

REFERENCES

1. Feigl, Herbert. "Some Remarks on the Meaning of Scientific Explanation," in H. Feigl and W. Sellars (eds.), *Readings in Philosophical Analysis*, pp. 510-14. New York: Appleton-Century-Crofts, 1949.
2. Feigl, Herbert. "Principles and Problems of Theory Construction in Psychology," in W. Dennis (ed.), *Current Trends in Psychological Theory*, pp. 179-213. Pittsburgh: University of Pittsburgh Press, 1951.
3. Ginsberg, Arthur. "Operational Definitions and Theories," *Journal of General Psychology*, 52:223-45 (1955).
4. Kendler, H. H. "What Is Learned—A Theoretical Blind Alley," *Psychological Review*, 59:269-77 (1952).
5. Meehl, P. E., and Kenneth MacCorquodale. "Edward C. Tolman," in William K. Estes et al. (eds.), *Modern Learning Theory*, pp. 177-266. New York: Appleton-Century-Crofts, 1954.
6. Skinner, B. F. *The Behavior of Organisms*. New York: Appleton-Century-Crofts, 1938.
7. Skinner, B. F. Review of Hull's "Principles of Behavior," *American Journal of Psychology*, 57:276-81 (1944).
8. Skinner, B. F. "Are Theories of Learning Necessary?" *Psychological Review*, 57:193-216 (1950).
9. Skinner, B. F. *Science and Human Behavior*. New York: Macmillan, 1953.
10. Skinner, B. F. "Critique of Psychoanalytic Concepts and Theories," *Scientific Monthly*, 79:300-5 (1954).
11. Verplanck, W. S. "Burrhus F. Skinner," in William K. Estes et al. (eds.), *Modern Learning Theory*, pp. 267-316. New York: Appleton-Century-Crofts, 1954.

An Operational Reformulation of Some of the Basic Principles of Psychoanalysis

THERE have been surprisingly few attempts to reformulate the main tenets of psychoanalysis in operational language, although many writers, including the present author (8, 9), have said that this can be done. Several theorists, such as Brown and Farber (4), Frenkel-Brunswik (19), Reid (41), Seeman (47), and Skinner (49), have attempted to translate a few psychoanalytic or psychodynamically oriented concepts into more operational terms, but a systematic reformulation of a good many of the Freudian principles does not as yet seem to have been attempted. Other theorists, such as Sullivan (51), have actually reworded much of the Freudian hypotheses in more precise terminology; but they have been systematic neither in their operationism nor in their inclusion of Freudian constructs; and they have often been more concerned with criticizing and modifying than with restating orthodox psychoanalytic concepts.

What Operationism Is

If psychoanalytic (or any other psychological) theory is to be reformulated in operational terms, the question must immediately arise: What is meant by operational? As originally presented by Bridgman (3), operationism seemed to be a relatively clear-cut method of research. But much ensuing comment and discussion has shown that, especially

NOTE: This paper was an outgrowth of a Conference on Psychoanalysis and the Philosophy of Science, held at the University of Minnesota, June 14-16, 1954, under the auspices of the Minnesota Center for the Philosophy of Science, directed by Dr. Herbert Feigl. Grateful acknowledgment is made for discussions with and comments by Drs. Herbert Feigl, Else Frenkel-Brunswik, Starke R. Hathaway, Paul E. Meehl, John Reid, William Schofield, W. S. Sellars, and Henry Winthrop. Extensive correspondence with Michael Scriven in regard to the first draft of this paper has been especially helpful. All responsibility for the views expressed herein, however, is the author's.

as it relates to psychological theory, it presents many serious problems (12, 25, 28, 31, 34, 39). Before we attempt to restate some of the basic principles of psychoanalysis in "operational" terms, therefore, it is best to define some of the main elements in a modified or revisionist operationism that today will philosophically and scientifically stand up.

1. To be operationally meaningful, a statement must be confirmable at least in principle: that is to say, a scientific theory must be tied to observables at some point. It may be part of a whole network of other statements or theories; but eventually, somewhere along the line, it must be related to observables (15, 32).

2. Strict operationism, as originally presented by Bridgman (3), may be unduly restrictive when applied to theory-making (34, 35, 50). It may be modified, as Feigl (12) has aptly shown, by requiring that scientific theories be, in some final analysis, linked to operations that are logically consistent, definite, empirically rooted, possible to execute, intersubjective and repeatable, and aimed at the creation of concepts which will function in laws or theories of greater predictiveness.

3. In modern operationism or empiricism we can no longer demand full verifiability or full falsifiability of scientific statements since, as Hempel (25), Scriven (43, 44), and others have recently shown, it is more realistic to demand only confirmability or partial verifiability. Modern physics, as Reichenbach (15) shows, accepts a statement as meaningful if it is verifiable as true, false, or indeterminate; and all scientists must today recognize what Feigl (15) calls the incompleteness and indirectness of the verification of practically all statements.

4. So-called intervening variables or dispositional concepts—that is, concepts which are fairly directly abstracted from or closely tied to observables and whose definition is given by the empirical laws in which they occur, which they imply, or which they presuppose—are legitimate and fruitful in scientific theorizing, but they have distinct limitations. In addition, modern operationists or empiricists may, and indeed should, make use of higher-order abstractions, or hypothetical constructs—which, as Ginsberg (22) and MacCorquodale and Meehl (33) point out, are highly abstract and general systems of concepts which are only indirectly rather than explicitly related or reducible to observational facts or empirical terms. Where intervening variables are of limited usefulness in scientific theorizing (30, 33), hypothetical constructs take in the widest

range of relevant phenomena, lead to maximum success in the prediction and explanation of behavior, and are heuristically necessary because the human intellect is so limited that it cannot very well get along without them (15, 22, 23, 24, 25, 30, 32, 38, 40, 44, 50). At the same time, the dangers of cavalierly employing hypothetical constructs must be acknowledged, as they are frequently used in an indefinite, vague, overspeculative, and rigid manner (5, 11, 15, 21, 24, 35, 44).

5. While almost all leading psychological theorists today, including Hull (27), Skinner (49), and Tolman (52), are known as Behaviorists, Skinner in particular has gone to extremes in insisting that the so-called inner states of the organism, such as the idea of "emotion" or "wish," or even physiological formulations like "neuron" or "engram," may actually exist but are not relevant in the functional analysis of behavior. Skinner also states that events affecting an organism must be capable of description in the language of physical science. Theorists like Frenkel-Brunswik (19) and Rapaport (40), on the other hand, insist that only partial explanations of human behavior are ever offered by the behavioral-operational approach. Although strict operationism would probably require a fairly strict Behaviorism in psychological theorizing, a modified operational approach leaves room for a less strict, non-Skinnerian form of psychological theory.

6. Many psychological theorists, including Hebb (24), Krech (30), and Tolman (53), have recently favored the use of hypothetical constructs in psychological theorizing, but at the same time have asked that, whenever possible, these constructs be stated in neurophysiological terms. At the same time, other psychologists, such as Lindzey (32), Skinner (49), and Spiker and McCandless (50), have been sceptical of the neurophysiological approach. From the standpoint of a modified operationism or empiricism it may be pointed out that although it is highly probable that many neurophysiological constructs are isomorphically related to many behavioral ones (Feigl (14, 15)), and although it would be highly desirable if constructs which apply to behavior could be stated in physiological terms, at the present time this is neither necessary nor, to a large degree, possible. Therefore operational reformulations of psychoanalytic (or other psychological) theory need not presently be stated in neurophysiological language.

7. The question has been raised by various writers, including Lundberg and Sarbin (quoted in Meehl (37), Maze (36), and Pratt (39)),

as to whether hypothetical constructs are not, at bottom, arrived at by essentially inductive methods, and are therefore actually closely related to so-called intervening variables. Meehl (37), attacking this view, points out that although the process of hypothesis creation is not entirely outside the rules of inductive logic, and must eventually conform to these rules; and while it is theoretically possible to arrive at hypothetical constructs by amassing so much experiential data and intercorrelating these data so thoroughly that the hypotheses will almost automatically arise out of the collected data and their intercorrelations; this, in point of fact, is *not* the way in which hypothetical constructs are ordinarily formulated. Instead, humans arrive at such hypotheses by employing exceptionally incomplete data and intercorrelations; and the human process of thereby formulating hypotheses, or of unconsciously inferring from relatively few facts and partial correlations, may be called creative imagination or clinical intuition and is indispensable to scientific thinking. Whether Meehl or Lundberg and Sarbin are strictly correct or not, a modified operationism or empiricism may, with Kneale (15), extend the use of the word "induction" to cover the hypothetical method but at the same time, perhaps, distinguish this new application of the term by adding the adjective "secondary." This usage would permit us to retain, as an integral part of the scientific method, creative hypothesizing, while recognizing that it is, in the last analysis, a form of unconscious or secondary induction.

8. Assuming that a modified operationism may encompass both higher-order and lower-order theories, or hypothetical constructs as well as intervening variables, the following question arises: With what degree of simplicity or parsimony shall we attempt to state our psychological theories? A fairly rigorous adherence to simple or parsimonious statements of scientific theories has, as Feigl (13, 14), Ginsberg (22), and Scriven (45) demonstrate, the advantage of insuring against inconsistency, superfluity, confusion, and mysticism. At the same time, as Dittmann and Rausch (6), Beck (15) and Reichenbach (15) indicate, simplicity, in itself, cannot carry too much of the burden of adequate theorizing since it may lead to a surrendering of plausibility or specificity of prediction. It would appear, then, that simplicity is a desirable but not essential requisite of scientific theorizing; that it often serves a useful purpose; but that, in itself, it does not guarantee the formulation of the best kind of theory.

9. It has often been contended—as by Feigl (13), Frank (18), Lindsay (31) and Seeger (46)—that although some scientific theories, particularly those stated in the form of hypothetical constructs, may seem vague, inconsistent, or even mistaken, they may have distinct heuristic value: that is to say, they stimulate further scientific investigation and ultimately lead to the formulation of better theories. Rudner (42), Wigner (15), and others have also noted that value decisions are inevitably involved in scientific conclusions, and that it is foolish to deny that this is so. On the other hand, as the present author (8, 10) and Skinner (48) have observed, it is difficult to prove or disprove the notion that theories postulated in the early days of science, such as theories of "essences," "phlogistons," "ethers," "ids," or "libidos," were essential to the historical process or that they have actually advanced scientific thinking. It could well be that such "heuristically desirable" theories actually have done more harm than good, and that some of them are still hindering our thinking. From the standpoint of a modified operationism or empiricism, it is legitimate to formulate speculative theories; but it is questionable whether they should be defended on "heuristic" grounds, since it is virtually impossible accurately to define or confirm what is or is not "heuristic."

In the light of the foregoing description of what modified operationism or empiricism is, it can be seen that it is a highly liberal, open-minded, scientific viewpoint, which includes, and even encourages, considerable speculative, creative hypothesizing. Modern empiricism, in fact, seems to have only one invariant requisite: namely, that in some *final* analysis, albeit most indirectly and through a long network of intervening constructs, a statement or hypothesis must in some manner (or in principle) be confirmable—that is, significantly tie-able to or correlatable with some kind of observable. It thereby rules out sheer metaphysical speculation but keeps the door widely open for all other hypotheses.

This, then, is modern operationism or empiricism. As applied to psychoanalysis, it means that psychoanalytic principles should be stated in terms so that they are, in some final analysis, in principle confirmable in terms of some ultimate observables. In the following paragraphs, however, we shall attempt to be even more strictly operational than this in translating psychoanalytic principles into scientific language. For as Joseph Zubin (personal communication) stated in commenting upon

Robert Oppenheimer's plea for scientific open-mindedness in his address to the American Psychological Association at its 1955 annual convention: modern physicists, because they have already brilliantly established many factual findings, can afford to be liberal in their scientific hypothesizing today. But can, as yet, modern psychologists also afford this when, in the realm of personality theory, they have factually established very little?

In the formulations of psychoanalytic principles that follow, then, a deliberate attempt will be made to avoid hypothetical constructs and higher-order abstractions and to remain, instead, on the so-called intervening variable, lower-order level of theorizing. No attempt will be made to use physiological constructs, on the one hand, nor strictly behavioral terms, on the other hand, though a moderately behavioral terminology will be employed.

The main reasons for adhering, in the following psychoanalytic reformulations, to lower-order theorizing are these:

A. The existing orthodox Freudian principles make use of many vague terms like "libido," "id," "mental life," "energy cathexis," etc., which may be legitimate hypothetical constructs but are most difficult to pin down to earth and experimentally validate or disprove.

B. The science of psychoanalysis, because of the complexities involved in examining human perceptions and responses, is difficult enough to confirm empirically when it is stated in lower-order terms, and tends to be considerably less easily confirmable when stated in the form of hypothetical constructs.

C. It has never been shown that the use of hypothetical constructs in psychoanalytic theory is necessary or desirable.

D. Stating analytic hypotheses in lower-order terms may have the practical advantages of eliminating dogmatism and fuzzy thinking, encouraging new psychoanalytic hypotheses and experiments, making for a closer rapprochement between general psychological theory and psychoanalysis, and making analytic principles more acceptable to practicing therapists and their patients.

E. By restating psychoanalytic views in terms of lower-order theorizing, some of the more speculative, and perhaps erroneous, physiological hypothetical constructs originated by Freud may be eliminated as being redundant.

It should not be denied that psychoanalytic principles can be scien-

tifically, and quite legitimately, formulated in terms of hypothetical constructs, including physiological constructs. It is the present writer's contention, however, that these principles can be presented so that they become more easily empirically confirmable, clearer, less tautological, and more practical. To this end, a more operational reformulation of psychoanalytic theories will now be attempted.

A Basic Operational Vocabulary

In any set of psychodynamic principles a basic vocabulary is necessary. Such a vocabulary will now be operationally derived from two observables or "facts"—perception and response. It will be assumed that every human organism (a) perceives (observes, sees, senses, or feels) and (b) responds (acts, performs, or behaves). Perception and response would appear to be basic, unarguable characteristics of living organisms because, first, they are intrinsic to the definition of life (an organism that in some way did not perceive and respond could hardly be called living); and, second, perceiving and responding to stimuli can be as directly observed as almost anything else in this world.

In the empirical concepts of perception and response we can easily anchor all the other constructs necessary and useful to a psychodynamic set of principles of human behavior. Consider the following:

1. *Conscious and unconscious perception.* The individual consciously perceives when he perceives that he perceives. He unconsciously perceives when he perceives but does not perceive that he perceives. We can observe an individual's conscious perception by (a) asking him if he perceives that he is perceiving; or (b) observing his other behavior—e.g., observing that he is alert, that he is performing a difficult task, that he speaks as if he were conscious of what he is doing, that he is not drunk, dazed, or asleep, etc.

We can confirm the hypothesis that an individual is unconsciously perceiving by observing that he acts as if he perceives, although he may tell us that he is not aware that he is perceiving (41). Thus, if he suddenly swerves his car to avoid a log in the road, but tells us that he does not know why he swerved, we may infer that he unconsciously did see the log. Or if he tells us that he consciously sees his wife as a most desirable sex partner, but we observe that, in practice, he continually has sex relations with other women and rarely with his wife,

we may infer that he unconsciously perceives his wife as an unsatisfactory sex partner.

Unconscious behavior, then, is merely behavior which occurs without the individual's perceiving that it occurs. Unconscious perception occurs without his perceiving that he perceives; unconscious responding occurs without his perceiving that he responds. There is nothing mysterious about this, since there is no reason why an individual should not fail to observe events, either outside himself or part of his own behavior, even though they are conspicuous and important. If a man can fail to report the details of an accident or a robbery accurately, he can certainly also fail to note correctly his own perceptions or responses.

2. *Thinking and learning.* The individual *thinks* or *discriminates* when he organizes or reorganizes his perceptions—when he labels or distinguishes among the things he perceives. More specifically, he thinks when he perceives two or more of his sensations as being integrally or causally related so that he can make accurate predictions about one or more of them. The individual *remembers* when he perceives again something that he has previously perceived. He *learns* (adjusts, adapts) when he organizes or reorganizes his perceptions and changes his behavior as a result of this reorganizing.

The individual's thinking, learning, and remembering may be observed by asking him to verbalize about his perceptions; or the hypothesis that he thinks may be confirmed by observing his nonverbal behavior. Thus, if we observe that a child who, on several occasions, is given a basket containing rotten and good apples, soon begins consistently to disregard the rotten and eat only the good ones, we may conclude that (a) he has organized or discriminated among his perceptions of the apples—that is, he has thought about them; (b) he has re-perceived—or remembered—the apples from occasion to occasion; and (c) he has adjusted or changed his behavior—learned—in regard to the apples on the basis of his organizing his perceptions.

An individual unconsciously remembers, thinks, and learns when he organizes or reorganizes his perceptions as if he consciously remembered, thought, or learned. Thus, if we observe a child invariably throwing away rotten apples and eating good ones, but he tells us that he doesn't realize what he is doing, we may conclude that he has unconsciously learned to make this kind of a selection.

3. *Evaluating, emoting, and desiring.* An individual *evaluates* (atti-

tudizes, becomes biased) when he perceives something as being "good" or "bad," "pleasant" or "unpleasant," "beneficial" or "harmful" and when, as a result of his perceptions, he responds positively or negatively to this thing. Evaluating is a fundamental characteristic of human organisms and seems to work in a kind of closed circuit with a feedback mechanism, since perception biases response and then response tends to bias subsequent perception. Also, prior perceptions appear to bias subsequent perceptions, and prior responses to bias subsequent responses.

Evaluating always seems to involve both perceiving and responding, not merely one or the other. It also appears to be a fundamental, virtually definitional, property of humans, since if they did not have some way of favoring or reacting positively to "good" or "beneficial" stimuli and of disfavoring or reacting negatively to "bad" or "harmful" stimuli, they could hardly survive.

An individual *emotes* when he evaluates something strongly—when he clearly perceives it as being "good" or "bad," "beneficial" or "harmful," and strongly responds to it in a negative or positive manner. Emoting usually, probably always, involves some kind of bodily sensations which, when perceived by the emoting individual, may then reinforce the original emotion. Emotions may therefore simply be evaluations which have a strong bodily component, while so-called nonemotional attitudes may be evaluations with a relatively weak bodily component.

Evaluations and emotions are consciously experienced when the individual perceives that he is experiencing them. They are unconsciously experienced when he acts as if he evaluates or emotes but does not perceive that he does so. Thus, he may consciously perceive that he hates another; or may bristle, glower, and make nasty remarks, so that everyone else perceives that he hates this other, even though he does not perceive or admit this himself.

Some of the more important human evaluations and emotions may be defined as follows:

A. An individual *desires* (wishes, wants, likes, loves) when he evaluates something positively—perceives it as being "good" or "beneficial" and usually moves toward or tries to possess it.

B. He *needs* (has a drive toward) something when he strongly evaluates it in a positive manner—perceives it as being vitally important or necessary to him.

C. An individual fears something when he evaluates it negatively, perceives it as being "bad" or "harmful," and tries to prevent its occurrence or to get away from it.

D. He is anxious when he perceives that something he does or may do will be disapproved by himself and/or others and is uncomfortably expecting something dreadful to happen because of this action.

E. He becomes angry when he perceives something as being "bad" or "harmful" and strongly wants to annihilate this thing.

F. He is guilty when he perceives that some aspects of his behavior are "bad" or socially disapprovable and agrees that he should be punished or disapproved for acting in this way.

An individual becomes unconsciously fearful, anxious, angry, or guilty when, without perceiving that he perceives something as "bad" or socially reprehensible, he acts as if he so perceived it and consequently avoids it, is uncomfortably expectant about it, wants to annihilate it, or wants to punish himself because of it. When an individual is unconsciously fearful, anxious, angry, or guilty, he tends to express his unperceived emotions in psychosomatic and psychomotor reactions, such as muscular tensions, vasomotor reactions, respiratory effects, etc.

Reformulating Psychoanalytic Principles

The foregoing definitions of human (conscious and unconscious) perceiving, responding, thinking, learning, and evaluating are meant to be operational formulations in that they are solidly anchored to observable events or things. Using these definitions, we shall now take some of Freud's main hypotheses, as stated by him in his last work, *An Outline of Psychoanalysis* (20), and restate these in more operational terms.

The *id*. Freud: "The *id* . . . contains everything that is inherited, that is present at birth, that is fixed in the constitution—above all, therefore, the instincts, which originate in the somatic organization and which find their first mental expression in the *id* in forms unknown to us" (20, p. 14).*

Operational reformulation: Human beings have certain basic needs or drives, such as hunger, sex, and thirst needs, toward the expression of which they inherit tendencies, but which can be considerably modi-

* All quotations from Sigmund Freud's *An Outline of Psychoanalysis*, published by W. W. Norton & Co. (New York, 1949), are made with the permission of the publisher.

fied by experiential reinforcement or social learning. The existence of these needs is confirmable by our observing—e.g., in the course of the famous University of Minnesota experiments in semistarvation (29)—how aberrated, distorted, and frenzied the behavior of most humans becomes when some of their basic needs are frustrated.

The *ego*. Freud: "The *ego* . . . has the task of self-preservation. As regards external events, it performs that task by becoming aware of the stimuli from without, by storing up experience of them (in the memory), by avoiding excessive stimuli (through flight), by dealing with moderate stimuli (through adaptation) and, finally, by learning to bring about appropriate modifications in the external world to its own advantage (through activity). As regards internal events, in relation to the *id*, it performs that task by gaining control over the demands of the instincts, by deciding whether they shall be allowed to obtain satisfaction, by postponing that satisfaction to times and circumstances favorable in the external world or by suppressing their excitations completely" (20, p. 15).

Operational reformulation: The individual perceives, remembers, thinks, learns, and evaluates. The entire network comprising his perceptions, memories, thoughts, and evaluations may be called his *ego* or *self*. To say that an individual has a self or *ego* has also come to mean that he has self-evaluating attitudes, or concepts of himself. That is to say, just as he evaluates outside persons and things, he also comes to view himself as "good" or "bad." If he has consistently favorable self-evaluations, we say he has a "strong" *ego* or "good" self-concept; if he has unfavorable self-evaluations, we say he has a "poor" *ego* structure.

The individual's *ego* or *self* is self-protective in that in order to maintain his physical and mental well-being he acts to protect himself from threatening external events, such as fire, flood, and attack, and from social disapproval. Out of fear of external danger or social disapproval he will also frequently control some of his internal needs, such as his hunger and sex needs. He may decide whether these needs shall be allowed outlets at certain times and may even, on occasion, completely suppress their excitations.

The individual's tendency to protect himself and his self-evaluating concepts from external and internal threat may be confirmed by experimental and clinical observation, as Hilgard, Kubie, and Pumpian-Mindlin (26), Skinner (48), and other authors have shown.

The *superego*. Freud: "The long period of childhood, during which

the growing human being lives in dependence upon his parents, leaves behind it a precipitate, which forms within his ego a special agency in which this parental influence is prolonged. It has received the name of *superego*" (20, p. 16).

Operational reformulation: Just as individuals learn to evaluate external objects, they also, largely through the teachings of their parents, come to evaluate their own behavior as being "good" or "bad." When they perceive their own acts as "bad" or socially reprehensible, and when they agree that they should be reprimanded or punished for these acts, we say that they have a poor conscience, or a strong *superego*, or are guilty. Like all other thoughts and emotions, feelings of guilt may be consciously perceived; or they may be unconsciously perceived, as shown by an individual's acting as if he perceived them.

Eros and the death instinct. Freud: "After long doubts and vacillations we have decided to assume the existence of only two basic instincts, *Eros and the destructive instinct*. . . . We may suppose that the final aim of the destructive instinct is to reduce living things to an inorganic state. For this reason we also call it the *death instinct*" (20, p. 20).

Operational reformulation: All important desires and needs of human beings may be grouped under two main headings: (a) the erotic, life, or self-preservative needs; (b) the destructive or death needs. If only these two basic needs exist (as few of even the most orthodox Freudians today seem to agree) confirmation of their existence may be found through empirical observation and experimentation.

The sexual life. Freud: "Sexual life does not begin only at puberty, but starts with clear manifestations soon after birth. It is necessary to distinguish sharply between the concepts of 'sexual' and 'genital.' The former is the wider concept and includes many activities that have nothing to do with the genitals. Sexual life comprises the function of obtaining pleasures from zones of the body . . ." (20, p. 26).

Operational reformulation: Since the word "sexual" normally connotes "genital" in our culture, it is perhaps best to use it as a synonym for "genital" and to use another word, "sensual," to describe the function of obtaining pleasures from all zones of the body, genital and non-genital. Sensual life, especially that comprising oral and anal sensations, begins soon after an infant's birth. Sexual or genital activity also to some degree begins in infancy.

Confirmation of this hypothesis may be obtained from (clinically and experimentally) observing infants, most of whom appear to act as if they perceive and respond to stimulation of their oral, anal, and genital areas.

Oral eroticism. Freud: "The baby's obstinate persistence in sucking gives evidence at an early stage of a need for satisfaction which, although it originates from and is stimulated by the taking of nourishment, nevertheless seeks to obtain pleasure independently of nourishment and for that reason may and should be described as 'sexual'" (20, p. 28).

Operational reformulation: Babies, through their oral perceptions, appear to obtain satisfaction independently of nourishment. We may describe this tendency of infants to seek oral stimulation as oral sensuality and may find confirmation of it through observing the behavior of infants in relation to their oral zones.

Anal sadism. Freud: "Sadistic impulses already begin to occur sporadically during the oral phase along with the appearance of the teeth. Their extent increases greatly during the second phase, which we describe as the sadistic-anal phase, because satisfaction is then sought in aggression and in the excretory function" (20, p. 28).

Operational reformulation: Children, through their anal perceptions, appear to obtain satisfaction, at least on some occasions, when they are anally stimulated. We may describe their tendency to obtain, and sometimes actively seek, anal stimulation as anal sensuality. Some children discover that their excretory functions are a means through which they may express hostility; and some of these children become anal sadistic.

The phallic phase. Freud: "The third phase is the so-called phallic one, which is, as it were, a forerunner of the final shape of sexual life, and already greatly resembles it" (20, p. 29).

Operational reformulation: Children often have sex desires and activities which are quite similar to those experienced by adults. Childhood sex experiences may have important influences on adult sex and other behavior.

These hypotheses may be confirmed by observing the verbal and nonverbal behavior of children and adults in relation to their sex activities and calculating appropriate correlations between childhood and adult sex feelings and behavior.

Repression. Freud: "During this development the young and feeble ego dropped and pushed back into the unconscious condition certain

material which it had already taken in, and behaved similarly in regard to many new impressions which it *might* have taken in, so that these were rejected and were able to leave traces in the id only. In consideration of its origin, we term this portion of the id the repressed" (20, p. 43).

Operational reformulation: When the human individual perceives something, particularly something that he himself has done or helped bring about, as being "bad" or socially reprehensible, he often protects himself by trying not to re-perceive or remember this thing. In these instances, he sometimes manages to forget the thing entirely, or to remember it in a vague or distorted way; and he thus protects his feelings of self-esteem (i.e., his ego or his perception of himself). When he consciously misperceives or forgets significant occurrences, we say that he suppresses them; when he unconsciously does so, we say that he represses them.

If we consider an individual's inherited needs or action-tendencies, some of which he may never have been conscious of and some of which he may have once perceived and then have suppressed or repressed; and if we add to these his socially learned thoughts and evaluations, some of which he also may have once perceived but later suppressed or repressed; we may call the totality of his never-conscious and once-conscious thoughts and evaluations his id.

The hypothesis of the individual's repressing some of his perceptions may be confirmed (or denied) by our (a) observing that he remembers things in certain situations when he is off guard—e.g., when he is relaxed, in psychotherapeutic interviews, during dreams, in hypnotic or sodium amytal interviews, etc.; and by our (b) observing that he sometimes acts as if he were making an effort not to remember some embarrassing fact—e.g., when we observe him staring at pretty girls but insisting that he has never done such a thing.

Dreams. Freud: "With the help of the unconscious, every dream in the process of formation makes a demand upon the ego for the satisfaction of an instinct (if it originates from the id) or for the solution of a conflict, the removal of a doubt, or the making of a decision (if it originates from a residue of preconscious activity in waking life). The sleeping ego, however, is focused upon the wish to maintain sleep; it regards this demand as a disturbance and seeks to get rid of the disturbance. The ego achieves this by what appears to be an act of com-

pliance: it meets the demand with what is, in the circumstances, the innocent fulfillment of a wish and thus disposes of the demand. This replacement of a demand by the fulfillment of a wish remains the essential function of dream-work" (20, pp. 54-55).

Operational reformulation: The human individual frequently dreams and appears to use many of his dreams as an outlet for the direct or symbolic satisfaction of some of his needs and desires. Thus, he may employ a dream to prevent himself from waking; to continue certain lines of thought he has had during the day; to express pent-up emotions; and to satisfy some of his "good" and "bad" wishes. In his dream thoughts, particularly when they pertain to socially tabooed desires, he may protect his self-esteem (his ego) by resorting to distortion, condensation, displacement of affect, censorship, symbolism, and various other techniques of disguising his dream thoughts and desires.

If this hypothesis concerning human dream processes is true it may be confirmed by having individuals describe a series of their dreams and correlating the contents of these dreams with other important things known about the dreamers—e.g., their life events preceding the dreams; their associations; the mores of their culture; etc. The hypothesis that dream contents are related to underlying wishes and desires of the dreamer may be tested by predicting that certain kinds of dreams represent certain kinds of desires and then probing into the dreamers' present and past experiences to discover whether or not they have or have had the predicted desires.

The libido. Freud: "We may picture an initial state of things by supposing that the whole available energy of Eros, to which we shall henceforward give the name of *libido*, is present in the as yet undifferentiated ego-id and serves to neutralize the destructive impulses which are simultaneously present . . . It is difficult to say anything of the behavior of the libido in the id and in the superego. Everything that we know about it relates to the ego, in which the whole available amount of libido is at first stored up. We call this state of things absolute, primary *narcissism*. It continues until the ego begins to cathect the presentation of objects with libido—to change narcissistic libido into *object libido*. Throughout life the ego remains the great reservoir from which libidinal cathexes are sent out onto objects and into which they are also once more withdrawn, like the pseudopodia of a body of protoplasm. It is only when someone is completely in love that the main

quantity of libido is transferred onto the object and the object to some extent takes the place of the ego. A characteristic of libido which is important in life is its *mobility*, the ease with which it passes from one object to another. This must be contrasted with the *fixation* of libido to particular objects, which often persists through life. There can be no question that the libido has somatic sources, that it streams into the ego from various organs and parts of the body" (20, pp. 22-24).

Operational reformulation: The human individual has self-preservative and sex needs which partly originate in his biological make-up and partly stem from his social learning. When he is young, the individual tends to concentrate almost exclusively on himself and his own self-preservative needs and to view objects in his environment in a non-differentiated manner, as extensions of himself. At this time, we may say that he is in a state of primary narcissism.

As he grows older, the individual begins to differentiate other objects from himself and to discriminate among outside objects. In accordance with his perceptual discrimination and the satisfactions he derives from outside objects, he begins to evaluate them positively or negatively, as "good" or "bad" objects. He may thereby become interested in outside persons or things in their own right and forgo much of his primary narcissism. But unless he falls completely in love with some outside person or thing he never surrenders a considerable amount of his narcissism or self-interest.

Once an individual becomes significantly interested in, or positively evaluates, objects outside himself, he is usually able to transfer his interest easily from one object to another. Occasionally, however, he becomes so strongly attached to a certain object or thing that his interest becomes fixated on it; and this kind of fixation may sometimes persist through life.

The individual's propensity to become interested, and in particular amoratively and sexually interested, in other people and things we may call his *libido*. While many aspects of the expression of his libidinous drives are learned, his underlying tendencies to become vitally interested in outside things, or to display libido, would appear to be biologically rooted.

The sexual libido. Freud: A "portion of the libido . . . from its instinctual aim, is known as sexual excitation. The most prominent of the parts of the body from which this libido arises are described by

the name of erotogenic zones, though strictly speaking the whole body is an erotogenic zone. The greater part of what we know about Eros—that is, about its exponent, the libido—has been gained from the study of the sexual function, which, indeed, in the popular view, if not in our theory, coincides with Eros. We have been able to form a picture of the way in which the sexual impulse, which is destined to exercise a decisive influence on our life, gradually develops out of successive contributions from a number of the component instincts, which represent particular erotogenic zones" (20, p. 24).

Operational reformulation: Sexual excitation stems from (a) our biological drives, which appear to be hormonally activated; and (b) our social learning or conditioning. Sexual impulses seem to be closely related to, and in part compounded of, sensual excitations—e.g., oral, anal, urethral, and other tactile sensations. In some instances, human beings never clearly differentiate their sexual or genital sensations from some of their sensual sensations; or they become sexually fixated on an oral, anal, or urethral level because, originally, there was a close association between their genital and oral, anal, or urethral sensations.

The Oedipus complex. Freud: "When a boy, from about the age of two or three, enters upon the phallic phase of his libidinal development, feels pleasurable sensations in his sexual organ and learns to procure these at will by manual stimulation, he becomes his mother's lover. He desires to possess her physically in the ways which he has divined from his observations and intuitive surmises of sexual life and tries to seduce her by showing her the male organ of which he is the proud owner. In a word, his early awakened masculinity makes him seek to assume, in relation to her, the place belonging to his father . . . At last his mother adopts the severest measures: she threatens to take away from him the thing he is defying her with. As a rule, in order to make the threat more terrifying and more credible, she delegates its carrying out to the boy's father, saying that she will tell him and that he will cut the penis off" (20, pp. 91-92).

Operational reformulation: When, in a small family system such as normally exists in our culture, a boy learns that his father assumes an all-important position in regard to his mother, he frequently wishes that he could usurp this position for himself. When, in addition, a boy's early sex drives are denied easy outlet, as they usually are in our society, he often becomes sexually obsessed, and intensely desires to have sex

relations with a great many women, including his own mother. As a result of his nonsexual and sexual jealousy of his father, complicated by his guilt about his incestuous desires, a boy in our society may develop an incest complex and may desire to kill his father and/or fear that his father is going to castrate him. This complex will tend to be even greater if his parents make an issue over masturbation and sexually threaten him because of it.

Confirmation of the Freudian hypothesis of incest and castration complexes may be sought by (a) questioning boys about their sex desires and attitudes and about their relations with their parents; and (b) by observing the sexual behavior of boys and men and correlating their early and later sex desires and attitudes.

The ego defenses. Freud: "The ego often enough finds itself in the position of warding off some claims from the external world which it feels as painful and . . . this is effected by denying the perceptions that bring to knowledge such a demand on the part of reality. Denials of this kind often occur, and not only with fetishists; and whenever we are in a position to study them, they turn out to be half-measures, incomplete attempts at detachment from reality." (20, p. 118)

Operational reformulation: When an individual's perception of himself—that is, his self-esteem or ego-strength—is threatened, he frequently tends to perceive reality in such a distorted way as to convince himself that he is still a "good" or socially approved individual and that his behavior is justified. His techniques of distorting his perceptions may include repressing or denying painful occurrences; displacing or transferring embarrassing affects; becoming fixated or fetichistically attached to an early form of behavior that he views as pleasant or safe; compensating for his deficiencies in one area by becoming proficient in another; rationalizing or excusing his presumed deficiencies; projecting his own failings onto others; insisting that the world is acting unfairly against him; compulsively resorting to magical notions and rituals; resorting to asocial or antisocial behavior; masochistically expiating his "sins" by resorting to self-punishment; using alcohol or drugs as an escape from anxiety; etc.

The hypothesis that human beings tend to protect their self-esteem by consciously or unconsciously becoming defensive may be tested by observing their verbal and nonverbal behavior and correlating their perceptions of threat with the defense techniques they employ.

Neurosis and psychosis. Freud: "The necessary conditions for the pathological states we have mentioned can only be a relative or absolute weakening of the ego which prevents it from performing its tasks. The severest demand upon the ego is probably the keeping down of the instinctual claims of the id, and for this end the ego is obliged to maintain great expenditures of energy upon anti-cathexes. But the claims made by the superego, too, may become so powerful and so remorseless that the ego may be crippled, as it were, for its other tasks. We may suspect that, in the economic conflicts which now arise, the id and the superego often make common cause against the hard-pressed ego, which, in order to retain its normal state, clings onto reality. But if the other two are too strong, they may succeed in loosening the organization of the ego and altering it so that its proper relation to reality is disturbed or even abolished" (20, p. 62).

Operational reformulation: The so-called normal or well adjusted individual learns to like himself sufficiently (i.e., to perceive his behavior as being "good" enough and to have confidence that he will consistently continue to behave in a socially approved manner) to face his own desires and the demands of the external world even when conditions are rough and he is having a hard time making his way. But if his own unsatisfied needs become too great (e.g., he becomes continually cold, hungry, or sex-starved) or if he perceives many of his desires or actions as being "bad" or socially reprehensible, he tends to become hostile toward the world and himself and to lose confidence in himself.

If what the individual perceives as reality—that is, his picture of himself and the world around him—becomes too threatening, his perceptions of this reality may become distorted and he may see many things as he would like them to be rather than as they actually are. Such a distorted view of reality by the over-frustrated or over-guilty individual we call a neurosis or a psychosis.

Confirmation or disproof of the hypothesis that individuals become neurotic or psychotic when they are over-threatened by external events or by their own guilt feelings may be sought by correlating their verbal and nonverbal behavior relating to feelings of threat with their neurotic or psychotic symptoms.

Psychoanalytic therapy. Freud: "To begin with, we induce the patient's thus enfeebled ego to take part in the purely intellectual work of interpretation, which aims at provisionally filling the gaps in

his mental resources, and to transfer to us the authority of his super-ego; we stimulate his ego to take up the struggle over each individual demand made by the id and to defeat the resistances which arise in connection with it. At the same time, we restore order in his ego, by detecting the material and impulses which have forced their way from the unconscious, and expose them to criticism by tracing them back to their origin. We serve the patient in various functions as an authority and a substitute for his parents, as a teacher and educator; and we have done the best for him if, as analysts, we raise the mental processes in his ego to a normal level, transform what has become unconscious and repressed into preconscious material and thus return it once more to the possession of his ego" (20, pp. 76-77).

Operational reformulation: The psychoanalyst helps the emotionally disturbed individual in several ways: (a) He accepts the patient and shows that he likes and approves him, thus reducing the patient's notion that he is socially reprehensible. (b) He helps the patient tolerate some of his ungratified needs—that is, accept the fact that obtaining certain advantages in life also entails accepting some disadvantages. (c) He helps the patient gratify some of his ungratified needs—e.g., to work more effectively and thereby get a better-paying position. (d) He enables the patient to understand why he behaves in an irrational, disorganized way, and how to stop this irrational behavior. (e) He becomes something of a parent-substitute and authority-figure to the patient, and thereby serves as a good model for the patient and encourages him, out of love for the analyst, to surrender some of his neurotic symptoms. (f) He acts as a teacher and educator to the patient, often giving him useful information, such as sex information. (g) He gives the patient the possibility of greater conscious, and more effective, control over his behavior by making him aware of many things which he did not previously consciously perceive but which were seriously affecting him. He thus enables the patient to be honest with himself and to forgo time- and energy-consuming self-deceptions.

Limitations of the Operational Reformulation of Freudian Principles

In the foregoing sections of this paper we have defined the keywords needed for psychodynamic formulations by operationally anchoring them

in human perception and response. We have then translated some of the most important Freudian theories into this operationally derived language. In so doing, we have been able to state the essentials of Freudian theory in molar terms, on a so-called intervening variable level. We have not actually proven or empirically verified any of the restated psychoanalytic hypotheses; but we have indicated how they may be confirmed or disproved by clinical or experimental observation.

We have made no attempt to show that *all* scientific theories can or should be operationally stated in terms of lower-order constructs; and, in fact, have shown that, at the present time, setting such a limitation on scientific theorizing is neither practical nor desirable. But we have tried to demonstrate that it is practical, and probably quite desirable, to state the essentials of analytic theory in considerably more operational terms than those in which they are usually stated.

We have not, in this paper, made any attempt to translate *all* Freudian hypotheses into operational terms: since that would be too space-consuming. It is hoped, however, that a sufficient number of the main Freudian principles have been operationally reformulated so that it will be obvious that virtually all the psychoanalytic theories omitted in this paper may also be, with relatively little trouble, reformulated along similar lines.

There has been no attempt in this paper to rephrase two of Freud's more debatable concepts: (a) that of the psyche, mental life, and mental qualities; and (b) that of mental energy and energy cathexes. These are hypothetical constructs which are in part based on nineteenth-century notions of physics which are no longer tenable and in part confirmable only in terms of neurophysiological findings which have not yet been made. They also appear to be redundant in that all the necessary and valuable psychodynamic principles which are involved in the hypotheses of mental life and energy cathexes can easily be stated, as we have shown in the previous sections of this paper, in terms of behavioral intervening variables, without resorting to these vague and debatable hypothetical constructs.

Summary

Some of the main problems involved in scientific theorizing are considered. It is concluded that theories should not be strictly limited to

observational, intervening variable, dispositional, strictly inductive, or lower-order terms, since this kind of rigid operationism would, at the present time, unduly restrict scientific thinking and investigation. It is nonetheless felt that, for a variety of reasons, the reformulation of Freudian psychoanalytic principles into more operational, observational, and intervening variable terminology is desirable at present. Accordingly, many of the basic Freudian hypotheses are quoted and then restated in operational terms.

REFERENCES

1. Ayer, A. J. *Language, Truth and Logic*. New York: Dover, 1947.
2. Bergmann, G. "Sense and Nonsense in Operationism," *Scientific Monthly*, 79: 210-14 (1954).
3. Bridgman, P. W. "Some General Principles of Operational Analysis," *Psychological Review*, 52:246-49 (1945).
4. Brown, J. S., and I. E. Farber. "Emotions Conceptualized as Intervening Variables—With Suggestions Toward a Theory of Frustration," *Psychological Bulletin*, 48:465-95 (1951).
5. Dallenbach, K. M. "The Place of Theory in Science," *Psychological Review*, 60: 33-39 (1953).
6. Dittmann, A. T., and H. L. Rausch. "The Psychoanalytic Theory of Conflict: Structure and Methodology," *Psychological Review*, 61:386-400 (1954).
7. Ellis, A. "Towards the Improvement of Psychoanalytic Research," *Psychoanalytic Review*, 36:123-43 (1949).
8. Ellis, A. "An Introduction to the Principles of Scientific Psychoanalysis," *Genetic Psychology Monograph*, 41:147-212 (1950).
9. Ellis, A. "A Critique of Systematic Theoretical Foundations in Clinical Psychology," *Journal of Clinical Psychology*, 8:11-15 (1952).
10. Ellis, A. *The American Sexual Tragedy*. New York: Twayne, 1954.
11. Eysenck, H. J. "The Organization of Personality," *Journal of Personality*, 20: 101-17 (1951).
12. Feigl, H. "Operationism and Scientific Method," *Psychological Review*, 52:250-59 (1945).
13. Feigl, H. "Principles and Problems of Theory Construction in Psychology," in W. Dennis (ed.), *Current Trends in Psychological Theory*, pp. 174-213. Pittsburgh: Univ. of Pittsburgh Pr., 1951.
14. Feigl, H. "Aims of Education for Our Age of Science: Reflections of a Logical Empiricist," in Nelson B. Henry (ed.), *Modern Philosophies and Education*, 1955, pp. 304-41. Chicago: National Society for the Study of Education, 1955.
15. Feigl, H., and M. Brodbeck (eds.). *Readings in the Philosophy of Science*. New York: Appleton-Century-Crofts, 1953.
16. Feigl, H., and W. Sellars (eds.). *Readings in Philosophical Analysis*. New York: Appleton-Century-Crofts, 1949.
17. Flew, A. "Motives and the Unconscious." Paper delivered at the Conference on Psychoanalysis and Science, University of Minnesota, June 1954. Also reprinted in this volume.
18. Frank, P. G. "The Variety of Reasons for the Acceptance of Scientific Theories," *Scientific Monthly*, 79:139-45 (1954).
19. Frenkel-Brunswik, Else. "Psychoanalysis and the Unity of Science," *Proceedings of the American Academy of Arts and Sciences*, 80:271-350 (1954).

20. Freud, S. *An Outline of Psychoanalysis*. New York: Norton, 1949.
21. George, F. H. "Logical Constructs and Psychological Theory," *Psychological Review*, 60:1-6 (1953).
22. Ginsberg, A. "Hypothetical Constructs and Intervening Variables," *Psychological Review*, 61:119-31 (1954).
23. Halstead, W. C. "Biological Intelligence," *Journal of Personality*, 20:118-29 (1951).
24. Hebb, D. O. "The Role of Neurological Ideas in Psychology," *Journal of Personality*, 20:39-55 (1951).
25. Hempel, C. G. "A Logical Appraisal of Operationism," *Scientific Monthly*, 79: 215-23 (1954).
26. Hilgard, E. R., L. S. Kubie, and E. Pumpian-Mindlin. *Psychoanalysis as Science*. Stanford: Stanford Univ. Pr., 1952.
27. Hull, C. L. *Principles of Behavior*. New York: Appleton-Century, 1943.
28. Israel, H. E. "Two Difficulties in Operational Thinking," *Psychological Review*, 52:260-61 (1945).
29. Keys, A., J. Brozek, A. Henschel, O. Mickelson, and H. L. Taylor. *The Biology of Human Starvation*. Minneapolis: Univ. of Minn. Pr., 1950.
30. Klein, G., and D. Krech. "The Problem of Personality and Its Theory," *Journal of Personality*, 20:2-23 (1951).
31. Lindsay, R. B. "Operationalism in Physics Re-assessed," *Scientific Monthly*, 79: 221-23 (1954).
32. Lindzey, G. "Hypothetical Constructs, Conventional Constructs, and the Use of Physiological Data in Psychological Theory," *Psychiatry*, 16:27-34 (1953).
33. MacCorquodale, K., and P. E. Meehl. "Hypothetical Constructs and Intervening Variables," *Psychological Review*, 55:95-107 (1948).
34. Margenau, H. "On Interpretations and Misinterpretations of Operationalism," *Scientific Monthly*, 79:209-10 (1954).
35. Marx, M. H. "Intervening Variable or Hypothetical Construct," *Psychological Review*, 58:235-47 (1951).
36. Maze, J. R. "Do Intervening Variables Intervene?," *Psychological Review*, 61: 226-34 (1954).
37. Meehl, P. E. *Clinical Versus Statistical Prediction*. Minneapolis: Univ. of Minn. Pr., 1954.
38. Miller, N. E. "Comments on Theoretical Models," *Journal of Personality*, 20: 82-100 (1951).
39. Pratt, C. C. "Operationism in Psychology," *Psychological Review*, 52:262-69 (1945).
40. Rapoport, D. "The Conceptual Model of Psychoanalysis," *Journal of Personality*, 20:56-81 (1951).
41. Reid, J. R. "The Concept of Unconscious Anxiety and Its Use in Psychotherapy." Paper delivered at the Conference on Psychoanalysis and Science, University of Minnesota, June 1954.
42. Rudner, R. "Remarks on Value Judgments in Scientific Validation," *Scientific Monthly*, 79:151-53 (1954).
43. Scriven, M. "The Age of the Universe," *British Journal for the Philosophy of Science*, 5:181-90 (1954).
44. Scriven, M. "Notes on the Discussion Between Frenkel-Brunswik and Skinner," *Scientific Monthly*, 79:309-10 (1954).
45. Scriven, M. "The Principle of Inductive Simplicity," *Philosophical Studies*, February 1955.
46. Seeger, R. J. "Beyond Operationalism," *Scientific Monthly*, 79:226-27 (1954).
47. Secman, W. "The Freudian Theory of Daydreams: An Operational Analysis," *Psychological Bulletin*, 48:369-82 (1951).