadow (50) used the Asch line judging problems to obtain groups of undergraduate students showing differences in susceptibility. The male high conforming group was found to make lower scores on the masculinity-femininity (more feminine), the hypochondriacal, and psychasthenic scales of the Minnesota Multiphasic Personality Inventory, and to make lower anxiety scores on the Taylor Manifest Anxiety Scale. The female: high conformity group rated significantly higher on the psychasthenic scale of

the MMPI and the Taylor Scale. The divergent findings for men and women were not interpreted.

Crutchfield (33) used the Group Squares Test to identify three groups of male subjects differing from one another in degrees of readiness to yield under influence. Those least responsive to pressures were found to be low in introspectiveness and more masculine, as measured by the MMPI. Using the Asch line judging problems, Barron (6) selected extreme groups in independence and yielding. He found no significant differences between groups on the MMPI scales nor did Crutchfield (34) using a different task.

It is difficult to identify basic relationships between MMPI measures and susceptibility. A probable relationship is that men low on MMPI masculinity are more susceptible.

Intelligence. Neither Berenda (11) nor Jenness (70) found significant correlations between intelligence measures and susceptibility (see above). Fisher, Williams, and Lubin (44) report no relationship, but the measures used were not explained. Other investigators have shown a significant inverse relationship between intelligence and conformity. Crutchfield (34) found correlations of -.51 with the Terman Concept Mastery Test and -.63 with staff ratings between intelligence and frequency of yielding (see above).

The relationship between intelligence and responsiveness to pressures has been found in two studies by Crutchfield to be curvilinear. One (32) employed the Group Squares Test, and the other (33), the "Bingo" task. Those scoring in the intermediate range of responsiveness scored highest on intelligence measures, including the Terman Concept Mastery Test and the Idea Classification Test in the first study and an undefined measure in the second study.

Nakamura (106) investigated the possibility that conformity as a nonintellectual variable contributes to variability in problem-solving ability. Intelligence as measured by Part II, Analogies, of Form B of the Concept Mastery Test was held constant by statistical means. For men, there was a significant negative correlation between tendency to conform and performance on all problems combined, but especially on the restructuring problems. The negative correlation for men above twenty-one years only was considerably higher. For younger men, results were consistent with those for women. A significant sex difference was found, with men superior in problem-solving and intelligence, but lower on conformity.

Studies of the relationship between intelligence and susceptibility are not entirely clear; if a relationship does exist, it probably is inverse and curvilinear.

Complexity-Simplicity. Barron (7) categorized two extreme groups of subjects as yielders and independents. Using the Barron-Welsh Art Scale to measure complexity-simplicity, he found that independents made significantly higher complexity scores. Crutchfield (32) found that those who yielded in the intermediate range showed less preference for symmetry on the Welsh Figure Preference Test.

Originality. From a sample of USAF captains, Barron (8) selected the extreme groups on eight measures of originality, including scores from the Rorschach Test, the Thematic Apperception Test, anagrams, and plot titles. Susceptibility scores were obtained on a twenty-one item test. Significant differences between groups were found, with those classified as original yielding less. Crutchfield (32) found that

students responding to the Group Squares Test in the intermediate range were rated by instructors as highest on originality.

Dependence on the Perceptual Field. Linton (86) measured dependence on the perceptual field by subtasks and a composite score on the Tilting Room, Tilting Chair, and Embedded Figures tasks. Other measures included the degree of attitude change after reading an article contrary to own opinion and the influence of personal attitudes on a syllogisms test. Subjects were divided into two groups according to the extent of change toward the judgments of a male confederate who responded five inches above the subject's pregroup norm on the autokinetic task. The conformity measure for the autokinetic situation correlated significantly with the composite score for the degree of dependence on the perceptual field. No significant correlations were found between social influence and performance on the syllogisms and attitude task. The Embedded Figures Test also was administered to high and low yielders in a study by Rosner (114). Yielders failed to locate the test pattern in the complex figures significanitly more often than nonyielders.

Compliance with Requests. Wiener, Carpenter, and Carpenter (132, 133) classified undergraduate psychology students by three degrees of their compliance with a request to return some experimental materials. The mean conformity score was significantly higher for the group that completed and returned the material. Helson, Blake, and Mouton (62) report comparable results.

Projective Materials. Hoffman (65) composed extreme groups of those who shifted most and least toward false group norms reported for two) tasks. High conformers were

found to score significantly lower on all Thematic Apperception Test measures of ego strength, and higher on measures of parental dominance, aggression directed toward self, success striving, overconcern for parents, and readiness to submit to authority.

Linton (85) using the Rorschach Test found significant correlations between high conformity and low W, high P, flexor M, high Hd, high F%, high M; Sum C, high Sum C, and animal responses consisting mostly of insects, sea life, birds or bats, in contrast to a preponderance of dogs, rabbits, elephants, or bears. The picture of the high conformity person is one of high constriction.

Needs. A cluster of studies have investigated relationships between conformity and strength of various needs or drives, as measured by

personality tests, including affiliation, dependency, approval, and achievement.

In the study by Jacubczak and Walters (69), child subjects, half classified as high-dependent and half as low-dependent, were subjected to pressures, once from a peer and once from an adult. Differences were small and not statistically significant.

Hoffman (64) found that subjects with high conformity needs tended to conform when faced with divergent norms, and showed less anxiety when they did so (see above).

Hardy (54) determined the degree of affiliation motivation by subject's responses to TAT type pictures prior to the discussion task. In the no-support condition, the high- and medium-need affiliation groups were more conforming than the low group. In the partner condition, the medium and low groups conformed more than the high group (see above). Samelson (115) reports in an abstract that he failed to find a relationship between need affiliation and conformity on a discrimination task.

Moeller and Applezweig (102) placed women college students into groups representing combinations of high and low social and selfapproval needs, as measured by a sentence completion form of The *Behavior Interpretation Inventory.* Consistent with findings from Hoffman's (64) study of need affiliation and from the achievement studies, summarized next, subjects high in social approval needs and low in need for self-approval significantly and consistently yielded to the erroneous reports by others. No differences were found for persons scoring high in self-approval needs and low in social approval needs, or for those scoring high on both measures. Qualitative data from postexperimental interviews substantiate the findings.

Krebs (80) validated the hypothesis that the greater the achievement need of a person, the more resistant he is to opinion change.

Samelson (115) provided information that might allow the individual to account for the discrepancy between physical and social reality. Subjects identified simple visual stimuli presented tachistoscopically. Personality data available included measures of need achievement and affiliation based on McClelland's scoring of TAT responses, a measure of sensitivity to social stimuli and approach, and a measure of anxiety, both drawn from items on the Cattell 16 PF. Significantly less conformity was found under the reduced conflict situation when prior failure by the others provided the naive subject with an "explanation" for the social discrepancy. No relationships between conformity and need affiliation or anxiety were found. In the usual full conflict situation, both need achievement and social

approach were negatively but not significantly correlated with conformity, whereas under the reduced conflict condition the correlation was positive and significant.

Since only one or two studies have employed the same measures of strength of needs, the conclusions drawn can only be regarded as tentative ones.

*Rating and Check List Proce*dures. Barron (6) selected extreme groups in susceptibility. In self-ratings on the Gough Adjective Check List, subjects low in conformity perceived themselves as possessing intellectual and cognitive originality, open-mindedness, a high degree of personal involvement, emotional reactivity, and lack of social ease or absence of social virtues; yielders perceived themselves as possessing ease and facility in interpersonal relations, personal effectiveness, playfulness in achieving goals, and personal stability and health. On the eighty-four descriptive item check list, independents placed significantly higher values on creativity, close interpersonal relations, and the importance of the individual as opposed to the group. Yielders saw themselves as practical-minded, physicalistic in thinking, and group-oriented.

Self-descriptive questionnaire and personality inventories, used by Crutchfield (34) to contrast extreme groups, characterized the independent person as one who is adventurous, self-assertive, possessed of self-respect, and free from compulsion about rules. Conforming persons were seen as rigid, externally sanctioned, inconsistent, anxious, and possessing moralistic attitudes and conventionality of values. High conformers described their parents in rigidly idealistic terms; as parenc., they saw themselves as restricting children, whereas independent subjects saw themselves as permissive parents.

In another study by Crutchfield (33), staff ratings on an adjective check list described those subjects most responsive to social influence as fluid, impulsive, tense, and

disturbed; those least responsive as rigid, calm, conventional, and practical; those intermediate in responsiveness as moderate, conventional, careful, stable, quiet, intelligent, and serious. On self-ratings, those who were most responsive agreed with the staff assessment; those least responsive tended to overrate themselves; whereas those who were intermediately responsive underrated themselves. Crutchfield (32) also reports significant relationships between responsiveness and such variables as impulsiveness, dominance, flexibility, spontaneity, femininity, and independence of judgmemt, as well as differences between groups in self-perception based on results from adjective check lists.

Responses of students to Fiedler's inventory of assumed similarity (AS) have been used to characterize subjects' tendencies toward acceptance or rejection of the poor performance of co-workers, with a high score indicating tendencies toward rejection. Nonconformers had larger AS scores than conformers.

Pathological Trends in Personality. In a study utilizing "normal" subjects, Cervin (27) selected as subjects high and low scorers on several pencil and paper tests of emotional stability. Highly unstable subjects were found to be significantly more likely to change their opinions under opposition.

Levine, Laffal, Berkowitz, Lindemann, and Drevdahl (84) contrasted the variability in individual scores on the autokinetic task for patients in a Veterans Administration hospital. The psychiatric group was found to be more variable in perceptual judgments and to show less convergence toward group norms than the "control" group. Didato (36) obtained similar results for schizophrenic compared with normal subjects. Degree of regression in chronic schizophrenia has been reported by Spohn (125) to be related to the tendency to modify judgments in accordance with group norms, with those patients rated as moderately regressed showing more conformity in perceptual judgments than those rated as markedly regressed.

Personal Consistency. Blake, Helson, and Mouton (18) investigated the generality issue for responses to various tasks under simulated group conditions. Generality of susceptibility was demonstrated by individual consistency for all tasks. The split-half reliability for a composite conformity score of +.93 also is interpreted as supporting the conclusion that the conformity response is general. Helson, Blake, Mouton, and Olmstead (63) demonstrated that individuals shifting their judgments on a larger number of attitude items moved closer to the contradictory opinions of others than those who shifted less frequently. Crutchfield (34) found the split-half reliability of individual conformity scores for a twenty-one item test to be +.90.

Rosner's (114) study revealed a high degree of consistency in conformity for all tasks and for two different administrations of one task.

Luchins (90) has reported a significant rank order correlation between degree of agreement with responses given by an assistant both in the preliminary and in the experimental series (see preceding).

Asch (3) investigated intraseries consistency in individual performance. Both subjects who conformed and those who resisted initially tended to maintain their behavior throughout a series of trials. Tripling the length of the series did not alter results.

Summary. Results suggest that those who are more susceptible to conformity pressures are more likely to be submissive, low in selfconfidence, less intelligent, less original, show less nervous tension, score higher on authoritarian scales, score on the simplicity end of the dimension of the complexity-simplicity scale, show greater dependence on the perceptual field, and comply with requests more frequently. Several investigations reveal that conformity tendencies are geiteral across several tasks.

Combinations of Variables

Significant interactions between factors were found in some studies, and pooling effects were obtained by simultaneous variations in others.

Variations in Stimulus and Background Dimensions

A strong request complied with by another person has been found by Blake, Mouton, and Hain (19) to produce the highest frequency for signing a petition (see above). Highest frequency of volunteering has been obtained by Rosenbaum (112) (see above). Freed, Chandler, Mouton, and Blake (45) found that the largest and smallest number of violations respectively occurred when subjects saw an assistant (a) violate a "weak" sign forbidding entry and (b) conform to a strong" sign (see preceding).

Blake, Helson, and Mouton (18) have varied difficulty of arithmetic items in combination with degree of discrepancy between correct answers and erroneous reports by background subjects. They report greatest shifting for more difficult items when the erroneous reports were only slightly divergent from the correct answers and the converse (see above).

Uncertainty of judgment (or difficulty) also has been varied by Deutsch and Gerard (35). Subjects were found to be most susceptible when responses were given from memory, and when group members were told that the group would be rewarded for accuracy with a prize. Differences between manners of presentation were not found when subjects wrote their responses prior to hearing the reports of others (see above).

Weiner (132) reported positive relationships among stimulus ambiguity, degree of certainty of judgment, discrepancy from the norm, and conformity (see above).

Cole (30) found that subjects shifted *away* and *toward* the confederate's judgments respectively when he was alternately represented as highly intelligent and as an "expert" (see above).

Variations in Stimulus Dimensions and Sex

Coleman, Blake, and Mouton (31) have demonstrated a significant relationship between task difficulty, susceptibility, and sex of subject. Men and women college students responded to information items after hearing the reports of two other men or women in the simulated group situation. Difficulty level was varied by precalibration on a comparable sample. Responses were analyzed separately, since difficulty level was varied by sex. Conformity was found to be positively and significantly related to difficulty of item for both men and women.

Variations in Background Dimensions

Schachter, Ellertson, McBride, and Gregory (116) found that pressures from other group members to increase production were equally effective for both high and low cohesion groups, and influences to decrease production successful only for the high cohesion groups (see above).

Gerard (47) found that the higher the attractiveness of the reference group and the greater the initial agreement, the smaller the amount of shifting under exposure to influences (see above). Dittes and Kelley (37) have investigated changes in public and private opinion by group members varying in feelings of acceptance. Those told that they were about average in acceptance showed higher conformity in both public and private expressions.

Jackson and Saltzstein's (68) results support the hypothesis concerning the behavior of highly accepted persons: conformity was greater in the normative than in the *modal*

situation, and greater for the high attraction than for the low attraction group situation (see above).

Interaction between degree of discrepancy, characteristics of others in the situation, and extent of attitude change has been found when the task involves ratings of the subject by himself and by both himself and others. Harvey, Kelley, and Shapiro (57) found that changes in an unfavorable direction on self ratings were greatest for acquaintances who evaluated the subject most unfavorably (see above).

Jones, Wells, and Torrey (71) found that where individual accuracy was stressed, correct feedback was more significant in increasing inde-

pendence than incorrect feedback in increasing conformity (see above).

The interaction between degree of confidence expressed by others in the situation and group membership or task-solving orientation has been shown by Thibaut and Strickland (127) to influence conformity behavior. Under group mentbership set, conformity increased as confidence shown by other members increased. For a task set, conformity decreased as pressures increaied (see above).

Deutsch and Gerard (35) found that commitment to a judgment prior to hearing the responses of others reduced the degree of shifting and tended to eliminate differences between responding under anonymous conditions and face-to-face conditions (see above).

Festinger and Thibaut (41) and Gerard (47) have reported similar findings for the relation of homogeneity among persons composing the group and readiness to shift opinions (see above).

In Hare's (55) study of shifting related to group size, leaders were classified as good, average, or poor on the basis of TAT responses. He found that leader skill was correlated positively with amount of change for large groups only.

Variations in Background Dimensions and Personal Characteristics

Mouton, Blake, and Olmstead (103) report that submissive subjects only were found to differ in susceptibility as a function of whether they participated under personal identity or anonymity conditions (see above).

Hardy (54) found that high and medium affiliation groups were more conforming in the no-support condition, and the medium and low groups more so in the partner condition (see above).

Bray (23) has reported that the degree and direction of the relationship between conformity and personality characteristics varied for attitude subgroup and the ethnic characteristic of the confederate (see above).

Samelson (115) found that, in the usual full conflict situation, both need achievement and social approach were negatively but not significantly correlated with conformity, whereas under the reduced conflict condition, the correlation was positive and significant (see above).

Blake, Mouton, and Olmstead (20) found greatest shifting for subjects who had an initial experience of' failure and who participated under conditions of high pressures toward uniformity (see above).

A factorial design was used by Mausner and Bloch (100) to study the additivity of variables. All variables-prior success or failure, prestige of partrier, and prior cooperative experience-separately affected to a

significant degree the extent of convergence of the students to a partner's prearranged judgments. With the exception of the group in which both of the other factors opposed social influence, one effect of prior cooperative experience was to decrease the variability of response among subjects. Where all forces worked in the same direction, greatest consistency of response was found. Significantly higher variance was found for the conflict groups, so that the reaction of the individual in this type of situation is not predictable. The authors suggest that personality measures are needed to tap this source of variance.

Harvey and Rutherford (58) found that subjects with a fewer number of pretrials showed more readiness to shift in response to pressures applied in an absolute approach than to gradually increasing divergence pressure (see above).

Millon and Simkins (101) subjected high and low scorers on the California F-scale to influence from either a prestige or a nonprestige partner. More susceptibility to the prestige partner was demonstrated by subjects high on the authoritarian scale.

Kimbrell and Blake (78) have shown that behavior in a prohibition situation is determined partly by properties of individual drive strength and partly by social properties in the situation (see above).

Variations in Personal Characteristics

Kelman (75) found that subjects scoring either low in self-confidence or showing lack of nervous tension had significantly higher suggestibility scores for all conditions except those of prior success (see above).

Lawson and Stagner (82) found that attitude shifts during discussion were accompanied by *decreasing* palmar sweat (see above).

Beloff (10) found that there was a negative relationship between ascendance and conformity for men, with ascendant men remaining more independent, and a positive one for women, with ascendant women conforming more. Conformity was positively related to neuroticism for men, but opposite results were reported for women (see above).

Factors Associated with Conversion Behavior

Conversion may be identified by the effects remaining after the conformity pressures have been removed. A research design permitting assessment of the degree of conversion includes measurement first of individual performance under private conditions; next, the

shifting of responses under pressure conditions; and at some later time the subject's behavior under private, post-pressure conditions. Conversion is evident when performance in the post-pressure situation differs from that in the pre-pressure situation in the direction of the divergent reports others gave in the conformity situation.

The phenomenon of conversion has received far less attention in researcll studies than susceptibility. The result is that at best only an imperfect picture can be drawn of psychological factors associated with conversion. Additional limitations in assessing the dynamics of conversion result from the failure of many experimental studies to employ sound designs. Nevertheless, because of its importance, it seems useful to evaluate the present state of understanding of conversion behavior.

Severl investigators have reported effects of prior group influence on later alone judgments of perceptual tasks. In Sherif's study (121), male college students judged one hundred trials in four sessions, each held one day apart. The first three sessions were composed of groups of two or three members each, and the fourth of individuals judging by themselves. Initially, different individual judgments converged toward a common

norm in the group situations, and the group norm persisted into individual sessions. Sherif (122) has reported similar results for prearranged responses given by an assistant. For the majority of the subjects in the alone postgroup session, greater convergence was found toward the responses reported by others. Schonbar (118) obtained comparable results. Judgments of length of lines and of a moving slot of light were made individually after a series of judgments had been given in the presence of another person. The influence of the subjects' reactions persisted into the postgroup, private situation. She has also reported the important finding that the longer the individual resists modifying his judgments, the longer the persistence of the influence in the later private situation.

The autokinetic situation was used by Bovard (21), with the degree of conformity determined by shifts in standard deviations among pregroup, group, and postgroup judgment series. Rank order coefficients showed significant correlations for the sizes of the standard deviations among the three situations. Subjects were ranked in order for degree of susceptibility to change in the group situation. The susceptibility to conversion — the extent to which changes persisted for twerity-eight days into the post-pressure situation-is represented by a rank order correlation of.92. Subjects who showed larger shifts in their mean judgments also showed a greater tendency to retain the shift over the twenty-eight-day period.

Rohrer, Barron, Hoffman, and Swander (111), trained ROTC students under alone conditions to make judgments for points of light traversing distances of two inches for one-half and eight inches for the other half of the subjects. They then had subjects judge in pairs. The mean distance judged under the interaction conditions was six inches. Significant consistency was obtained between estimates given under interaction conditions and those given under private conditions one year later. Similarities between performances after initial training and the private situation were small, indicating that when the rank order in the postgroup serves as the criterion, pretraining influences are negligible by comparison with effects produced within the interaction situation.

Schachter and Hall (117) used the frequency with which subjects "followed through" on a volunteering commitment. Subjects who volunteered independently (without knowledge of the responses of others) showed the highest relative frequency of carrying out the promised action.

Marinho (95) studied the persistence of experimentally shifted food preferences in four- to six-year-old children. In a private test situation one year later, the aftereffect of the social influence situations persisted in all those children originally having indefinite taste. Importance attaches to this study since it suggests that those most susceptible to

conversion effects are the ones least committed *before* group pressures are exerted (see previous sections).

Duncker (38) investigated carryover effects on food preferences, and found that when the experimental situation was repeated two or three times a week for an unstated period, significant effects were shown to persist, indicating the adoption of new preferences under repetitive social reinforcement.

Gerard (48) studied conversion effects in groups of three members, which differed both in degree of cohesion and in the extent of initial disagreement on the solution of a labor-management case. One week after participating in a fifteen-minute discussion, subjects made individual judgments that were recorded on a seven-point scale, both before and after discussion in a two-person situation with a confederate. For persons initially interacting under high cohesion conditions, individual judgments given prior to discussion with the confederate showed significaritty greater convergence toward the original group position. High cohesion members also showed more resistance to shifting toward a different position under the social influence condition than did subjects participating initially under low cohesion conditions. Similar results were found relating degree of initial agreement among members to resistance: the finding is that the greater the

initial agreement among members, the lesser the susceptibility in a second pressure situation.

Several studies have reported results that relate degree of conversion behavior to variations in background factors or to personality characteristics of the subjects.

Hardy (54) studied differences in the amount of conformity pressure exerted by unanimous as contrasted with near-unanimous opposition in a discussion situation. Conversion was increased by unanimity of opposition in the pressure situation (see previous sections).

Willingness to volunteer bas been studied by Bennett (9) to determine the effect of perceived unanimity. One-third of the groups of college subjects participated under discussion conditions, one-third under lecture conditions, and one-third as control groups. The measure for the degree of influence exerted was the number of positive responses by subjects to subsequent mail requests for volunteers. The factor of perceived group unanimity in the decision to volunteer was found to be significantly related to the carrying out of the specified action.

McKcachie (92) measured shifting of opinions among students in six sections, three of which were taught by leader-centered methods and the other three by group-centered methods. After one month, classes were given hypothetical problems concerning either Negroes, criminals or children, with class members asked to arrive at a unanimous decision. One week later, the attitude scales used at the beginning of the experiment were readministered. Leader-centered as contrasted with group-centered classes showed more convergence. These findings are opposite those reported by Bovard (22) (see above).

Hoffman (64) measured Conversion effects by readministering a scale of social attitude items individually two weeks after the pressure situation. The conversion score consisted of the proportion of all conforming responses that persisted for the two-week period. Persons classified as low in conformity needs had significantly higher conversion scores than those classified as high in conformity needs (see above).

Results are generally consistent in showing that responses altered by social pressure persist into the future as conversion phenomena. The degree of conversion is limited, however, by the intensity of one's initial preference, with the general rule being that the more indefinite one's position, the greater the impact of a later social situation and the greater the carryover effect into the future. Suggestive is the finding that the longer one resists altering his position under pressure conditions, the longer he retains the altered position in the postpressure situation.

Although increased susceptibility has been shown to be related to higher inner conformity needs of subjects, one experiment suggests that those lower in inner conformity needs may be more likely to show increased conversion effects at a later time. Persons exposed to unanimous divergent responses of others are more likely to demonstrate conversion behavior. If the interaction is leader-centered rather than group-centered, then greater conversion may be expected at a future time.

Implications for Interrogation

The implications for interrogation of research on conformity can be evaluated by describing known key factors that are likely to produce maximum suggestibility for any given individual. If the goal is to aid an individual to resist interrogation pressures, then opposite conditions must be created.

Conformity and Resistance

Task

Individuals appear to be more susceptible to conformity pressures when expressing social opinions, ideological attitudes, and abstractions that are not rooted in concrete experience than when they are dealing with factual materials, with which they are well acquainted, or with personal preferences. Regardless of the materials, increases in susceptibility appear when an individual is uncertain of his beliefs, uninformed regarding the facts of the situation, or when objective cues that could aid him in maintaining his orientation to the situation are reduced or eliminated. Available experimental evidence demonstrates the key importance for conformity of inadequate individual knowledge and understanding. An important inference is that *resistance* to conformity or to interrogation pressures can be heightened by insuring that an individual is well informed of necessary facts and their implications.

Social Situation

Tendencies toward conformity and conversion are heightened when an individual is with at least three other persons, when others are in

unanimous agreement and when their reactions represent only small departures from the position believed by the individual to represent his own convictions. Resistance is minimized by leading the individual away from his own position gradually by small steps.

If the other individuals present are personally acquainted with the subject, and are persons whom he respects, additional conformity pressures are created. Furthermore, if the individual is required to act in his own name and is not required to commit himself to a position prior to the application of pressure, greater influence in the conformity direction can be exercised. A group situation tends to foster conformity, when the group is led according to a permissive groupcentered approach, when members are dependent on one another to obtain significant goals, when the situation calls for unanimous agreement among members, and when the group is cohesive.

To create these conditions in life, it would be necessary to compose groups by careful selection to insure friendliness and responsibility among members, with all but one — the person on whom pressures are to be applied — agreeing unanimously in support of a position not greatly divergent from the position held by the critical person.

It would appear that the best single antidote against conformity pressures is intimate acquaintance and thorough understanding of the issues involved. Although yet to be demonstrated experimentally, it also is probable that an individual would be aided in maintaining independence through understanding of conformity pressures. If not understood, they can operate "silently" to render an individual uncertain of himself, ready to follow others, and to capitulate to an interrogator.

The Person

A peisonality profile of the kind of individual who is least able to resist conformity pressures, and probably interrogation pressures as well, would include such characteristics as submissiveness, lack of self-confidence, lack of originality, lack of achievement motivation, desire for social approval, and being uncritical, conventional, and authoritarian.

Conversion

As with conformity, conversion is highest for individuals whose initial response regarding factual matters or attitudes is indefinite,

vague, and uncertain. Conversion further appears to be more complete for individuals who resist conformity pressures for a longer time. Unlike conformity, however, conversion effects are heightened when capitulation occurs under leader-centered group pressure conditions. Here again, it would seem that one of the most powerful factors determining conversion is limited understanding of the problem or minimum insight into one's own attitudes or convictions. Resistance to conversion probably can be increased through insuring that the individual remains well informed and understands his own opinions and attitudes sufficiently well to express them clearly.

Future Research Directions

A number of limiting factors make generalizations from laboratory situations to life difficult.

Laboratory Settings vs. Real Life Situations

Laboratory situations are relatively bland as far as involvement is concerned, at least in comparision with lifelike settings where the personal stakes connected with

conformity, compliance, and conversion are higher. Because of the limited investment a laboratory situation usually evokes in an individual, direct or absolute comparisons between results obtained in it and actual life settings are likely to be treacherous. There is a need for the type of research that provides the experimenter with the opportunity to control and manipulate variables under realistic operating circumstances. Only then can generalizations be made with higher probability of accuracy. Current knowledge of relevant variables should make it possible to design experiments for lifelike settings with a minimum of trial and error. Such studies could be combined with experiments on sleep deprivation or simulated space flights, in which the experimenter's control over living conditions and the duration of the experiment is quite high.

Artificial Tasks vs. Significant Issues

Many of the experiments reviewed in this study have employed tasks requiring adjustments of individuals under conformity or conversion conditions that are extremely artificial. As a result, conformity or resistance may develop under conditions that bear little resemblance

to actual situations. Future laboratory investigations can benefit from employing tasks that arouse deeper personal commitment and stronger group loyalties.

Theory vs. Empiricism and Intuition

Even a cursory examination of the principal reports summarized here shows that much of the work in this area has been designed according to empirical understanding, intuition, and "hunch." Experiments designed to test systematic and theoretical issues are needed. Sherif's general formulations concerning frames of reference (123) and Helson's adaptation-level theory (59), applied in analyzing the conditions of social adjustment, constitute examples of theories that have already demonstrated their usefulness in experimental designs. Such theoretical statements can serve to bring order to an otherwise chaotic field of endeavor.

Simultaneous Variation of Factors vs. Single Variable Designs

Results from more recent experiments give substantial support to the view that conformity, compliance, and conversion are complex matters of adjustment that occur when a host of circumstances, rather than a single factor, are favorable. Critical factors include the nature of the task, the circumstances of the situation within which the behavior occurs, and the characteristics of the individual on whom pressures are exerted. Each possible source of influence needs to be varied simultaneously within the design of

a single experiment, if we are to obtain a more nearly accurate picture of the dynamics of conformity. In terms of present understanding, it can be stated that the interaction of sources of influence is not additive, but that true interaction among variables occurs.

Replications vs. "One-Shot" Studies

The literature is riddled with "one-shot" studies that make acceptance of conclusions tenuous. Replication experiments are needed to insure that conclusions from single studies will stand.

Conformity vs. Conversion

Over 90 per cent of work in this area has been concerned with conformity, yet the conditions under which changes induced by conformity

pressures extend into future behavior are of critical concern. Such experiments are not difficult to design. For the most part, they represent an extension of the conditions already used in studying conformity to secure measurements of the residual effects of conformity pressures. Great progress in the understanding of both conformity and conversion phenomena may be expected from investigations designed to measure the persistence of conversion over time.

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CHAPTER 7

Countermanipulation Through Malingering

MALCOLM L. MELTZER

Introduction

Historically, the problem of psychopathology has been the development of techniques which would discover and make apparent emotional pathology that is not immediately evident. Screening tests, lie scales, observational and interview procedures have all been devised with the primary intent of unmasking the potentially or actually disturbed individual who masquerades behind a front of defensiveness and superficial social conformity. The opposite type of unmasking, i.e., of the feigning or simulation of emotional illness which is not in reality present or is exaggerated to an extreme degree, has received comparatively less attention. Murphy (65) has written an excellent history of malingering and has shown that the problem of simulation has been present since Early Greek and Biblical times. Although the simulation of psychosis or of epilepsy has a long history, more attention has been given in the past to the feigning of diseases of single organs, and the development of laboratory techniques which would differentiate the sick from the well. The malingerer, on his part, has shown amazing resourcefulness in keeping abreast of the literature and in devising counter counter-measures.

The simulation of mental illness by captured prisoners of war is a potential, and perhaps effective, technique for evading interrogation. In almost all cultures, the mentally ill person cannot be held accountable for his actions, is considered incompetent, and is not

expected to give a rational account of himself, his past, or his environment. The prisoner of war, faced with coercive interrogation, and reluctant to betray his country and friends, might choose this as an honorable alternative which favors self-preservation. Certainly this has become more frequent among persons charged with serious crimes in courts of

law. The increasing popularization of the mental health movement and the publicity attendant to the M'Naghten Rules and the Durham decision may lead to a further confounding of criminal acts and mental illness. This chapter is not concerned with the moral or ethical aspects of this problem, but rather is directed toward understanding how malingering may become a factor in situations involving the interrogation of a resistant source by a captor.

Because of the focus of interest, it seems feasible to limit the scope of this chapter to the feigning of those illnesses which would render the person mentally incompetent. Although a person may malinger a paralysis of the arms or legs, blindness, or a low back pain, none of these symptoms would make it impossible for him to testify or reveal information. However, psychosis, mental deficiency, or amnesia would more than likely lead an interrogator or examiner to the conclusion that the person is not a reliable source of information who can be expected to report events accurately and realistically. Thus, the primary aim of this behavior is evasion rather than the financial gain which is often the motivation for simulating physical disease. More specifically, it is an evasion of responsibility, the responsibility for past acts or for future acts, as related to the giving of information. In this chapter, then, malingering refers to the planned and deliberate simulation of mental symptoms for the purpose of evading responsibility.

Two things become apparent in reviewing the literature on malingering. The bulk of it is impressionistic and subjective, and at times there is more disagreement than agreement among the writers. Much of the polemics revolve around issues such as the moral reprehensibility of malingering; whether or not the malingerer is, by definition, an emotionally disturbed person; the differentiation of malingering from the Ganser syndrome; whether or not the Ganser syndrome is an hysterical or psychotic reaction; and the difficulties of detecting malingering. For the most part, it appears that those who are optimistic about detecting malingering might do well to share some of the pessimism of their colleagues. As Davidson (19) points out, even the best clinicians make errors in this area, and MacDonald (58) stresses the need for professional skill and long experience in determining whether malingering is an element of the clinical picture.

Primarily, this chapter will attempt to bring some order and clarity to this area by reviewing and evaluating the literature, and by attempting to fit these findings to constructs taken from the broader area of social psychology. Hopefully, this may present certain reference points for thinking about malingering and evaluating it, and may provide an orientation for organizing techniques to detect malingering. Studies from the experimental literature which deal with related concepts will be included. The following four pathological states will be considered, the simulation of which might lead the

interrogator to conclude that the source is unreliable or incompetent: psychosis, the Ganser syndrome, mental deficiency, and amnesia.

Adoption of a Deceptive Role

The simulation of psychosis or of any mental aberration may be considered as a conscious and deliberate attempt to take a specific social role. According to Sarbin (77), the concept of role deals with the organized actions of a person in harmony with a given status or position. A position may be considered a system of rights and duties exercised by the person who occupies the position. It is equivalent to a cognitive system of role expectations. The role expectations, which are learned through direct or indirect experiences, deal with with the behavior expected of the occupant of a particular position, and with the behavior anticipated of the person occupying the reciprocal position in the social interaction situation. Thus the position or status of the mentally ill person is culturally transmitted just as any other role, and consists of a system of expectations about the behavior of the mentally ill person. It also includes the reciprocal expectation that the person dealing with the deranged patient will protect him, consider him not responsible for his actions, prevent him from doing harm, make few if any demands on him to be rational, and institute therapeutic and rehabilitative measures. The organized behavior of the individual, directed toward fulfilling these expectations of the self and other, is called the role. Thus, the person who plays the role of the psychotic is trying to determine the role of the examiner or interrogator, and he expects a certain response from him. How successful he will be in enacting that role seems to be dependent on three factors. The first relates to the adequacy and validity of his role perception, i.e., how well he has perceived and understood the organized set of actions comprising that role. The second appears to be related to a generalized skill at taking and

enacting roles. Finally, certain enduring or temporary motivational and qualitative characteristics of the self structure are probably influential in determining the choice and adequacy of the role. This possible consonance of basic personality to enacted role is one of the most complicating factors in recognizing malingering, and is one with which almost all workers in this field have wrestled.

Although these notions on role behavior may help in understanding malingering in general, there is as yet little empirical work which would aid in the prediction of the persons and the circumstances which might combine to produce simulation of psychosis. It is apparent that almost all individuals play different roles, and the role played is partly dependent upon who the partner is in the social situation. Block (9) and Block and Bennett (11) have demonstrated that a single subject varies his behavior as

the interpersonal situation changes. Meltzer (62) has shown that there are individual differences in the ability to shift roles, and this ability seems partly related to the sophistication and complexity of the person's understanding of others. The complexity of this understanding did not appear to be a function of self and ideal-self discrepancy in a homogeneous sample of college students. However, Gough (35) and Cameron (14) have argued that role-taking ability is related to emotional well-being. Studies by Sarbin and Farberow (78), Sarbin and Hardyck (79), and Sarbin and Jones (80) have tended to confirm that adequate role perception and validity of role enactment are positively related to adjustment. However, in a study by Helfand (40), schizophrenics in remission were found to be more adept at taking the role of a standard stimulus person than were either normals or chronic schizophrenics. In addition, Drake (21) found that the better actors in a college drama department scored higher than did poorer actors and nonactors on two of the three neurotic scales of the MMPI. Thus, there are somewhat contradictory findings concerning the question of adjustment in relation to skill for enacting a variety of roles.

The more specific question of the type of person who will attempt to simulate the role of the psychotic has not been investigated experimentally. From role theory comes the suggestion that the role chosen and played well is the one which is congruent with the nature and organization of the self (77). This would tend to support those writers who feel that malingering of psychosis is a symptom of a serious personality defect, if not a psychosis in itself. This position is most clearly taken by Ossipov (69) who feels that the person who simulates a psychosis is accentuating his own latent characteristics. Moreover, several authors have pointed out that malingering may be used to

conceal an actual psychosis, and that which was at first considered malingering may show up as a grave disorder later (13, 22, 34, 47, 58). Eissler (22) explains this as an attempt to hold a psychosis in abeyance by acting as if the behavior is under control and not something one is submitting to. Furthermore, on recovery from psychosis, a person may claim he was malingering because it may be too humiliating to have others know that that he was suffering from a psychiatric disorder (22, 58). Thus, regardless of the problem of who is best at taking roles, the disturbed or the integrated individual, there are many who would hold that the choice of a specific role, that of the psychotic, usually indicates serious psychopathology.

However, others argue that while the malingerer may be emotionally upset, there are also many normals and near normals who malinger under extreme circumstances (22, 23, 29, 30, 41, 58, 88, 91). As MacDonald (58) and Ossipov (69) indicate, the simulation of mental incompetence is more frequent when there is danger of loss of life. Certainly the malingerer does not expect to be punished more severely for having

committed a murder and feigning psychosis than for having committed a murder without feigning psychosis, if through simulation there may be a chance of avoiding punishment.

The interrogation situation appears similarly extreme. The person may see himself in a role conflict, and failure to resolve the conflict may cost him his life. He is occupying two positions simultaneously, and the role expectations of the one are not compatible with the other. As a loyal soldier he is expected by his country to withhold information which would aid the enemy. As a prisoner of war, the enemy expects him to reveal what he knows. As shown by Gullahorn (38), a person who is placed in a situation where incompatible demands are placed upon him because of his role relationships in two groups will try to retain both positions and find a way of satisfying them both. Toby (84) in his analysis of role conflict situations suggests that illness is an excuse by which a person in role conflict may avoid performing an obligation or duty of a role, without relinquishing the position and without suffering sanctions for failing to perform the duty. Thus illness, and particularly mental illness, would allow the prisoner to escape the role dilemma, and since illness is such a widespread excuse, special personality characteristics may not be necessary for selecting this role under extreme circumstances.

Turner (85) has shown that nonconforming behavior is excused by friends if they believe that the behavior is inconsistent with the person's usual role and was caused by unusual stress. A person may forgive himself in a similar fashion. Furthermore, if one conceives of malin-

gering as antisocial behavior (Szasz, 83), then there is much evidence to indicate that many people are dishonest at one time or another (15, 17, 39, 51, 59). Hartshorne and May (39), using school children as subjects, concluded that deceit or honesty is not a unified character trait but rather a specific function of the person's life situation. One of the situations which seems to enhance the possibility of deceit or cheating is a threat to the person's role. This is one way of interpreting the rather consistent finding that poor students who are having difficulty maintaining their roles as students are more likely to cheat (15, 17, 39). Another indication that circumstances are influential in determining antisocial behavior is the finding that examination deception is a function of the particular peer group's attitude toward dishonesty (59). Thus, it is possible to conclude that in conflict situations and extreme circumstances, especially when one's life may seem to be at stake, motivational factors could override enduring personality traits, at least as regards an attempt at malingering. This also seems to be congruent with the finding that a person will take a particular role if it is seen as satisfying an important need (66).

The Imitation of Symptoms

The success of simulation appears to be greatly dependent on the validity and adequacy of the malingerer's perception of what comprises the role which he is trying to simulate. As pointed out by several writers, the person who simulates is an actor who portrays an illness as he understands it (8, 58, 69). It would appear that the characteristics and behaviors which are perceived as crucial to the role are acquired through experience and observation. Personal experiences may have occurred with friends or relatives who were psychotic. In the two cases described by Atkin (4), the role perceptions necessary for the malingering were built up by confinement in mental hospitals at eariler times. The cultural stereotype of the deranged person also seems to be used as a basis for role enactment. Observations made of criminal cases being psychiatrically evaluated prior to trial tend to support this. Many Negro patients who are thought to be malingering tend to play the part of a slow, somewhat confused and defective person who understands little of what is going on around him. Like members of other oppressed minorities, some Negroes have adopted a mask of dullness and unawareness when interacting with the Caucasian majority (5). The cultural determination of the ingredients Which are perceived as comprising the psychotic

role is also evident in the work of Benedict (6). Her investigation of trancelike states in primitive cultures led her to conclude that the content of the hallucinations experienced is relatively constant within groups but highly variable between groups. This suggests that the role of the person in trance is learned from interaction with his own group. As she states, "Even in trance the individual holds strictly to the rules and expectations of his culture, and his experience is as locally patterned as a marriage rite or an economic exchange" (6, p. 77). Sarbin (76) gives a similar interpretation to the behavior of the hypnotized subject which can also be approximated through simulation. Sarbin understands this behavior as an unconscious attempt on the subject's part to take the role of the hypnotic subject as perceived by him through previous experience (see Chapter 5).

The detection of malingering depends to a great extent on the simulator's failure to understand adequately the characteristics of the illness he is feigning. This principle appears central to the indices of malingering which are reported in the literature. Although the simulator may have some understanding of psychosis, his understanding is usually spotty. He fails to appreciate the underlying disturbance and portrays isolated symptoms instead (19, 87). Thus, he may complain of hallucinations or delusions but not show any of the formal characteristics of schizophrenic thought. Often he presents symptoms which are exceedingly rare, existing mainly in the fancy of the layan (8). One such symptom is the delusion of misidentification, characterized by the patient's belief

that he is some powerful or historic personage. This symptom is very unusual in true psychosis, but is used by a number of simulators (19). In schizophrenia, the onset tends to be gradual, delusions do not spring up full-blown overnight; in simulated disorders, the onset is usually fast and delusions may be readily available (47, 69). The feigned psychosis often contains many contradictory and inconsistent symptoms, rarely existing together (8, 47, 69, 87). The malingerer tends to go to extremes in his portrayal of his symptoms: he exaggerates, overdramatizes, grimaces, shouts, is overly bizarre, and calls attention to himself in other ways (8, 19, 47, 55, 69, 87). In doing this, the malingerer presents a childish, dadaistic, nonsensical picture rather than a psychotic one. On the other hand, Atkin (4) feels that the malingerer fails by not maintaining the simulation long enough rather than by failing to portray a psychotic picture accurately. Eissler (22) is more pessimistic and contends that a smart malingerer probably will maintain an accurate picture over a long period of time and may get away with it.

Jones and Llewellyn (47) feel that psychosis and mental deficiency are more frequently feigned than depression and euphoria, but others have reported a wide range of simulated illnesses. Several of the more frequently feigned symptoms are delusions, hallucinations, depression, confusion, excitement, and mutism. Some of the inconsistencies and fallacies apparent in the malingerer's enactment of these symptoms may be specified.

Delusions

The nondeteriorated schizophrenic is often reluctant to discuss his delusions because he has discovered that people are likely to scoff at him. If he is willing to talk about them, he will probably talk at great length and answer questions if the interviewer appears sympathetic and encouraging. The malingerer, on the other hand, feels that he must continually remind the examiner about his delusions and brings them up on each occasion. However, when pressed for particulars he may become evasive, especially if he sees a doubting attitude in the interviewer. Although some truly bizarre and complicated delusions may be fabricated on the spur of the moment, it is more likely that the delusions will be very vague and very limited. It is rare to find delusions as the only symptom of mental illness, but some malingerers present no other major symptoms.

Hallucinations

Malingerers often report visual and auditory hallucinations. Visual hallucinations are rather rare and are more characteristic of acute delirium and hallucinosis due to toxicity than of schizophrenia. Again, in toxic conditions this should not be an isolated symptom,

and one would also expect confusion, tremor, slurred speech, and disorientation along with the visual hallucinations. Auditory hallucinations, which are more characteristic of the schizophrenic, should also be accompanied by the types of thought disturbance characteristic of the schizophrenic.

Depression

Depression, especially psychotic depression, is considered difficult to simulate, primarily because the concomitant somatic and physiological changes are absent (19, 47, 58). The truly depressed patient will show a poor appetite, loss of weight, constipation, and a disturbance of his

sleep cycle. Even more difficult to feign are the alterations of the physiological processes which appear in prolonged depressions. These may include lowered metabolism, lowered temperature, dry skin and hair, and lowered red cell count. However, there is evidence to indicate that motivation, attitude, and intent will have an effect on physiologic processes; therefore the success of the malingerer in actuating some of these changes should not be discounted. Arnold (3) has reviewed some of that evidence. However, the crude malingerer will probably not show these changes nor will he manifest the selfreproachful and self-condemnatory ideas which are characteristic of the depressed patient. Also, the simulator may be too quick, alert, and responsive when he is examined.

Confusion

Confusion, stupor, and amnesia may result from the stress and strain of combat, capture, or arrest. If it is a temporary anxiety state, it should respond to drugs and a sympathetic attitude. Also it should at the outset be associated with other symptoms, such as headache, agitation, restlessness, poor concentration, insomnia, nightmares, ideas of physical disease such as heart trouble, the effort syndrome, dyspepsia, tremor, poor appetite, and an exaggerated startle reaction. The malingerer who feigns a confused state is usually slow, puzzled, unaware, and unable to answer even simple questions. His responses to questions may be bizarre, but if he is repeatedly pressed for the correct answer, he may give it. Most important would be close observation during periods when the patient does not know that he is being observed. When alone or with friends, or even when talking about certain topics with the examiner, the malingerer may show a surprising amount of responsiveness and alertness. However, Eissler (22) warns that the good malingerer is on guard to maintain his symptoms at all times, and that the behavior of both the normal and the abnormal changes when in solitude or when not being questioned by an authority figure.

Mutism

This appears to be a most difficult ruse to expose, but also a difficult one for the malingerer to maintain. Mutism may result from psychosis, organic brain disease, hysteria, or may just be malingered. If it is a manifestation of cerebral involvement, the other symptoms mentioned above may be evident. If it is of a psychotic nature, the

patient will probably be withdrawn and not responsive to his environment. Of course, physical damage to the speaking apparatus must be ruled out. The differentiation of hysterical and malingered mutism is especially difficult. Since it is a difficult symptom to maintain over a long period of time, the malingerer may give himself away in an unguarded moment. Narcoanalysis may help in making the correct diagnosis. The hysterical patient will probably be able to speak during narcosis, whereas the malingerer will probably continue to be mute.

Telltales of Imposture

Aside from the likelihood that the simulator will not realistically and consistently portray the symptoms of the disorder he is feigning, he may also show evasive and uncooperative behavior while he is being examined (28, 47, 58, 72). Since he is aware of the unreality or exaggeration of his symptoms, he is apprehensive lest others recognize his ruse, and this leads him to be especially suspicious, mistrustful, and cautious. Of course, this behavior is also typical of the true paranoid patient and therefore cannot in itself be taken as evidence of malingering. However, as Sarbin (77) indicates, a person must move cautiously and uncertainly when he is not sure what is expected of him and how his partner in the social situation may react. Thus the hysteric, who is convinced of the reality of his symptoms, may revel in being examined, but the simulator attempts to avoid examination. Using Goffman's term (31), he is afraid of being found out of face or in the wrong face, and he sees the examiner as a person who may reveal his false face or provoke him into contradictory behavior. In his attempts to forestall examination, he may complain of physical illness, or he may behave in a sulky, aggressive manner. He may be ill at ease, laugh in a self-conscious manner, be alert, watchful, and quick to take issue.

Reid and Arthur (28), in their discussion of the behavior symptoms of lie-detector subjects, observed that those who were later proven guilty tended to show certain similarities in behavior. The guilty persons were reluctant to take the test, and they tried in various ways to postpone or delay it. They often appeared highly anxious and sometimes took a hostile attitude toward the test and the examiner. Evasive tactics

sometimes appeared, such as sighing, yawning, moving about, all of which foil the examiner by obscuring the recording. Before the examination, they felt it necessary to explain why their

responses might mislead the examiner into thinking they were lying. Thus the procedure of subjecting a suspected malingerer to a liedetector test might evoke behavior which would reinforce the suspicion of fraud. However, it should be noted that certain persons such as psychopaths show few manifest signs of anxiety (Lykken, 56), and others are cool, reserved, and underreact to the lie-detector situation (10, 46). But, generally, the unskilled malingerer is apt to to be reluctant to be examined and to exert too much obvious effort in circumventing the usual diagnostic techniques. Fortunately, few of them display the cleverness of Thomas Mann's hero (60) who gave the impression that he was anxious to evade the examination because he was hiding a symptom which would keep him out of the army if discovered. This little bit of play acting made the examiners only too anxious to strip away his mask of health and to discover triumphantly the epilepsy which he was so cleverly simulating.

Some Unmasking Techniques

Among the "strategic ruses" offered by Jones and Llewellyn (47) is the method of suggestion. In this procedure, the interviewer suggests other symptoms by inquiring about their presence, and usually about symptoms which might be inconsistent with the syndrome originally presented. If the malingerer does not immediately agree that he suffers with that symptom, he may show up with it at the next interview. Cases are reported in the literature where the malingerer picked up the most outlandish and unusual suggestions made by the examiner and displayed that bizarre behavior shortly after the interview. The method of suggestion can be supplemented by indicating that an infallible cure for the patient's condition is available. This may consist of any number of devices, including drugs, electroshock, or hypnosis. The success of placebos in effecting symptomatic changes derives from the patient's confidence in the physician and his conviction that the drug will produce the predicted effect (74, 92). In the malingerer the suggested potency of a therepeutic maneuver may shake his confidence and lead to his dropping the symptom. This would seem to occur because of the simulator's imperfect understanding of the role he is playing, and of the fuzzy expectations he may have of the effects of certain procedures on the symptoms he is portraying. There is much in the literature to indicate that suggestibility is increased when the situation is ambiguous, unstructured, or difficult, and the person has few guideposts on which to rely. Under such

circumstances, he seems to be greatly influenced by the attitudes and perceptions of peers and authorities. On the other hand, studies by Spohn (81) and Didato (20) indicate that schizophrenics may be less susceptible to social pressures to conform. They may therefore be less susceptible to suggestions made by an interviewer regarding their improvement or symptoms.

The success reported for the Rorschach in detecting malingering seems to follow from the same principles. The malingerer is confronted with an unstructured stimulus, and there is very little in his background or experience which would indicate to him the responses to the Rorschach which would be consistent with the illness he is simulating. Thus, once again, the malingerer would be hampered by inadequate role expectations and an unsatisfactory frame of reference. Whether or not a Rorschach can be changed enough to fool an experienced psychologist is still undetermined. Fosberg (24, 25) asked his subjects to give two Rorschachs, a good impression one and a bad impression one, and when he found high correlations between the scoring categories on the two Rorschachs, he concluded that the Rorschach cannot be manipulated, at least with regard to its formal scoring categories. Carp and Shavzin (16) also asked their subjects to fake the Rorschach, and using a somewhat different method of ordering the data, found correlations between the good impression and bad impression Rorschachs ranging from .16 to .97. However, the correlations between the F, F+, and F- scores were all very high. The authors state that no attempt was made to determine whether the subjects were successful in altering their responses in the desired direction. Studies carried out with persons actually suspected of malingering, rather than being asked to malinger, all report a similar picture as being typical of the malingerer's behavior on the Rorschach (7, 73, 87). In each of these studies, the malingerer is described as constricted, evasive, suspicious, reluctant to respond, and determined not to give himself away. He may appeal for clues on how to respond, show increased reaction times, and may very often attempt to reject a particular card or the entire procedure. Productivity is not high, and most of the responses are cheap, popular, or vague. There may be much card turning, description, color naming, or perseveration. The malingerer must deal with the unexpected when he is presented with the Rorschach, and very often he seems to err by giving an extremely poor or wildly bizarre Wechsler and then a constricted, evasive but "good" Rorschach. Thus, there may be inconsistencies not only on the Rorschach but throughout the battery of tests.

Less ambiguous and more content-oriented projective techniques appear to be more susceptible to feigning. Weisskopf and Dieppa (90) found that subjects when trying to make a good or bad impression on the TAT could influence the diagnoses made by experienced TAT interpreters, and Meltzoff (63) reports essentially the same finding for the sentence completion procedure. It is interesting that in the TAT study, the subjects'

worst stories deviated more from their neutral stories than did their best stories, indicating that it is easier to appear disturbed than to appear well adjusted.

Ganser Syndrome

Before turning to the simulation of mental deficiency and amnesia, it is necessary to mention a pathological state which resembles malingering and resembles psychosis, but which may be neither. That is the Ganser syndrome. In this condition, the person appears to be psychotic, but his behavior is strikingly similar to that of the person who is simulating psychosis. The symptoms usually arise in a stressful situation, and it is readily apparent that it would be to the patient's benefit to simulate psychosis. The symptoms are an imperfect representation of the condition they resemble and correspond to the mental picture that the patient might be expected to have of psychosis (32, 53, 86). The patient's behavior may be childish, theatrical, ludicrous, and wildly bizarre (8, 58). MacDonald (58) reports that such a patient may enter a room and stand on his head, wear his clothes inside out, eat the skin instead of the banana, and try to light his cigarette with the wrong end of the match. Most striking and characteristic of this disorder is the patient's inability to answer the simplest questions precisely. Instead he gives an approximate answer, one which is not too far wrong and is obviously related to the question, but is wrong nevertheless. This has been called "vorbeireden," or talking past the point, and it was first described by Ganser (26). An example of this would be the patient who says that 2 + 2 equals 5, 5 times 5 equals 24, a cat has three ears, and that there are eleven months in the year. These responses are usually given after great deliberation and concentration, and the patient does not appear to be upset or irritated when he is told he is wrong.

Almost all authors agree that this peculiar mental state arises when the patient is faced with a crisis and when irresponsibility would help mitigate the crisis. It is differentiated from malingering in that malin-

gering is a deliberate pose, whereas the patient is unaware of the driving forces which lead him into the Ganser syndrome (53, 58, 68, 89). Historically it has been considered a hysterical twilight state, characterized by vorbeireden, clouding of consciousness, excitement or stupor, and bizarre behavior (26, 49). More recently it has been considered a last ditch attempt to ward off a real psychosis (54), a prodromal sign of psychosis (53), or an acute epidose superimposed on an actual psychotic condition (2, 8, 61, 82). Golden and MacDonald (32) as well as Tyndel (86) see it as occupying a position intermediate between malingering and hysterical fugue states. Weiner and Braiman (89) feel that it occurs in a setting of hysteria or psychosis, and interpret it as a

reaction to intolerable stress in a person who fells utterly helpless and who wishes to throw off his identity and responsibility. They argue that it is not malingering because of the uniformity seen among patients with regard to clouding of consciousness, amnesia, and approximate answers.

Although the Ganser state may not result from purposive deception, the overt behavior is similar enough to malingering to make differential diagnosis an extremely difficult problem. Indeed, the examples given of the Ganser state are sometimes indistinguishable from those given for simulation, and the same inconsistencies which establish a diagnosis of Ganser syndrome are on other pages proof positive of malingering. However, Weiner and Braiman (89) point out that the Ganser patient rarely if ever offers a peculiar or approximate answer unless it is solicited, whereas the malingerer is anxious to display his peculiarities. Two differences between schizophrenia and the Ganser state have been noted: (a) the schizophrenic differs in that his responses are given explosively and impulsively rather than with great concentration and thought, and (b) the answers are often irrelevant rather than approximate (53, 58, 89). The Ganser patient also differs from the schizophrenic by being able to adapt himself to the ward situation and to carry out the tasks of the day in a manner which would be inconceivable if he had as advanced a dementia as examination seems to indicate (53). Golden and MacDonald (32) and Tyndel (86) report success in using electroshock therapy with Ganser patients, with only a few courses being necessary. However, the same treatment might be effective with the malingerer for other reasons, and therefore this is not a crucial diagnostic test. The Ganser state may clear fairly quickly with alleviation of pressures, sympathy, and psychotherapy, which can also be the case in malingering.

Other Simulations

Mental Deficiency

A criminal awaiting trial or a prisoner about to be interrogated might feign feeblemindedness in hopes that the examiner would conclude that he is not responsible for his acts and is unable to give a meaningful account of himself. Mental deficiency usually entails a reduced scope of awareness of the environment, failure to discriminate between the consequential and the inconsequential, difficulty in forming concepts and using symbols, and sometimes poor memory. Although low intelligence would not preclude a source from being able to supply some useful information, it might lead an interrogator to reject such a person in favor of a more intelligent source. Although a source may play dumb with regard to certain areas of discussion, it probably is not too

likely that he will play dumb in general, or to the degree that he will be classified as defective. His role as a soldier suggests that he has some capacity for training and learning, and if he is a commissioned or noncommissioned officer, the odds are very much against an extremely low level of intelligence. Thus, it is apparent that the person's history, including his past educational and vocational level, is important in evaluating his true intelligence; thus it would be difficult for a person with certain minimum accomplishments to deceive others into believing that he is an imbecile or idiot.

Almost all the studies relating to the simulation of mental deficiency have employed standard psychometric tests of intelligence. In one of the earliest of these (43), naval recruits were asked to behave as if they were defectives, and then their performances were compared with those of true mental defectives. Hunt and Older found that the simulators did not act dumb enough, and as a group, their scores were higher than those attained by true mental defectives. Goldstein's finding (33) was essentially similar. However, more recently, Pollaczek (70) asked college males and naval recruits to simulate feeblemindedness on the comprehension, vocabulary, and similarities subtests of the Wechsler-Bellevue Intelligence Scale (Form I), and found that their mean scores did not differ significantly from the mean scores of the mentally defective control group. Crowley (18), using college females and comparing them with defective women on the Kent EGY, found that the mean score of her malingering group was significantly lower than that of her feebleminded group. However, all

these authors would agree that simulated mental deficiency cannot be identified on the basis of total score alone unless that total score is extremely low and there is contradictory information available.

Hunt and Older (43) report that the malingerer tries more items than the defective and gets them incorrect; whereas the defective does not even attempt many items. However, some malingerers attempt only a few items, but they undertake and answer correctly some of the difficult problems after failing easier items. This tendency to pass difficult items after failing easy ones has been reported by Crowley (18), Goldstein (33), and Hunt and Older (43), and reflects the inability of the malingerer to estimate properly the difficulty of a question. This behavior is out of keeping with the typical test performance of the true defective who shows little scatter on most intelligence tests. Also, Crowley(18) noted that the female malingerers used in her study tended to give foolish, nonsensical answers which often were wildly exaggerated or bizarre. The malingerers displayed a better speaking vocabulary than the defectives, and answered more quickly on hard questions, but more slowly on easy ones. Pollaczek (70) constructed a key for malingering derived from three subtests of the WechslerBellevue Intelligence Scale. Examination of the key suggests that malingerers tended to do too

well on vocabulary and similarities, but did quite poorly on comprehension. Thus the malingerer may misconstrue feeblemindedness as a condition in which the person is unable to show judgment in even the simplest social situations, but is able to form concepts, think abstractly, and attain a rather literate level. Krout (50) suggests that the test be administered twice to note inconsistent behavior. The simulator may come out with the same score, but he may change some wrong answers to other wrong answers, or he may even spoil some answers which were correct on the first administration. Krout also suggests that the examination of the suspected malingerer should begin with the most difficult questions and take the person back to a point near imbecility. If he cannot answer even the simplest questions, he is probably trying to be consistently defective and is malingering. Hunt (42) indicates that the malingerer and the defective may both give wrong answers, but that there are qualitative differences either in the answers or in the manner of reaching the answers. On arithmetic, for example, the defective may combine the elements of the problem incorrectly and thereby arrive at the wrong answer. The malingerer, however, may perform the correct operations, arrive at the correct answer, and then spoil it. Moreover, his response is usually closer to being correct and indicates that he was aware of the correct procedure for solving the problem.

Thus the simulation of mental deficiency is uncovered by procedures similar to those used in detecting pseudo-psychosis. Inconsistencies are most important, whether they be inconsistencies within a test or with the past history. The person who simulates defectiveness must be extremely clever if he is to evade completely the reporting of events and experiences. More than likely such extremely defective behavior in the examining situation will be out of line with the adaptiveness and resourcefulness shown in daily behavior. If the malingerer chooses to be as low as the idiot or imbecile, then he must select the items to which he will respond, and it is likely that he will overestimate or underestimate their difficulty, or demonstrate the qualitative differences between the simulator and the true defective in other ways.

Amnesia

Amnesia may be a symptom of organic brain disfunction, hysteria, psychosis, or malingering. According to MacDonald (58), it is a popular and frequent symptom among malingerers. By saying that he cannot remember, the malingerer implies that he was not responsible for any criminal acts which might have occurred when he was not himself. A prisoner of war might plead an inability to respond to the interrogator's questions because the stress and strain of combat and capture have caused him to lose his memory. Since a symptom such as this is not too uncommon among soldiers who have lived through rather harrowing experiences, a thorough investigation and evaluation of the amnesia are warranted.

Genuine amnesia associated with pathology of the brain may result from head injury, acute infection, toxemia, narcotics, alcohol, or epilepsy. There may be loss of memory for events which immediately preceded the head trauma and for those which immediately followed. In more extreme cases, other symptoms will be present, such as stupor, delirium, and bizarreness (52). Immediately following cerebral trauma, there may be a curious in and out state of awareness, where the patient loses and regains consciousness (67). The patient may have a spotty memory for this period of time, which seems to be a function of a failure to acquire information rather than an inability to recall it. This condition may last for hours or days, and the patient will remember only very isolated events of that period. Retrograde amnesia, or the forgetting of events prior to the injury, usually spans only a short period of time prior to the trauma, and is of short duration. Russell (75) studied retrograde amnesia in 200

cases of head injury and found that in 180 cases the retrograde amnesia lasted only a few seconds or minutes, and that in only four cases was it more than 24 hours. However, in severe cases, the memory loss may extend to the person's entire life. Not only can there be a loss of personal memories, but there can also be a loss of acquired facts and performances (aphasia). According to Nielsen (67) the malingerer rarely imitates aphasia when he complains of amnesia. Nor does he often feign loss of personal identity, which sometimes occurs in genuine amnesia. The period of amnesia in epileptics usually has definite limits. The epileptic may be able to state what he was doing up to a certain point, then everything goes blank, and after a blurred period, he can again remember subsequent events (52, 67). Events during the seizure are not recalled, however.

Under circumstances of war, head injury and amnesia are possible, and a careful physical examination appears necessary. If the prisoner complains of head trauma, if the scope of the amnesia is limited to the period surrounding the time of the injury, and if the laboratory and physical findings are positive, the amnesia probably has a genuine basis in cerebral pathology.

Amnesia, however, may result from psychic trauma, and almost all authorities are agreed that it is exceedingly difficult to separate malingering from hysterical symptoms. Extreme combat anxiety may result in an amnesia, especially for the traumatic events which were most anxiety provoking. The patient's memory for this period is usually a complete blank, and although he wishes to fill in the gap, he finds himself fearful and anxious when he tries to think of the events leading up to the trauma (36, 37). Although in most war neuroses, the amnesia is for a circumscribed period, there are cases in which a person's entire past experiences and identity are forgotten (44, 52). Very often the person who is amnesic on a neurotic basis exhibits other typical anxiety reactions, such as tremulousness, tenseness, restlessness, overresponsivity, sleep difficulties, and poor

appetite. The malingerer, on the other hand, may not exhibit these correlated symptoms, and instead of being somewhat anxious and withdrawn, he may be dramatic, argumentative, and demanding (55). Amnesia resulting from psychic trauma differs from that based on physical trauma in that there is no cerebral pathology, and the memory loss is reversible once the conflict is lifted.

The most effective technique for differentiating neurotic and malingered amnesia appears to be narcoanalysis (see also Chapter 3). The reason for this runs counter to popular conceptions. It is effective because it does not make the malingerer tell the truth. The

neurotic is usually able to recall the traumatic experiences when given barbiturates, and thus differs from the malingerer who continues to resist efforts to lift his amnesia. This difference seems well documented in the literature. Ludwig (55) felt that neurotic patients will talk freely under sodium amytal and will cooperate willingly in attempts to regain the traumatic episode. The malingerer when narcotized fails to show the productivity of the neurotic patient and combats every effort to recover the lost memory with negativism (37, 55). Hurst (44) and Nielsen (67) using hypnosis report the same differential reaction. Gerson and Victoroff (27) found only six out of 17 malingerers compliant to sodium amytal interviews. In most of their cases fears and fantasies became so intertwined with the truth that the malingerers' productions under amytal could not be considered valid. Adatto (1) noted this same tendency to fabulize under thiopental narcosis. Redlich, Ravitz, and Dession (71) asked their normal subjects to withhold an embarrassing incident from an interviewer during a sodium amytal interview. For the most part the subjects were able to do so, and the authors postulate a need for punishment in the two subjects who made full confessions. These authors conclude, as does Inbau (45), that "truth serums" are successful on persons who would have disclosed their information anyway, and that the person who is lying will continue his deception under drugs. See (Chapter 3.)

Not only does the person suffering from a war neurosis usually recall the traumatic events while narcotized but he also behaves differently during the interviews from the malingerer (1, 37). Neurotic patients were found to be eager to recover the events, they groped for an answer, and were upset at not being able to recall. In discussing the events surrounding the period of amnesia they would frequently become restless, perspire profusely, become tense and rigid, breathe rapidly, move convulsively, and sometimes cry out. The intensity of the emotion may become unbearable when the patient reaches the climax of the story. The malingerer rarely shows these emotional and physiologic reactions under sodium amytal. However, according to Grinker and Spiegel (37), there are some neurotic patients who show little overt anxiety and who block in the account of

their experience as they approach the moment of trauma. In such cases, Grinker and Spiegel report that more than one session of narcosynthesis may be necessary to recover the trauma.

This, then, appears to be the most effective procedure for differentiating hysterical amnesia from malingered amnesia. According to MacDonald (57) narcoanalysis may work in even another fashion. It

sometimes provides the malingering criminal with an apparently honorable way of divulging what he claims to have forgotten. Although narcoanalysis seems to help in differentiating neurotic and malingered amnesia, it cannot rule out the possibility of organic pathology. Sodium amytal will not lift amnesia due to brain disfunction, and there is some evidence that it will not restore memories to acutely psychotic individuals (12).

Applications to Interrogation

At first glance, interrogation would appear to be a situation where malingering is quite likely to be employed. The captive source is faced with the dilemma of which of two roles to play-that demanded by his country or that demanded by the enemy-and his selection of either role might result in serious sanctions, including loss of life. The simulation of incompetence offers a solution to this role conflict by enabling the prisoner to remain loyal to his country and by providing him with an alibi for not submitting to the enemy. However, a number of circumstances peculiar to the interrogation situation seem to operate in an opposite direction and may be influential in reducing the likelihood of malingering. These factors appear to have a restraining influence on the prisoner and a liberating one on the interrogator.

As compared with the citizen, the prisoner must show greater restraint and care in adopting malingering as a solution because of his uncertainty of the effect of such a role. In civilian life, simulation is attempted partly because of the humanitarian values held by the society. The person hopes that he will be labeled mentally ill, and when this happens, he expects that no further demands will be made on him, that he will not be held responsible for his conduct, and that he will be treated with kindness and care. The prisoner who simulates in the interrogation situation has no such assurance about the enemy's humanitarian and benevolent outlook. Mental illness may be considered deviationism or negativism, either in the culture in general or in the interrogation situation in particular. Moreover, the prisoner may have become convinced, and perhaps realistically, that his life depends on his worth to the enemy, and that if he cannot give

information, he has no worth. This may make the prisoner reluctant to appear incompetent, or at least completely incompetent, and therefore would act to reduce the amount and degree of malingering. Thus, the prisoner is uncertain that simulation would

produce the desired effect, and indeed, there is the danger that if his ruse is accepted, the directly opposite effect might result.

The prisoner may be restrained from or reluctant to initiate or continue malingering because of the nature of the prisoner-interrogator relatioaship. The relationship offers the potential for rather great intimacy, and therefore for the development of fear and guilt in the prisoner. Fear may not be as great a component in civil life since the malingerer is assured a great deal of protection. Many people are involved in his case, and appeals are always possible to courts, civil rights boards, mental health commissions, etc. The prisoner of war, however, may be placed in the custody of a single interrogator, or he may be made to believe that it is the interrogator alone who makes all the decisions about his well-being, his value to the enemy, and his fate. With one authority figure who has seemingly unlimited power, the game becomes more dangerous, since the sanctions for being caught in a deception may be immediate and great, and there is no recourse or appeal to other power figures. Thus, the fear of being found out should be greater in the interrogation situation; this should serve to reduce the amount of malingering attempted and possibly reduce the adequacy of the simulation that is attempted.

Guilt may become involved because of the closeness which sometimes grows up between the interrogator and the prisoner. In some lengthy interrogations, the interrogator may, by virtue of his role as the sole supplier of satisfaction and punishment, assume the stature and importance of a parental figure in the prisoner's feeling and thinking. Although there may be intense hatred for the interrogator, it is not unusual for warm feelings also to develop. This ambivalence is the basis for guilt reactions, and if the interrogator nourishes these feelings, the guilt may be strong enough to influence the prisoner's behavior. Under such circumstances, the person who attempts malingering may begin to feel that he is taking advantage of the interrogator and may feel some guilt for misleading the one person who seems to be interested in him and who is looking after his welfare. Guilt makes compliance more likely, or at least it increases the likelihood that the prisoner may drop his simulated role.

For his part, the interrogator has fewer of the restraints and control than a psychiatric interviewer would have in a democratic society dedicated to humanitarian values. He can easily make the prisoner feel that his life is under his control, and that psychosis or the simulation of psychosis would be punished just as severely as any other type of

resistance. Although persons charged with major crimes are malingering in increasing numbers to avoid imprisonment,

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it seems that simulation by persons charged with less serious offenses is on the decline since these people have realized that being committed to a mental hospital for an indeterminate period can drag out longer than a delineated jail term. Also, the physical techniques for treating mental illness can be quite frightening to a patient; thus it is likely that a malingerer will think twice before allowing himself to be subjected to a course of electroshock treatment and be even more reluctant to undergo a lobotomy. The interrogator is especially free to use these devices as threats, whereas the civilian psychiatrist must consider many other factors.

The interrogator has another advantage over his clinical counterpart in civilian life when it comes to reducing the amount of malingering in an entire group of men. When persons charged with crimes are placed together on the same ward while undergoing psychiatric observation prior to trial, there is a great deal of coaching and training occurring among them as they teach one another how to "bug out." Moreover, when a patient leaves the ward to go to trial, the other patients have no idea whether or not his ruse has been successful. The interrogator, however, can keep his prime sources separated so that there is no cross-fertilization, and also he can attempt to extinguish malingering in the group by exposing and punishing an unsuccessful malingerer. Thus he can give himself or the unit the reputation for being a shrewd detector of deception and a harsh punisher of such duplicity.

Once the prisoner gets the feeling that his pretense is endangered, the interrogator may supply him with many face-saving devices which would allow him to relinquish the symptoms that prevent him from cooperating, but without forcing him to admit his guilt. Already mentioned was the technique of giving the prisoner "treatment" for his illness, one that is guaranteed to bring about a cure. Thus the prisoner may behave as if the pills or the electroshock did produce a cure or that the hypnosis or narcosis did allow him to recover his memory, and there will be no need to admit the malingering or suffer punishment for it. The prisoner may use this way out if he gets the impression that the interrogator is becoming wise or is demanding recovery.

Another honorable way out for the prisoner could be to remain "ill" but not to allow the illness to interfere with the communication of relevant information. The interrogator might allow the prisoner to keep his simulated depression, delusions, or posturing and gesturing, but he would insist that these symptoms in no way interfere with his ability to recall and communicate important facts. To augment

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this approach, the interrogator might "treat" only those symptoms which cause memory or communication difficulty, reassuring the prisoner that the other symptoms will remain for a while and that he will be hospitalized and be given more care and privileges than he might otherwise receive. This approach makes it possible for the prisoner to cooperate without revealing his deception, and it offers a substitute goal for the malingering — that of better treatment and privileges. From the interrogator's standpoint, these indirect approaches would appear to be preferable to direct confrontation, except under some circumstances where the evidence of malingering was overwhelming and he was certain that the prisoner had great ego strength.

Direct confrontation could conceivably produce a real psychic disorder, especially in those persons who are borderline psychotics to begin with and whose symptoms are exaggerations of their own latent tendences. As Hurst (44) and Eissler (22) point out, that which was feigned at one time may show up as a real illness at a later time. If the anxiety over sanctions for malingering is too great, the prisoner may deny to himself that he is willfully faking, and the symptoms may then become determined without awareness and thereby become less amenable to the interrogator's procedures. This seems to be the type of stress situation which produces a Ganser state. If forced compliance to the interrogator would produce more anxiety and guilt than would malingering, a serious disorder may be the alternative which the prisoner will take.

Thus, it would seem that the rational interrogator is constrained to use his extensive power over the prisoner carefully, lest a real disorder be precipitated and the prisoner's potential value be lost completely.

Conclusions

Detection of Malingering

Exact procedures for the determination of malingering are not available. Few true psychotics display the exact symptoms of the textbook cases, and this wide range of variability among psychotics requires evaluations of a wide variety of symptom patterns for the detection of malingering. The malingerer may demonstrate a set of symptoms which must be entertained as a possible deviation from the more usual syndromes. It is only through rather skillful and lengthy observations that an examiner may be able to come to the conclusion

that the patient is feigning his condition. Hurst (44) feels that malingering can be diagnosed with certainty only when the simulator is caught flagrante delicto or gives an

unforced confession. Eissler (22) doubts the validity of confessions, since psychotics or borderline psychotics may feign malingering. The fact that borderline schizophrenics may try to malinger complicates the matter and makes diagnosis more difficult. Another complicating but undetermined factor is the effect the role may have upon the malingerer. Hurst (44) suggests that what was simulated may become a truly hysterical symptom after a time. There are therapeutic techniques which are dedicated to the proposition that a person may unconsciously take over portions of roles which he has consciously enacted (48, 64). Experimental support for this may be found in a study by Sarbin and Jones (80) which showed that the subject's self concept may shift following role enactment, and the change is in part a function of the specific role enacted. Thus, the determinants and effects of malingering are only somewhat understood. *Correct diagnosis must still depend on the skill and experience of the examiner.*

Effectiveness of Malingering as Countermanipulation

The advantages of malingering to an individual resisting coercive attempts to influence his behavior lie primarily in the cultural definitions of the psychotic as incompetent and not responsible for his acts. The discouragement of malingering involves principally the creation of the impression that psychosis is no excuse or that the person who is detected in malingering will be treated even more harshly than he might otherwise have been. When the value conflict is sufficiently great, however, neither threat nor actual punishment may be capable of forcing the person to abandon malingering as defense. The prudence in the use of threat and punishment forced on a rational interrogator by the possibility of creating a genuine disorder confers an additional advantage on the malingerer.

Risks of Malingering

In considering recommendations of malingering as a resistance tactic in training military personnel for the event of capture, certain dangers follow from these same three factors: the cultural definitions of the insane person, the rationality of the interrogator, and the possibility of a genuine disorder being created. Captors may not operate with humane cultural definitions toward the psychotic, and

they may not be constrained by rationality in their use of threats and punishments. The risk the malingerer takes must be evaluated in terms of the importance of the goal of resistance and the possible effectiveness of alternative modes of resistance and evasion open to him. The risks involve both the damage the captor may inflict upon him and the possibilities of a real and lasting personality disorder resulting from his simulation.

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