

## CHAPTER 4

# *Hypnosis and the Psychology of Delusions*

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Hypnosis is a social interaction in which a person experiences anomalies of perception, memory, and action that have been suggested by the hypnotist. What unites the various phenomena of hypnosis is that all involve compelling subjective experiences that do not correspond to objective reality. For example, hypnotic subjects may hallucinate, perceiving objects that are not present in the stimulus field. Alternatively, they may fail to perceive stimuli that are actually present, as in the case of hypnotic analgesia. They may experience a regression to a previous period in their lives (or, for that matter, an ostensibly previous life altogether), and other changes in self-concept. After hypnosis has been terminated, they may forget the events and experiences that transpired therein. Even so, they may feel an urge to carry out some activity that was suggested to them while they were hypnotized—though if amnesia is in place they may not know why this is so.

Since the late nineteenth century there has been considerable controversy over the nature of hypnotic effects (Sheehan & Perry, 1976; Shor, 1979). Stated bluntly, and without regard for nuance, the principal question has been whether such effects are real or the products of deliberate deception. In part the controversy is due to the social matrix in which hypnosis takes place, and the fact that mere words seem to have so much power to control experience, thought, and action. In large part, however, the problem of hypnosis is the larger epistemological problem of the knowledge of other minds. The

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effects suggested in hypnosis are entirely subjective and private, and these changes in experience are mirrored only imperfectly in objective behavior. We have no way of knowing *for sure* whether what a hypnotic subject reports is faithful to his or her actual subjective experience.

The historical conflict in theories of hypnosis was summarized aptly by Sutcliffe (1960, 1961), who described two opposing points of view. According to the *credulous* view, the mental (chiefly perceptual) processes affected by suggestion are assumed to be the same as those instigated by actual stimulus conditions. By contrast, the *skeptical* viewpoint assumes that mental processes are unaffected by the hypnotic procedure, but the subject acts as if the world were as suggested by the hypnotist. Whereas the credulous view takes the subject's testimony at face value, Sutcliffe claimed, the skeptical view discounts this testimony and focuses on overt behavior (for critiques of Sutcliffe's dichotomy, see Evans, 1968; Hilgard, 1965; Sheehan & Perry, 1976; Weitzenhoffer, 1963, 1964). As an exemplar of the credulous position, Sutcliffe nominated Milton Erickson—who generally seemed to hold that the sensory content of hypnotic experiences such as hallucinations was identical to that engendered by an actual, physical stimulus condition corresponding to the suggestion (e.g., Erickson & Erickson, 1938). Sutcliffe's representative of the skeptical view was White (1941), who argued that hypnotic behavior was the product of the motivated subject's striving to act like a hypnotized person, as defined by the hypnotist and understood by the subject.

The contrast between the two points of view may be illustrated with respect to hypnotic analgesia—the suggestion that the subject will feel no pain. From the credulous point of view, the effect of this suggestion would be analogous to a nerve block, preventing afferent impulses from being transmitted to the central nervous system. The skeptical point of view assumes that the subject will report feeling fine even though he or she feels intense pain—much as postoperative patients might reply to the queries of medical personnel that they are “feeling fine.” The two points of view might be evaluated by a specimen experiment in which subjects are hypnotized and given an analgesia suggestion, and then their arms are plunged in circulating ice water. If highly hypnotizable the subjects will report little or no pain; nevertheless, psychophysiological responses to a pain stimulus (heart rate, GSR, etc.) will be unaffected (for reviews of this type of experiment see Hilgard & Hilgard, 1983).

At first glance, the available research findings would appear to favor the skeptical point of view—the subjects *report* no pain, but their covert behavior gives clear evidence that a painful stimulus is being processed. However, there is another possible perspective—Sutcliffe's own version of the skeptical view. Sutcliffe argued that subjective conviction distinguishes hypnosis from simulation. This kind of subjective conviction, in the case of analgesia, leads

patients to return for treatment or to recommend hypnosis to others (Bowers, 1976). Thus, hypnosis involves an alteration in self-awareness, or, perhaps more precisely, in the subject's awareness of his or her relation to the external world. In the case of analgesia, for example, the hypnotic subject processes a veridical mental representation of the pain stimulus, but is not *aware* of doing so. Because the subject's verbal reports of pain reflect his or her subjective experience, he or she denies feeling pain. The psychophysiological responses do not contradict these self-reports, but rather indicate that the subject's assessment of the stimulus state of affairs is incorrect. Sutcliffe argued that because hypnotized individuals are unaware that objective reality has characteristics other than those suggested by the hypnotist, they are essentially deluded. Sutcliffe characterized his point of view as a variant on skepticism, because there was no implication that hypnotic experiences would be isomorphic with actual sensory experience.

Sutcliffe's idea, that hypnotized subjects are essentially deluded, is interesting for a number of reasons. First, it makes hypnosis relevant to an ancient problem in psychology: the nature and function of consciousness, and the relations between conscious and unconscious mental processes (Kihlstrom, 1984). Moreover, from a historical point of view hypnosis has been of interest largely because of the phenotypic similarities between the phenomena observed in hypnosis and the symptoms of psychopathology (Kihlstrom, 1979). The parallels are especially profound between the classic phenomena induced by hypnotic suggestion and the symptoms of the dissociative neuroses of depersonalization, derealization, hysteria, fugue, and multiple personality (Hilgard, 1977; Kihlstrom, 1984). However, the parallels go further than this. In the classic case, hypnotic phenomena—both subjective experiences and their accompanying behaviors—are associated with a degree of involuntariness bordering on compulsion, and subjective conviction bordering on hallucination and delusion. These similarities between hypnosis and psychopathology—in experience, thought, and action—suggest that hypnosis may serve as a laboratory model for the study of a wide variety of psychopathological conditions, including delusional states (Kihlstrom, 1979).

### **CREDULITY AND SKEPTICISM IN HYPNOSIS**

Sutcliffe characterized hypnotized subjects as deluded because their reports of perceived and remembered experience, made with apparent conviction, were counterfactual in two senses: (1) They contradicted objective evidence concerning what was registered and available in their perceptual-cognitive systems; and (2) the material they denied knowing actually affected their ongoing thought and action. For example, he found that hypnotized subjects

reporting reduced pain following a suggestion for analgesia nevertheless gave normal GSR responses in electric shock. Similarly, subjects reporting that they could not hear their own voices following suggestions for deafness nevertheless showed performance impairments due to the administration of delayed auditory feedback (Sutcliffe, 1961). In later research, Sutcliffe (1972) found that subjects asked to imagine a color patch generally failed to show the appropriate negative after-image upon termination of the suggestion. These results were largely in accord with Sutcliffe's (1958) review of previous research. As he noted, "The occasional well-designed study tends to refute the credulous view; and so all told the evidence can be said to directly support or be consistent with the skeptical point of view" (p. 97).

Sutcliffe's review gave rise to a large number of experiments that pitted the subject's self-report of experience following suggestions against some objective (often nonverbal, sometimes physiological) index of response. These experiments were not always expressly designed to test the credulous versus skeptical views of hypnosis. In fact, some of the experiments were designed by those who were critical of Sutcliffe's classification and its implications. Nevertheless, this line of inquiry bears directly on the credulous-skeptical distinction, and on Sutcliffe's claim that hypnotized subjects are essentially deluded into believing that the world is as it is suggested by the hypnotist, rather than as it appears to an objective observer.

Accordingly, it seems appropriate to essay a brief and selective survey of this literature, covering a wide variety of hypnotic suggestions, to bring his review up to date. Sutcliffe's theoretical analysis was couched in terms of the subject's awareness of actual stimuli, and the equivalence in content between real and imagined sensory experiences. Therefore, it seems most appropriate to begin with the effects of hypnosis on sensation and perception: suggested analgesia, anesthesia, deafness, and blindness (see also Bowers, 1976; Hilgard, 1965, 1975, 1977; Kihlstrom, 1984, 1985a). Later, we turn to effects involving memory functioning and personality. In short, Sutcliffe seems to have been more right than wrong; the reader who is not interested in the details of hypnosis research can skip to the next section.

### Hypnotic Analgesia

When administered appropriate suggestions, hypnotizable subjects can dramatically reduce the perceived intensity of a painful stimulus, an effect known as *hypnotic analgesia*. The pain relief produced through such suggestions can be enough to relieve pain in a wide variety of clinical syndromes (Hilgard & Hilgard, 1983; Hilgard & LeBaron, 1984). There are, in fact, numerous case reports of major surgery performed with hypnosis as the sole analgesic agent. In a recent laboratory study in which subjects were exposed

to both cold pressor and ischemic muscle pain, hypnosis proved more effective than any of the other challenging agents tested, including morphine and diazepam, in reducing self-reported pain (Stern, Brown, Ulett, & Sletten, 1977).

Despite the subjectively compelling reduction in pain experienced by many subjects during hypnotic analgesia, the suggestions do not necessarily modify psychophysiological responses to the pain stimulus. For example, anecdotal reports from the clinic indicate that hypnotized subjects undergoing medical or surgical procedures with hypnotic analgesia frequently perspire and show other signs of tension. Formal experiments using measures such as GSR and heart rate confirm the earlier findings of Sutcliffe (1961) that these indices of stimulation do not follow the pattern of verbal reports (for a review, see Hilgard & Hilgard, 1983). These sorts of somatic responses indicate that the pain stimulus is not blocked at the periphery, but rather is registered more centrally in the cognitive system. In other words, the body is feeling pain that the person denies experiencing.

Hilgard's "hidden observer" technique provides additional evidence contradicting the credulous view. After analgesia has been established, it may be suggested to the subject that there is a hidden part of the person that may have registered, and can report, the true level of pain stimulation. Under these circumstances, some (but not all) hypnotic subjects give pain reports that are comparable to those collected under normal waking conditions. The hidden observer is a metaphor for this continuing cognitive (but subconscious) representation of pain, and the method by which it may be accessed (Hilgard, 1977, 1979). The hidden observer has been replicated in other laboratories. Although some controversy has arisen over its interpretation (Coe & Sarbin, 1977; Kihlstrom, 1984, 1985a; Laurence, Perry, & Kihlstrom, 1983; Sarbin & Coe, 1972, 1979; Spanos, 1986), hidden observer reports clearly show that some representation of pain is permanently registered in the cognitive system, despite the subject's denial of awareness of the stimulus.

### Positive and Negative Hallucinations

In some sense, analgesia seems to involve a diminution in sensory acuity, resulting in a raising of the threshold for pain detection or pain tolerance. A somewhat different form of sensory-perceptual effect is the *negative hallucination*, in which the perceptual effect is selective rather than generalized, and focuses on only some portion of the stimulus. For example, research in the visual domain has studied hypnotic suggestions for selective blindness for location, form, or color. Such phenomena inherently involve a paradox, in that the targeted aspect of the stimulus must be registered, and processed at

some level, before the person can construct the negative hallucination. In other words, one has to know what is there before one can block it out of awareness. Thus, these phenomena would seem especially likely to yield the paradoxical effects that are the hallmark of hypnotic delusion. And so they do. For example, despite a widely cited early report to the contrary (Erickson & Erickson, 1938), those who receive hypnotic suggestions for color blindness do not mimic the performance of the congenitally color-blind on rigorous formal tests of color sensitivity (Cunningham & Blum, 1982); nor do they eliminate interference on the Stroop color-word test (Harvey & Sippelle, 1978).

Several experiments have examined the effect of hypnotic suggestions on some phenomenon to which the veridical perception is coupled. In theory, perceptual couplings are inviolate, in that one percept requires another. The argument is that if hypnotic suggestions truly affect sensory processing, there should be a palpable effect on other, coupled percepts. Perhaps the clearest evidence on this question is found in research by Blum, Leibowitz, and their colleagues on suggested tubular vision. In a case study, Blum (1975) found that such suggestions yielded an impairment in the detection of stimuli that was unresponsive to monetary incentives. However, the reported restrictions in the visual field remained constant over varying viewing distances, much in the manner of functional (but not organic) amblyopia. Moreover, when the stimuli were experimentally associated with strong positive or negative affect, their presentation elicited appropriate emotional responses in the subject—even though she was unable to detect the stimuli themselves. Leibowitz, Lundy, and Guez (1980) found that estimates of stimulus size varied with viewing distance—again, an effect that does not occur with true tubular vision. Finally, Leibowitz and his colleagues compared conventional perimetry procedures with a more subtle evaluation of peripheral acuity, roll vection, in which feelings of egomotion are induced by a stimulus rotating around the line of sight. Conventional perimetry confirmed the subject's verbal reports of tubular vision, but roll vection was unaffected by the negative hallucination (Leibowitz, Post, Rodemer, Wadlington, & Lundy, 1981).

In contrast to negative hallucinations, suggestions for *positive hallucinations* concern the hallucinated *presence* of some object or event. In a manner directly analogous to contemporary studies of mental imagery (Finke, 1980), the goal of many of these studies has been to determine whether the hallucination has the same perceptual consequences as an external stimulus. Again, however, the few studies performed in this area seem to reveal a contradiction between self-report and other indices of perception. For example, MacCracken, Gogel, and Blum (1980) employed a combination of positive and negative hallucinations in an attempt to alter the perceived distance between the subject and a point of light. Such suggestions altered estimated

distance in the appropriate direction, but not the apparent motion of the target when the subject's head was moved from side to side.

Thus, the general thrust of the research on the sensory-perceptual effects of hypnotic suggestions is consistent with the conclusions drawn from research on pain. By the evidence of their self-reports, hypnotized subjects do appear to experience alterations in functioning in accord with the suggestions. Subjects given suggestions for deafness indicate that they cannot hear; subjects given suggestions for selective blindness indicate that they cannot see the critical properties or objects. Nevertheless, performance on other tasks (analogous to the psychophysiological indices used in the pain studies) shows that the stimuli in question have been fully registered within the perceptual system. Additional evidence is available from an experiment in which partially deaf subjects interrogated with the hidden observer technique show no reduction in auditory acuity (Crawford, Macdonald, & Hilgard, 1979). Thus, the bulk of the evidence tends to go against the credulous viewpoint, and shows that the features of suggested hypnotic experiences do not necessarily parallel those of the actual stimulus conditions to which they correspond.

### Posthypnotic Amnesia

Similar conclusions may be drawn from the domain of memory. Just before hypnosis is terminated, it is common for subjects to receive a suggestion that they will find it difficult or impossible to remember the events and experiences that transpired while they were hypnotized—a phenomenon known as *posthypnotic amnesia* (Cooper, 1979; Kihlstrom, 1977, 1983a, 1985b; Kihlstrom & Evans, 1979). Nevertheless, it is easy to demonstrate that the material covered by the amnesia suggestion remains available in memory storage, even if it is not accessible on a particular attempt at retrieval. For example, both complete and partial amnesia can be reversed by administration of a cue, arranged during the suggestion, that will cancel the original suggestion. Thus, the amnesia does not represent the failure to encode the relevant memories, or their loss from storage. In other words, the memories covered by the amnesia suggestion remain available in memory, even if they are temporarily inaccessible (Tulving & Pearlstone, 1966).

Furthermore, it appears that the available but inaccessible memories are not merely latent, but continue to actively influence ongoing cognitive and behavioral performance during the time they are covered by the amnesia suggestion. In an experiment by Williamsen, Johnson, and Eriksen (1965), hypnotized subjects memorized a list of familiar words and then received a suggestion for posthypnotic amnesia. On a free recall test, the subjects of highest hypnotizability showed a dense amnesia for the word list. In a later phase of the experiment, however, the subjects were shown a set of words

that had been degraded by eliminating portions of their constituent letters, and were asked to indicate what the words were. Some words were those that had been previously memorized; others had not been presented previously in the experiment. Although the two sets of stimuli had been carefully matched in terms of task difficulty, the subjects were much more successful in identifying the critical compared to the neutral items. The enhanced perceptual fluency reflects a priming effect familiar in the semantic memory literature, wherein prior presentation of an item facilitates later processing of identical or closely related material. Interestingly, the degree of fluency was uncorrelated with response to the suggestion: Amnesic subjects showed just as much facilitation as those who remembered the contents of the word list perfectly well. Thus, the memories covered by the amnesia suggestion actively influenced performance on a perceptual task.

A later experiment by Kihlstrom (1980) revealed an analogous effect on memory *per se*. Following Williamsen's procedure, the subjects memorized a list of familiar words and received a suggestion for amnesia. Those subjects of highest hypnotizability, as expected, responded with almost total amnesia, as measured by a test of free recall. In the next phase, the subjects were asked to give word associations to stimuli likely to elicit those items, as well as control stimuli targeting items that had not been previously memorized. Although the critical and neutral lists had been closely matched for stimulus-response probabilities, the subjects were more likely to produce the critical associates than those targeted by the neutral stimuli—another reflection of priming. A second experiment, in which subjects memorized a list of taxonomically related words and then were asked to give instances of critical and neutral categories, again yielded evidence of priming. In neither case was there any difference in the magnitude of priming displayed by amnesic and nonamnesic subjects.

In such experiments as these, we see the counterpart in memory of the effects observed in the perceptual domain. Hypnotic subjects deny memory of certain past experiences, yet evidence from other indices shows clearly that the critical memories were encoded, remained available in storage, and actively influenced ongoing task performance. If amnesia is construed as encoding failure or loss from storage, then the research on posthypnotic amnesia would tend to support the skeptical over the credulous view. The critical memories remain present, despite the amnesic subject's assertion to the contrary.

### **Hypnotically Induced Paramnesia**

While posthypnotic amnesia effectively denies the subject conscious access to memory, the high responsiveness of hypnotized subjects to suggestions



calling for perceptual-cognitive distortions means that memory can also be distorted through hypnosis. Sometimes, these distortions can arise quite innocently. For example, it has become rather common in forensic situations for witnesses and victims to be hypnotized and given suggestions for improved memory for the details of a crime in which they have been involved. With one exception (Geiselman, Fisher, MacKinnon, & Holland, 1985), laboratory studies indicate that such suggestions do little or nothing to influence the actual accessibility of the critical memories (for reviews, see Kihlstrom, 1985a; Orne, Soskis, Dinges, & Orne, 1984; Sanders & Simmons, 1983; Smith, 1983). For example, Register and Kihlstrom (1987) found that insertion of hypnotic suggestions for improved memory had no discernible effect on memory, over and above the hypermnnesia often observed in the normal waking state (Erdelyi, 1984). Score another point against the credulous view: Hypnotic hypermnnesia is not the same as remembering better.

Nevertheless, the subjects may well *believe* that their memory has been refreshed, and attach unwarranted confidence to new material produced after the suggestion has been given. For example, Dywan and Bowers (1983) found that both false and accurate recall increased following hypnotic suggestions, that the former outnumbered the latter by a large margin, and that subjects expressed equal confidence in both types of productions. Because the subjects seem to believe in their false recollections (as well as in their accurate ones), they may fairly be said to be deluded about what happened in the past. These delusions can be quite mischievous, as indicated by the substantial number of false prosecutions and convictions instigated by hypnotically "refreshed" memory (Orne, 1979; Orne et al., 1984).

In addition, memory may be actively distorted by explicit or subtle leading questions raised by the interrogator. The result can be a subjectively compelling *paramnesia*—a false but believed-in memory. Of course, distortions can be deliberately induced in the normal waking state by means of leading questions (e.g., Loftus, 1979). Being hypnotized does not render subjects immune from these effects (Sheehan, 1985), and may well make things worse. Just how powerful this effect can be was recently demonstrated by Laurence and Perry (1983), who asked hypnotized subjects to recount the events of an arbitrarily selected evening one week before. After recounting their memories, the subjects received a suggestion that they had heard a noise in the night that had awakened them. Although none of the subjects had reported such an event in the pretest, fully half of the subjects incorporated the false memory into their posttest recall. Moreover, for half of these subjects, one quarter of the entire sample, this pseudo-memory remained unshakable even after the experimenter informed the

subjects that it was the product of suggestion. We may call these subjects truly deluded.\*

Of all the suggested changes in self-concept or self-image, perhaps the most dramatic is the phenomenon of age regression. In this case, it is suggested that the subject has returned to a previous period in his or her life—a childhood birthday party, for example, or a pleasant day in elementary school. In response, hypnotizable adults may take on a childlike demeanor and appear to relive an experience associated with that period in their past life. The experience can be quite compelling for subject and observer alike, entailing changes in voice quality and handwriting, mannerisms, and sophistication of speech (Hilgard, 1965). Still, the age-regressed adult does not behave exactly as a real child would (for a review, see Kihlstrom, 1982, 1985a). The “child” may well retain access to his or her adult fund of knowledge. Childhood memories ostensibly revived during age regression are not necessarily veridical. And ontogenetically prior modes of mental functioning are not actually reinstated—any more than the subject becomes smaller in the chair.

### **Contradiction, Metacognition, and Belief in Hypnosis**

Given the terms in which Sutcliffe originally framed the issue, then, the available literature—past and present—seems to support the skeptical rather than the credulous view of hypnosis. Hypnotized subjects responding to suggestions report experiences that do not correspond to the actual stimulus state of affairs. In the case of analgesia and the negative hallucinations, there is the true absence of adequate stimulation; in amnesia, the absence of available memory. With the hypnotic paramnesias, especially those involving age regression, the phenomena of hypnosis take on an even more delusional quality, because specific counterfactual beliefs about the self—about one’s past experiences, or present personality—are formed as the subject responds to suggestion.

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\*Hypnotically induced paramnesias have long been a staple of experimental psychopathology (see reviews by Blum, 1967, 1979; Levitt, 1967; Levitt & Chapman, 1979; Reyher, 1967; Silverman, 1976). Adapting a procedure invented by Luria (1932; see also Huston, Shakow, & Erickson, 1934), Reyher asks hypnotized subjects to imagine themselves the subject of a story designed to arouse socially disapproved sexual and aggressive ideas, wishes, and impulses. Similarly, Blum (1961, 1967, 1979) has suggested that some conflict-inducing event occurred during the subject’s early childhood, and observed the effects of the paramnesia on projective test performance. These suggestions appear to have profound effects on measures of emotional state (for a dissent, see Sheehan, 1969). However, in both Reyher’s and Blum’s paradigm, the paramnesia is covered by a suggestion for amnesia. Because these subjects do not have a conscious memory to believe in, it is not clear that they should be classified as deluded.

However, these experiments do not permit us to distinguish between the two versions of the skeptical view described by Sutcliffe (1958). From one view, subjects are seen as strategically complying with demands placed on them by the hypnotist and the wider sociocultural situation in which hypnosis takes place. From the other view, subjects are seen as deluded about the nature of reality, and their self-reports are seen as reflecting subjective conviction and belief. The problem is set out well by recent theoretical accounts of hypnotic analgesia. For example, Coe and Sarbin (1977; Sarbin & Coe, 1979) have suggested that the hidden observer technique gives the subject permission to report pain that he or she has actually felt all along. From this point of view, analgesia represents less a matter of delusion than one of false reporting—calling for skepticism in Sutcliffe's first sense. Hilgard (1973, 1977, 1979), on the other hand, has suggested that the instructions somehow penetrate an amnesic barrier that prevents conscious awareness of stimuli that ordinarily would be perceptually salient. Such a lack of awareness would certainly qualify the individual as deluded in Sutcliffe's second sense.

It might in principle be possible to distinguish between these formulations, on the basis of subjective convictions and belief. However, such a program is complicated because some skeptical theorists resort to the concept of self-deception. According to Sarbin and Coe (1979), for example, hypnotic subjects engage in "rhetorical communication" (p. 517) in order to enhance the credibility of their self-reports. In the course of enacting a convincing performance, subjects may come to convince themselves that their reports are factual rather than counterfactual. Similarly, Spanos (1986) has claimed that contextual features of the hypnotic situation may lead subjects to interpret their behavior as involuntary, rather than as a product of strategic, goal directed action. Once self-deception enters the theoretical picture, we must abandon hope of differentiating between the first and second forms of skepticism about hypnosis.

Still, evidence supporting such a distinction is provided by other types of experiments. Consider, first, the contradictions between self-report and other indices that have been cited as undermining the credulous view of hypnosis. These anomalies have sometimes been taken as evidence impeaching the testimony of hypnotic subjects. However, it is important to note that similar anomalies are apparent in the behavior of normal subjects who have no reason to simulate, and in clinical patients complaining of perceptual-cognitive deficits secondary to unambiguous organic brain syndrome. The parallels are particularly striking in the case of posthypnotic amnesia, which shares many features in common with Korsakoff's syndrome, traumatic retrograde amnesia, and normal forgetting caused by poor initial encoding or long retention intervals (for reviews, see Jacoby, 1982; Jacoby & Dallas, 1981; Moscovitch, 1982; Rozin, 1976; Schacter & Tulving, 1982). It is often

observed that the behavior of amnesic patients is influenced by recent events that they cannot remember. Yet it would be absurd to claim, on the basis of such observations, that the patients are playing the role of amnesiacs in accordance with the explicit and implicit demands contained in the clinical situation.

The point is not that hypnotic suggestion induces brain damage, or lengthens the retention interval, or is the psychological equivalent of a blow to the head. The point is merely that the kinds of anomalies observed in hypnosis are not confined to hypnosis. Therefore, observation of such anomalies, while certainly undermining the credulous point of view, does not necessarily call for Sutcliffe's first form of skepticism. In Sutcliffe's sense, amnesic patients are deluded about what they do, and do not, have available in memory. In an important sense, then, analgesia, amnesia, and other hypnotic phenomena represent disorders of *metacognition*. Hypnotic subjects appear to be unaware of mental contents that influence their current cognitive and behavioral activities; and their current cognitive and behavioral activities seem to be influenced by beliefs about themselves and the world that are false but are nonetheless held with conviction.

## AWARENESS, BELIEF, AND EXPLANATION

The literature on descriptive psychopathology contains several classic views of delusions, especially as these are encountered in schizophrenia. Pride of place, of course, goes to Bleuler's formulation in *Dementia Praecox, or The Group of Schizophrenias* (1911/1950). Later treatments of delusions were offered by Jaspers (1923/1963) in *General Psychopathology*, and by Reed (1974) in his beautiful but little-known *Psychology of Anomalous Experience*. From these sources, and from contemporary texts, we can piece together a picture of what delusions look like.

Pathological delusions are anomalies of judgment or belief commonly revolving around themes of persecution, grandeur, love and jealousy, and inferiority. They are false and even implausible beliefs that are assumed to be self-evident, and they are held with intense conviction by the believer, who shows a great deal of ego-involvement and preoccupation with them. Although incorrect, and even implausible, delusions are incorrigible in the face of persuasion, counterargument, and counterdemonstration. Although the stereotype of the delusional patient is the paranoid with a clearly worked-out system of beliefs, Bleuler (1911/1950) noted that delusions were not necessarily logically coherent. Then, if the patient is intelligent, his or her ideas may be highly systematized. But it is also possible for deluded patients to successively or simultaneously maintain sets of unconnected, even mutually

contradictory ideas. In other instances, however, this feature is not so prominent. Rather, delusions can also be vague, fragmentary, and indefinite.

In the scientific literature and the popular press alike, most attention has been given to the systematized delusions of the classic paranoid schizophrenic. However, Jaspers (1923/1963) noted that these delusional beliefs are actually secondary to the primary delusional experience, which has a more perceptual quality. Thus, psychotic patients believe that objects and events have special significance—that they are somehow uncanny, mystifying, and ineffable, and that they have some kind of personal significance. A similar special significance accrues to the individual's ideas and memories (as distinct from his or her percepts). Jaspers held that this primary delusion was *contentless*. The patient's specific delusional beliefs, then, were secondary—reflecting the individual's attempt to structure the diffuse experience of the primary delusion by giving it some sort of content.

### Delusions as Beliefs

Delusions are, first and foremost, false beliefs. In that limited sense, as Sutcliffe (1958) noted, hypnotic subjects are certainly deluded on matters that relate to their current experiences and memories of the past. The primary delusion of hypnotized subjects is that they, and the world around them, are as the hypnotist suggests. Despite the analgesic subject's lack of pain, a painful stimulus really is being applied to this or her skin, and his or her body is not really insensitive to it. Despite the amnesic subject's lack of memory, certain events did in fact transpire during hypnosis, and mental representations of them have been adequately encoded and remain available in storage. And despite the tunnel-blind subjects' assertion that they can see nothing in the periphery, parafoveal events are being processed by their visual systems, and are influencing both behavior and experience.

Even the most mundane hypnotic suggestions have this delusory quality. For example, it may be suggested that the subject's outstretched arm is heavy, as if his or her hand were holding a heavy book; or that his or her outstretched arms are being drawn together as if magnets were attached to the hands. As others have noted, hypnotic subjects frequently become so involved in imagining these experiences that they drop the "as if" qualifier, transforming a metaphor into mythological—we might say delusional—reality (Coe & Sarbin, 1977; Sarbin, 1950; Sarbin & Coe, 1972, 1979). For this reason, Sarbin and Coe refer to hypnosis as a condition of believed-in imaginings. Interestingly, Bleuler (1911/1950) recorded a similar aspect of schizophrenic delusions: The patients, he noted, "believe in their interpretations which they take for perceptions" (p. 383).

Bleuler also noted a kind of double awareness in deluded schizophrenics, in which they entertained the delusion and its opposite, or failed to act in accordance with their delusions but instead behaved in a manner consistent with the actual stimulus state of affairs. Similar phenomena occur in hypnosis. Orne (1959) used the term *trance logic* to denote the ability of hypnotized subjects to maintain in consciousness simultaneous representations of mutually contradictory states of affairs. For example, he noted that subjects who were given suggestions for a hallucination reported both the suggested object and other, real, objects that would have been obscured if the hallucinated object had actually been present in the perceptual field—a finding that has been repeatedly confirmed by others (e.g., Sheehan, Obstoj, & McConkey, 1976; Spanos, deGroot, Tiller, Weekes, & Bertrand, 1985; Stanley, Lynn, & Nash, 1986). Or, age-regressed subjects may experience duality—that is, perceive themselves both as children, participating in the suggested events, and as adults, watching themselves (Laurence & Perry, 1981; Nogrady, McConkey, Laurence, & Perry, 1983; Perry & Walsh, 1978). Orne (1951) and others observed that age-regressed subjects often behave incongruously, drawing on their adult repertoires of skills and world knowledge while presenting themselves as having returned to a childlike state (see also Perry & Walsh, 1978; Nogrady et al., 1983; McConkey, Sheehan, & Cross 1980; Spanos et al., 1985).

But while psychotic patients typically display a great deal of emotional investment in their delusions (see the chapter by Harrow, Rattenbury, & Stoll in this volume), the delusional beliefs of hypnotic subjects are rarely defended with conviction and vigor. The analgesic subject denies experiencing pain, but he or she is perfectly willing to acknowledge that his or her arm is immersed in circulating ice water that is objectively painful. Similarly, the amnesic subject is perfectly prepared to accept the experimenter's account of what happened during the session, even though it does not correspond with his or her personal recollections (McConkey & Sheehan, 1981; McConkey et al., 1980). On the matter of personal investment, then, the analogy between hypnotic subjects and psychotic patients begins to break down.

### **Absorption, Dissociation, Awareness, and Delusions**

At one level of analysis, the hypnotic subject seems to hold a delusional belief about reality, and holds it with some degree of conviction, because of his or her involvement with the suggestions offered by the hypnotist. A number of investigations have indicated that hypnotizable subjects have a capacity for vivid mental imagery (e.g., Sheehan, 1979, 1982), and for deep absorption in both sensory experience and fantasy (e.g., Hilgard, 1970; Tellegen & Atkinson, 1974). If a subject constructs an extremely vivid mental image in

response to the hypnotist's suggestion, and then focuses his or her attentional resources on that image to the virtual exclusion of all else, the imaginary experience may well become subjectively convincing, and the object of a delusional belief in its objective reality.

But absorption in imagination is only one aspect of hypnosis. Shor (1959, 1962, 1970, 1979) argued that the essence of hypnosis lies in the suspension of the subject's generalized reality orientation (GRO), which he defined as the mental framework (nowadays we might say schema or cognitive structure) that provides the individual with an informational context for interpreting experience and organizing action. Fading of the GRO results in an isolation of ongoing experience from external reality and critical self-appraisal. According to Shor, imaginative experiences can become subjectively real only with the fading of the GRO. Otherwise, the subject retains awareness that his or her experiences are only imaginary, and it would seem that imaginings could not become objects of delusional belief.

The fading of the GRO has two consequences. First, the subject experiences a diminished awareness of objective reality. In the present context, this means that he or she will not be aware of percepts and memories that would contradict the imaginings. Moreover, it is important to underscore that many hypnotic phenomena—age regression and the positive hallucinations are good examples—require constructive and reconstructive activity on the part of the subject in order to create a mental representation of the suggested state of affairs. Just as the subject is not aware of information that could contradict imagination, he or she is also not aware of his or her own active role in creating the experience. As a result, response to the hypnotic suggestion is perceived as involuntary and effortless.

Such an alteration of awareness is the topic of Hilgard's (1973, 1977, 1979) neodissociation theory of divided consciousness. Hilgard proposes that under certain circumstances the stream of consciousness can be divided, so that several mental activities proceed in parallel. Further, he argues, under certain circumstances an organized system of thought and action can proceed outside of phenomenal awareness. Hilgard refers to this state of affairs as one of dissociation. Recently, an attempt has been made to assimilate dissociation into the associative network models of memory, which form a central component in contemporary information processing theories of cognition (Kihlstrom, 1984, 1985b).

It is possible that dissociation is only a secondary product of absorption. That is, to the extent that attentional resources are focused on the suggested imagining, there may be little left over to focus on external reality, or on oneself as agent of the imagined experience. However, there are at least two reasons for thinking that separate mechanisms might be involved. First, many hypnotic phenomena do not involve acts of positive imagination.

Analgesia, amnesia, and the negative hallucinations can be brought about even though the subject does not actively imagine some corresponding state of affairs. Second, certain other phenomena seem to involve absorption in the suggested state of affairs without diminished awareness of objective reality. This is seen to greatest effect in the logical incongruities generically labeled as "trance logic." Because absorption and dissociation are at least somewhat independent, it seems more fruitful to think of them as separate cognitive processes.

Conceptually, dissociation involves two cognitive states of affairs. First, there must be a division of consciousness into multiple, simultaneous streams of mental activity influencing experience, thought, and action. In addition, one of these streams must influence mental life outside of phenomenal awareness and voluntary control. The first requirement is compatible with contemporary resource views of attention (e.g., Kahneman, 1973; Norman & Bobrow, 1975), which hold that attention can be allocated among several activities as long as the total requirements of the tasks do not exceed the total amount of available resources. In trying to integrate neodissociation theory with contemporary cognitive psychology, then, this aspect poses no special problems.

But what of the second aspect? Contemporary cognitive psychology is willing to discuss *preconscious* mental processes in terms of preattentive semantic processing and the like (Dixon, 1971, 1981; Erdelyi, 1974; Klatzky, 1984; Marcel, 1980, 1983a, 1983b; Shevrin & Dickman, 1980; but see Holender, 1986). It also has a place for *unconscious* mental processes, in terms of overlearned, automatized, procedural knowledge (Anderson, 1983; Hasher & Zacks, 1979; Posner & Synder, 1974; Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). But most contemporary theories do not propose a ready mechanism for the kinds of subconscious processing implicated by the phenomena of normal and pathological dissociation (Kihlstrom, 1984, 1985b). Nearly a century ago, in *Principles of Psychology*, James (1890) considered this problem and gave us the essential clue to its solution: "The universal conscious fact is not 'feelings exist' and 'thoughts exist' but 'I think' and 'I feel'" (p. 221). The key to conscious awareness of reality, then, is self-reference. Some link is forged between two classes of mental representations residing in working memory: On the one hand, some internal representation of current percepts, memories, thoughts, and actions; on the other, a representation of the self as agent or experiencer (Kihlstrom & Cantor, 1984, 1986).

Conscious perception requires the forging of this link, while conscious recollection requires its maintenance or recovery. Thus, in conscious perception the subject essentially reports access to two mental representations—one of the stimulus event, and the other of him or herself as the *experiencer* (or



the *agent*) of that event. In recall, the subject follows the link from the self to the event; in recognition, the reverse direction is traced. Some recent research indicates that in posthypnotic amnesia these links are broken or weakened, although both representations remain activated (Kihlstrom, 1985b). Thus, recall and recognition fail while priming and transfer effects are spared. A similar kind of process may be involved in the hypnotic hallucinations, especially the negative hallucinations, and in the amnesia that is part and parcel of classic posthypnotic suggestion. Put briefly, it seems that mental representations of some experience, thought, or action become conscious only when a direct link is established and maintained in working memory between them and an activated mental representation of the self. This, literally, is the basis for the phenomenal experience of consciousness of which James wrote. When this situation does not obtain, there occurs a dissociative loss of phenomenal awareness and the experience of voluntary control (Kihlstrom, 1984).

Thus, dissociation creates two conditions essential for the formation of delusions in hypnosis. First, the hypnotized subject is able to believe in a false view of reality—the one suggested by the hypnotist—because he or she is simply not aware of objective evidence to the contrary. But the relevance of hypnosis goes somewhat further than this, because hypnotic subjects are not passive automatons, overcome by the power of the hypnotist's technique. Rather, they actively construct mental representations according to the hypnotist's suggestions, drawing on information supplied by the hypnotist as well as preexisting knowledge stored in memory. However, by virtue of dissociation they fail to recognize their own roles as agents of this constructive process. Delusions occur not just because subjects do not know any better, but also because they are unaware of the internal origins of their current experiences (Johnson & Raye, 1981; see also Johnson's chapter in this volume). Delusional beliefs reflect not only the subjects' lack of access to the contradictory information, but also their lack of awareness of their own role in constructing the experiences, and the fact that the constructive activity was instigated by the hypnotist's suggestion.

This dissociative account of hypnotic delusions may have some bearing on pathological delusions as well. Interestingly, Jaspers (1923/1963) noted that the core of pathological delusions was a "diminished awareness of Being and of one's own existence" (p. 95). Many of the aberrant experiences of the schizophrenic described by Schneider (1959) seem to have dissociative qualities. Auditory hallucinations, for example, may be nothing more than the patient's own thoughts, or vivid mental images constructed from memory (McGuigan, 1966)—except that the patients are not aware of their internal sources, or of their own active role in generating the images. Similarly, thought insertion, and "made" feelings, acts, and impulses have their invol-

untary qualities precisely because the patients are not aware of their actual source in their own mental activities. Jaspers' primary delusion (Schneider's delusional percept) may reflect the priming of some preexisting mental representation by an internal or external event of which the person was not aware.

Still, the analogy between hypnotic and pathological delusions should not be taken too far. Hypnotized subjects are not aware of current environmental stimuli, or of past events, or of the reasons for their current behavior. Moreover, subjects construct hallucinations and delusions in accordance with the hypnotist's suggestions. Even if a loss of awareness plays some part in the formation of pathological delusions, and some sort of dissociative process is responsible for the loss, the parallels end there. The reason is simple: Whereas hypnotic subjects act on suggestion and accept the hypnotist's view of reality as their own, no such instigator or guide is present in the case of psychotic patients. These individuals come up with their delusional beliefs entirely on their own. In order to understand how this happens, however, we should first take a closer look at the nature of pathological delusions themselves.

### Delusions as Explanations

Reed (1974) has noted that delusions are highly valued false beliefs, but they are not *just* that. For example, delusional beliefs are similar to overvalued ideas in that people have a great deal of emotional investment in both, but the two phenomena differ in that the latter often possess some degree of consensual validation, and at any rate are psychologically comprehensible in terms of the individual's personality and life experience. Overvalued ideas typically deal with social, political, and religious issues, while delusions have a more personal, self-referential flavor. Delusions are, first and foremost, beliefs about *oneself*: "Their content is crucially related to the individual's personal fears, needs, or security" (Reed, 1974, p. 144).

Like Jaspers, Reed distinguishes between primary and secondary delusions. Primary delusions consist in the patient's illusory awareness of a change in significance of some object, event, idea, or memory. The deluded patient interprets these primary delusions (e.g., of depersonalization or derealization) in terms of a shift in the schemata, or cognitive structures, that are used to organize and interpret perception, memory, and thought. This event then precipitates an attempt to fit the new meanings into the person's body of world knowledge. By this account, delusional beliefs—secondary delusions—reflect the patient's attempts to describe, form attributions about, and explain primary delusional experiences. These explanations draw on the person's fund of world knowledge and repertoire of inferential processes. Secondary delusions are unusual largely because the experiences they

explain are unusual. Returning to his earlier discussion of overvalued ideas, Reed (1974, p. 152) concludes that delusions are also psychologically comprehensible:

Given the necessary information, the observer can empathize with the subject; if he himself were to have such an unusual experience he would express beliefs about it which would be just as unusual as those of the subject. . . . They can occur in anybody who experiences disturbing phenomena, whilst retaining the ability to think clearly enough to devise explanations of those phenomena.

A more thorough account of the attributional origins of delusional beliefs has been suggested by Maher (1974; Maher & Ross, see also Maher's chapter in this volume). He argues that delusions begin in the individual's unusual perceptual experience—one that is intense and pervasive, but not shared by others. These attributes lead the patient to conclude that the experience is personally significant. Like any strange experience, this unexplained perceptual anomaly arouses anxiety. It also demands explanation, which is arrived at by thought processes that are essentially normal, and the coherence of which is correlated with the intellectual ability of the patient. Of course, the particular explanation constructed by the patient will be shaped by aspects of his or her present and past experience. Moreover, the content of the delusion will be affected by both personal factors such as the person's history of guilty secrets and past triumphs, as well as cultural factors such as his or her society's focus on concealed agents and enemies. In any case, once an explanation is arrived at, the patient experiences relief from anxiety. This outcome diminishes the person's subsequent motivation to question his or her original conclusions, and increases resistance to contrary information.

Maher's essential point is that delusions do not reflect *thought disorder*, but rather that they reflect essentially normal thought processes engaged in by people trying to explain the occurrence of *perceptual disorder*. At a descriptive level, the pathological delusions commonly observed in patients seem consistent with the proposal. Goodwin and Guze (1984, p. 43) write:

Common delusions in schizophrenia are those of persecution and control in which patients believe others are spying on them, spreading false rumors about them, planning to harm them, trying to control their thoughts or actions, or reading their minds. Patients may express the belief that they are the victims of conspiracies by Communists, Catholics, neighbors, the FBI, etc. Delusions of depersonalization are also common. These may be feelings that bizarre bodily changes are taking place, sometimes as a result of the deliberate but obscure actions of others. . . .

In addition, patients may show delusions of being possessed by demonic forces, or of being inanimate objects. On the surface, at least, these contents

appear to reflect the sorts of explanations that people could give for anomalous perceptual experiences.

Other descriptive data are also consistent with Maher's proposals. For example, he argues that the age of onset of the perceptual anomaly determines the extent of the delusional explanation. That is, anomalies with an early onset may be less likely to demand explanation, simply because they have become ego-syntonic, and thus part of the individual's normal experience. In fact, it seems that delusions are most likely to be observed in cases of acute schizophrenia in which the patient has had a history of good pre-morbid adjustment. There is also the extensive literature indicating that paranoid patients, who characteristically show delusions, have higher levels of cognitive functioning than other schizophrenics.

Although these observations are consistent with Maher's proposal, formal empirical tests are difficult to come by. It is, of course, extremely difficult to catch acute schizophrenics at precisely the time of their initial breakdown—when presumably they first form their delusions. And, of course, we cannot induce schizophrenic episodes in normal subjects in order to watch their thought processes at work. Of course, it *is* possible to induce psychotomimetic phenomena in normals through psychedelic drugs and sensory deprivation. In fact, Maher notes that such procedures often elicit delusional thoughts in otherwise normal experimental subjects. However, there is a subtle problem with this kind of evidence. The attributional hypothesis asserts that delusions are secondary to the individual's *unexplained* anomalous experiences. But experimental subjects are aware that they are participating in an experiment involving the administration of drugs or sensory deprivation. Because they have at hand a satisfactory explanation for any unusual experiences that might occur—they know that they have just been given a drug, or that they are suspended in a water tank—there should be no motive to come up with a delusional explanation. Thus, Maher's proposal is extremely plausible, but it has not yet been subjected to empirical test.

### **Delusions and Posthypnotic Suggestion**

Hypnosis would seem to offer the possibility of such an empirical test. As noted earlier, anomalies of perception, memory, thought, and action are part and parcel of the experience of hypnosis and can be readily induced in hypnotizable subjects by means of suggestion. Moreover, by means of posthypnotic amnesia it is possible to restrict the subject's conscious awareness that the true source of these experiences resides in the hypnotist's suggestion. Under these circumstances, if the subject has an unexplained anomalous experience, we should expect to observe delusional explanations of the kind discussed by Maher.

In fact, clinical and experimental lore on hypnosis included many such observations. In the phenomenon of posthypnotic suggestion, for example, it is suggested that the person will perform some action in response to a prearranged cue; it is further suggested that the individual will not remember that a suggestion to this effect was given during hypnosis. On the Stanford Hypnotic Susceptibility Scale, Form A, for example, it is suggested that the subject will shift from one chair to another when the experimenter raps a pencil on the desk (Hilgard, 1965). A substantial proportion of subjects respond positively to this suggestion, with concomitant amnesia. When asked why they switched chairs so abruptly in the middle of the experiment, they will commonly confabulate a reason. This explanation is typically plausible and rational, so it does not have all the qualities of a full-fledged delusion. Yet it is an incorrect explanation, arrived at through the subject's attempt to understand (and explain) why he or she did something out of the ordinary. Thus it is the stuff of which genuine delusions are made.

Similar observations have been made in cases of automatic writing, or in cases of uncanceled hypnotic suggestions that persist after hypnosis has been terminated, outside the experimental context. Consider, for example, the results of an experiment on posthypnotic suggestion by Damaser (1964; see also Hoyt & Kihlstrom, 1986; Orne, 1970). In this study, a small group of highly hypnotizable subjects received a suggestion that they mail one postcard per day to the experimenter. When they were aroused from hypnosis, they opened their eyes to find a stack of 150 preaddressed, stamped postcards waiting for them. Although the experimenter never referred to the postcards in the normal waking state, all the subjects took the cards with them when they left the laboratory. A control group was hypnotized, but received the instruction about the postcards in the normal waking state. A third group received both the posthypnotic suggestion and the waking instruction.

As it happens, compliance was poorest among subjects who received only the posthypnotic suggestion, and the experiment was terminated after 69 days. But in the present context, more interest attaches to the subjects' reflections concerning their behavior. Many of the highly hypnotizable subjects, who were densely amnesic for the events of the hypnotic session, attributed their behavior to something that had occurred during hypnosis—regardless of whether, in fact, they had received a posthypnotic suggestion. Some of the control subjects inferred, incorrectly, that they had been given a posthypnotic suggestion that countermanded the waking request. One control subject, who was relatively insusceptible to hypnosis and thus had no posthypnotic amnesia, falsely concluded that he had been given a posthypnotic suggestion precisely because he did not remember that anything had been said about postcards during hypnosis.

An experiment by Zimbardo, Andersen, and Kabat (1981) also illustrates the way in which delusions might arise as a result of posthypnotic suggestion. The experiment involved a group of highly hypnotizable subjects, known to be capable of responding positively to suggestions for both partial deafness and posthypnotic amnesia. None of the subjects showed evidence of preexisting psychopathology, and in fact individual differences in hypnotizability were uncorrelated with indices of neurosis or psychosis. During an otherwise routine hypnosis session, some of these subjects were given a posthypnotic suggestion that they would experience partial deafness whenever a particular visual cue was presented; others were given a suggestion that they should scratch their left ears when the cue appeared. Half the deafness subjects, and all the scratching subjects, also received a suggestion of posthypnotic amnesia.

The posthypnotic cue was visually presented while the subjects were engaged in a problem-solving task with two experimental confederates, who were at the time talking with each other in a normal tone of voice at some distance from the subject. Independent raters, blind to the conditions of the experiment, then rated the subjects on a number of scales of emotional arousal and paranoid tendencies. In addition, the subjects completed a set of self-ratings of affect, and wrote stories to TAT cards depicting ambiguous relationships. Although the effects were somewhat weak, the trends were all in the predicted direction. Those subjects given suggestions for deafness plus amnesia experienced more dysphoria, and more signs of paranoia, than comparable groups who received suggestions for deafness alone, or for scratching plus amnesia.

The measures of paranoia employed by Zimbardo et al. included aspects other than delusions. Nevertheless, assuming that at least *some* delusional content was tapped by the paranoia measures, the findings are consistent with the attributional account. Of course, the deafness group without amnesia had a ready, and correct, explanation for their problem: They were able to remember that it had been suggested to them earlier. The amnesic group did not remember, and, hearing the confederates "whispering," the explanations they concocted on their own commonly took the form of delusions of conspiracy and secrecy. It is important to note that the same sorts of delusions did not form in the group given a posthypnotic suggestion, with accompanying amnesia, for scratching their ears. In this case, however, it is likely that the posthypnotic response was not experienced as anomalous—if indeed it was given any notice at all: We scratch our ears all the time, automatically and unconsciously. Thus, there was nothing to explain, and no opportunity for a delusion to arise.

The importance of conscious awareness of anomalies is underscored by a recent extension of Damaser's (1964) experiment (Hoyt & Kihlstrom, 1986).

In this study, subjects received a suggestion of amnesia for a list of words memorized during hypnosis. After an initial test of posthypnotic amnesia, they were asked to mail one postcard a day to the experimenter, reporting whatever they could remember of the list. In addition, the subjects were given a posthypnotic suggestion to underline the preprinted date on each postcard as they filled it out. The request to mail the postcards was made in the normal waking state; although the task itself was somewhat intrusive the subjects were aware of its rationale. The posthypnotic response of underlining the date, however, was quite unobtrusive. Although the subjects responded to the suggestion at a high rate, they did not develop any delusions concerning their behavior.

Thus, the attributional account of delusions receives some tentative support from the results of experiments on posthypnotic suggestion. In these studies, hypnosis was employed as a technique for inducing anomalous experiences and behaviors in subjects, and for preventing them from becoming aware of the origins of these anomalies. Apparently, the subjects' efforts to account for their experiences led them to develop delusional ideas and other features typically associated with clinical paranoia. Therefore, it seems appropriate to examine the attributional account of delusions in light of contemporary trends in the psychology of human thought.

## ATTRIBUTIONS, INFERENCES, AND DELUSIONS

During the early years of the cognitive revolution investigators of thinking and problem solving focused on normative rationality: categorization in terms of proper sets, syllogistic reasoning, and the like. These trends reflected the common conceptualization of persons as naive scientists, attempting to classify, explain, and predict events in their worlds—trends reflected in the classic literature on thought disorder in schizophrenia, as reviewed by Chapman and Chapman (1973). Beginning in the early 1970s, however, there occurred a dramatic shift in the conceptualization of thought processes. Without abandoning the model of persons as scientists, this contemporary work questions, if it does not abandon, the assumption of normative rationality. Thus, Tversky and Kahneman (1974) began to argue that human judgment is based on heuristic principles rather than algorithms, and Nisbett and Ross (1980) pointed to a number of biases and shortcomings that affect judgments of every sort. The history of this empirical and theoretical effort forms an important backdrop for testing the attributional account of delusions—whether those tests occur with clinical patients suffering from psychosis or with experimental subjects serving in a laboratory analog.

### Normative Inference Rules

Since the seminal work of Heider (1944, 1958), cognitive and social psychology has made important advances in understanding the process of causal explanation—an enterprise known as attribution theory (for reviews, see Kelley, 1972; Kelley & Michela, 1980; Ross & Fletcher, 1985). The earliest formal theory of causal attribution, elaborated by Kelley (1967), consisted of a set of logical or normative inference rules patterned after the analysis of variance. Essentially, Kelley proposed that individuals abstracted, over multiple observations, information concerning the consensus, consistency, and distinctiveness of events, and used this information to attribute these events to the actor, to the target of the action, to the context in which the action occurred, or to some interaction among these factors. For example, Kelley argued that high levels of consistency coupled with low levels of distinctiveness and consensus drive attributions toward the actor. In the first empirical test of the theory, McArthur (1972) showed that the "covariation calculus of causal attribution" (Brown, 1985) could predict with reasonable accuracy the attributions made by subjects given various combinations of consistency, distinctiveness, and consensus information. More recently, Brown (1985) has shown that the calculus can account for a wide variety of real-life attributional phenomena, from the thoughts of the characters in *A Long Day's Journey into Night* to the blame assigned for the deaths at the Cincinnati Who concert.

Kelley's calculus was subsequently adapted by Weiner and his colleagues (Weiner et al. 1972) in a model of attributions concerning performance outcome in achievement situations. The model is somewhat complex because the canonical elements of actor, target, and context, on the one hand, and consistency, distinctiveness, and consensus, on the other, do not map directly onto achievement situations. Weiner argued that the basic attributional possibilities in such situations were ability, effort, task difficulty, and luck; these can be classified as internal (ability and effort) versus external (difficulty and luck), and as stable (ability and difficulty) versus variable (effort and luck). In general, Weiner argued, high consistency drives attributions toward stable factors (such as ability and difficulty), while low consensus drives attributions toward internal factors (such as ability and luck). However, the nature of the outcome—success or failure—complicates the attributions: In general, we tend to attribute successes to internal factors and failures to external factors. Again, experiments by Frieze and Weiner (1971) showed that the adapted calculus accurately predicted people's attributions concerning success and failure. More recently, Abramson and her colleagues have extended the general model to take account of individual differences in prevailing mood state and in attributional style (e.g., Abramson, Seligman, & Teasdale, 1978).



The covariation calculus seems intuitively plausible, and it is supported by considerable empirical data. Nevertheless, its applicability to schizophrenic delusions is doubtful. Let us assume, for purposes of employing the covariation calculus, that the anomalous experiences of schizophrenics are highly consistent, indiscriminate, and have low consensus: They occur repeatedly, in a wide variety of situations, and to few other people. In Kelley's model, then, the schizophrenic should conclude from the covariation calculus that the origins of these experiences lie within the actor—that is, within the schizophrenic him- or herself. A similar prediction is made by Weiner's model. The combination of high consistency and low consensus should lead to attributions involving stable, internal factors. The problem is that these attributions are precisely those that schizophrenics do *not* draw. The delusions of persecution and control that figure so commonly in the presenting complaints of paranoid schizophrenics invoke *others*—Martians, the CIA or KGB, someone's spell—as the source of the patient's anomalous experiences. Because schizophrenics make external rather than internal attributions, it appears that we cannot look to the covariation calculus for an explanation of how they arrive at their deluded explanations for their anomalous experiences.

After Kelley's proposal appeared, there ensued a substantial debate over whether people in fact used these rules as assiduously as Kelley seemed to suggest they did, and the accretion of a butterfly collection of heuristics, biases, and other errors that affect the attributions that people make (Nisbett & Ross, 1980; Reeder & Brewer, 1979). This point of view has been systematized to some extent in a theoretical approach known as judgment heuristics theory. It should be noted that this theory, and the research on which it is based, remains somewhat controversial. It is by no means clear that the shortcomings in human judgment and inference are as pervasive as the strong form of judgment heuristics theory suggests (Hastie, 1983; Sherman & Corty, 1984). Nevertheless, from this literature we can identify a number of heuristics, errors, and biases that may serve to generate or maintain delusions or false beliefs about the nature of anomalous experiences. The strong version of judgment heuristics theory is not necessary for this exercise. All that is required is acceptance of a weak form stating that human judgment and inference are not always logical and rational, and that certain types of errors creep into the process.

### **Expectation and Arousal, Explanation and Affect**

A revised attributional account of delusions should begin at the same place as the original: with the assumption that schizophrenics generate causal explanations concerning their own perceptual-cognitive experiences—that is,

things that happen to them. A man predisposed to schizophrenia, walking down the street minding his own business, suddenly and unexpectedly has an anomalous experience—he hears his name, perhaps; or he has an abrupt shift in the direction of his stream of thought, or the stream stops entirely. Or he momentarily loses his balance or motor coordination; perhaps a strange or unpleasant idea crosses his mind, or a vague feeling sweeps over him. These are some of Schneider's first-rank symptoms of schizophrenia. According to some contemporary theories, these symptoms reflect a perceptual-attentional disorder that is the fundamental psychological deficit in schizophrenia (Kihlstrom, 1983b).

But the schizophrenic himself does not know this. All he knows is that something unusual has happened to him. Assuming that this is the onset of an acute psychotic attack, nothing like it may ever have happened before; or, at least, similar occurrences will have been rare. The occurrence of such an unexpected event will have two consequences. First, the person will initiate a search for the cause of that event, or at least some predictors of it. People seem to have a general propensity toward causal explanation (Mischotte, 1963), but anomalous, unexpected, schema-incongruent events especially demand explanation (Hastie, 1985). In addition, the subject's orientation to the event will increase his or her level of autonomic arousal (Mandler, 1984). Although some theories have held that unexplained arousal is affectively neutral, there exists considerable evidence that carries a negative affective valence (Marshall & Zimbardo, 1979; Maslach, 1979; Maslach, Marshall, & Zimbardo, 1979)—just as unpredictable events seem to arouse anxiety (Mineka & Kihlstrom, 1978). Thus, the anomalous event is both unpleasant and demands explanation.

### Self-Other Differences

In this context, it is important to recall the assertion by Jones and Nisbett (1972) that attributions made by actors to explain their own behavior differ considerably from those the same individuals would make to explain the behavior of other people. As they put it, "There is a pervasive tendency for actors to attribute their actions to situational requirements, whereas observers tend to attribute the same actions to stable personal dispositions [of the actor]" (1972, p. 80; see also Albright & Kihlstrom, 1986; Watson, 1982). If the Jones-Nisbett hypothesis is correct, then schizophrenics seeking explanations for their anomalous experiences will look to the environment outside them. This is especially the case with unpleasant events: Greenwald (1980; see also Greenwald & Pratkanis, 1984) has noted a beneffectance bias in causal attribution, such that people perceive themselves as responsible for positive outcomes and tend to deny responsibility for negative outcomes. If

we can generalize from the outcomes of actions to the affective valence of experience, then it would seem especially likely that acute schizophrenics would look to the environment, rather than themselves, for explanations for their experiences. This, in fact, they seem to do.

### Contiguity, Precedence, and Saliency

Kelley and Michela (1980) have noted that causal attributions are also influenced by certain assumptions that people intuitively make about causal relations. For example, people seem to assume that causes and effects are spatially and temporally contiguous—that effects occur near to their causes in space and time. (In addition, people seem to assume that causes appear prior to effects.) Finally, there seems to be a saliency bias, such that people tend to attribute causal significance to the most salient aspects of the perceptual field at the time that the event actually occurred (Taylor & Fiske, 1978). Returning to our acute schizophrenic, suppose that something else unusual has happened to him that day. He got a solicitation in the mail from a radical political group, or he heard a radio broadcast about the search for extraterrestrial life, or a spy was captured in Germany. Or, he refused the request of a street person for money, and was cursed violently by the solicitor. These things happen. The schizophrenic, unknowingly experiencing the early stages of an acute episode, is likely to perceive the event in the environment as somehow connected—causally connected—to his perceptual-cognitive anomalies.

### The Fundamental Attribution Error

The environment, of course, includes other people. From a social-psychological perspective, people are the most salient aspects of the external world (Cantor, Mischel, & Schwartz, 1982). It would seem likely that schizophrenics, in making judgments about the causes of their anomalous experiences, would focus on the people around them. Thus, in the course of explaining his own experiences, the schizophrenic comes naturally to focus on the actions of others. Having made the judgment that other people are somehow involved in causing his anomalous experiences, the schizophrenic is led to ask the next question: *Why?* At this point, somewhat paradoxically, the covariation calculus becomes relevant once again.

Although she confirmed the general outlines of the covariation calculus, McArthur (1972) also observed that consensus information—the actions and experiences of other people—had relatively little impact on causal attributions. This departure from normative inference was reflected in a general tendency for subjects to attribute an actor's behavior to the actor, regardless

of the pattern of available information—a tendency anticipated by Heider and enshrined by Ross (1977) as the Fundamental Attribution Error (see also Jones, 1979; Nisbett & Ross, 1980). This bias is so fundamental, at least with English-speaking people (and perhaps universally), that it has been enshrined in language: There are far more action verbs than the derived adjectives of which are attributive to actors than to targets (Brown & Fish, 1980).

Once an effect has been attributed to an actor, the next question is *why*—that is, what internal dispositions led the actor to behave as he or she did? The movement from acts to dispositions has been traced by Jones and Davis (1965) in their theory of *correspondent inference*. The theory holds that people assume that actions correspond to intentions, and that intentions correspond to dispositions. Therefore, dispositions can be inferred directly from actions. Jones and Davis hold that the assumption of correspondence is especially strong under conditions of *hedonic relevance*—that is, when the actor's behavior affects the perceiver's welfare. Such conditions obviously obtain in the case of the schizophrenic's unpleasant anomalous experiences. Further, these unpleasant effects should be assumed to correspond to hostile, aggressive, unfriendly dispositions on the part of the actor.

In this way, the apparent paradox of the covariation calculus—that schizophrenics make external attributions when they should make internal ones—may be resolved by tracing a two-step process. First, by virtue of the self-other difference in causal attribution, and the beneficence bias in self-attribution, their unpleasant, anomalous experiences are attributed to factors residing in the external environment, and particularly to the behavior of others. Then, by virtue of salience and the fundamental attribution error, the behavior of others is attributed to their internal dispositions—their abilities, traits, attitudes, beliefs, and intentions. Finally, by virtue of correspondent inference, others are characterized as hostile in intent. At this point, we have attributions that somewhat more closely resemble the delusions of persecution and control by others that characterize the paranoid schizophrenic.

### Judgment Heuristics

Self-other differences in causal attribution, the fundamental attribution error, biased hypothesis testing, and the like all illustrate some of the departures from normative inference that affect information processing in general, and causal attribution in particular. Beginning in 1972, an important series of papers by Kahneman and Tversky started to outline another set of such departures, collectively described as judgmental heuristics—in contrast to judgmental algorithms (e.g., Kahneman & Tversky, 1972, 1973, 1982; Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1973, 1974, 1982).

Algorithms are judgmental procedures that adhere to the rules of logical inference, and that are guaranteed to yield the correct solution. Unfortunately, there are some circumstances in which algorithms cannot be applied. Under conditions of uncertainty, either no algorithm is suitable to the task at hand or the information needed by an algorithm is not available. Even when an appropriate algorithm is available, and the person has access to all the information necessary to its use, the procedure still may not be employed. The reason for this is that human judgment is constrained by capacity limitations on human information processing. Algorithms are often complex, and we may not be able to handle all the information that is needed to employ them, especially under conditions of time pressure, low motivation, or—somewhat paradoxically—high personal involvement.

Under such circumstances, people seem to shift to heuristics—shortcut approaches to judgment that violate one or more rules of normative inference, but that nonetheless have some likelihood of leading to the correct solution to some problem. Heuristics are useful precisely because they are shortcuts: They permit judgments to be made when algorithms or the information algorithms require are not available, or when the requirements of a judgmental task exceed available cognitive capacity. Unfortunately, the fact that heuristics depart from the rules of logical inference means that their use increases the risk of error—that the judgment made may be wrong. Errors are produced because judgmental heuristics ignore or misuse information in a way that algorithms do not. In fact, observations of systematic errors and biases in judgment provide the most compelling evidence that people do in fact use heuristics in judgment. Kahneman, Tversky, and their colleagues have identified four major heuristic principles guiding judgments of frequency, likelihood, co-occurrence, and causality (for reviews, see Kahneman, Slovic, & Tversky, 1982; Sherman & Corty, 1981).

In *representativeness*, judgments are based on the degree to which any sample event is similar to the presumed parent population of that event. In a causal context, this means that people tend to assume that the features of a causal agent ought to resemble the features of its outcome: Weird, unpleasant effects should have weird, unpleasant causes. Kelley and Michela (1980) suggested that a similarity principle may account for such phenomena as conspiracy theories of political assassination. Such theories are not necessarily paranoid (or even necessarily incorrect), but similarity may underlie the kinds of conspiracy theories to which paranoid patients are prone. Additionally, people's causal judgments seem to be greatly influenced by their a priori theories about causation: If someone has the idea that many unpleasant events in the outside world reflect the activities of an international terrorist conspiracy, those same terrorists may be held responsible for unpleasant internal events as well. Thus, in seeking an explanation for his or her distress-

ing anomalous experiences, the person experiencing them may be especially likely to focus on members of out-groups, individuals and classes of people who are generally feared in his or her culture, and the like.

In *availability*, judgments are affected by the ease with which specific instances can be brought to mind. Availability is observed whenever judgments are inordinately influenced by concrete, vivid, extreme cases. In a causal context, availability may be illustrated by perceptual salience, which affects judgments of causality by drawing attention to certain events in the internal or external world. In one respect, this only makes sense: Causal attributions are made when people search for explanations or predictors of surprising or unexpected events. In this process, their attention naturally focuses on other events that are also surprising or unexpected. After all, a routine event—something that happens all the time—cannot be a very good predictor of a rare event, because the probability of the rare event, given the occurrence of the routine event, must be relatively low. Accordingly, the search for predictors of unexpected happenings must focus on relatively infrequent causal agents. Given that all vertebrate organisms possess a capacity for classical conditioning—that is, an ability to determine the contingent relations between CSs and USs—it may be that the salience bias in judgments of covariation is part of our phylogenetic endowment.

The *simulation* heuristic is conceptually similar to availability, in that the basis for judgment is the ease with which a plausible scenario can be constructed mentally. For example, judgments of causality may be affected by the ease with which the person can imagine a path from a presumed cause to a known effect. Prediction in advance, given knowledge only of potential causes, is of course difficult and uncertain. However, given sure knowledge of outcomes, it is often an easy matter to trace causal links to prior events—even if the purported causes are totally unrelated to their ostensible effects. These errors are frequently made by psychoanalysts, biographers, and others who try to explain the actions of individuals in terms of prior events drawn from a rich body of historical knowledge. By virtue of simulation, events appear to be inevitable consequences of their antecedents.

Again, consider an acute schizophrenic searching the environment for a likely cause of his or her anomalous experiences. Salient objects and events—a honk or a wave from a passing driver, perhaps, or a member of a minority group standing on a street corner—will inevitably draw attention, and be given special weight as likely causes of the troublesome internal events. If there is nothing salient in the perceptual field, salient events retrieved from memory—a curse uttered in anger by a coworker, perhaps, or a sin unconfessed to a priest—may seem to be involved. If no event is generated by the availability heuristic, through either perception or memory, the simulation heuristic may come into play. The person may imagine possible causes, and

grasp the first one that comes to mind as the most likely explanation. Perhaps someone slipped something into his morning coffee; perhaps there is a conspiracy afoot to prevent him from becoming aware of the true reasons for his experiences.

While representativeness, availability, and simulation seem to be involved in the initial generation of irrational causal explanations, another heuristic, *anchoring and adjustment*, may be important in the maintenance of such explanations. Many judgments begin as hypotheses, tentative conclusions that can be revised on the basis of newly arriving evidence. However, it has long been appreciated that final judgments are inordinately influenced by first impressions: The initial judgment serves as an anchor on the final one, in that there is relatively little subsequent adjustment. The heuristic of anchoring and adjustment reflects a general tendency to rely on initial or partial judgments, giving too little weight to newly obtained information. Although this heuristic plays a role in judgments of magnitude and frequency, it can also influence judgments of causality. By virtue of its use, judgments of causality tend not to accommodate to new information that should instigate revision. Instead, knowledge gained subsequent to the initial judgment may be distorted so as to fit the original causal theory.

### **Anomalies in Hypotheses Testing**

Delusional explanations and other erroneous judgments are also maintained by other processes. While initial judgments may be regarded as hypotheses, we are not always given the opportunity to actively test them by collecting additional data. If we had such an opportunity, of course, the rules of normative inference would make us behave the way professional scientists are supposed to behave in the course of formal experimentation. That is, we would search for information that is inconsistent with our hypothesis—or, better, for information that is diagnostic with respect to our hypothesis, consistent with the hypothesis but inconsistent with some plausible alternative. Instead, people seem to adopt nonoptimal hypothesis-testing strategies. Thus, Snyder and Swann (1978) claimed that subjects tended to adopt verificationist strategies, seeking and paying special attention to information that is consistent with their hypothesis. Alternatively, Fischhoff and Beyth-Marom (1983) argued that people tend to adopt inefficient strategies of hypothesis testing, wasting effort on nondiagnostic data (see also Trope & Bassok, 1982). The outcome is the same in both cases: People tend to hold onto incorrect hypotheses long after they should have been abandoned.

Another inferential shortcoming contributing to the maintenance of incorrect hypotheses is the *feature-positive effect*—the tendency to focus on the positive/positive cell in the contingency matrix. Having initially observed an

(adventitious) association between some external event and some anomalous experience, repetitions of the event experience would ordinarily give the person repeated opportunities to observe the actual correlation between the two events—that is, to assess the conditional probability of the experience, given that the event has occurred. However, judgments of contingency and covariation often seem to be based only on the number of co-occurrences, and people tend to ignore the information provided by nonoccurrences. Thus, even though the actual association may be random, the feature-positive effect will lead individuals to focus attention, and memory, on instances when both the effect and its presumed cause were present. Furthermore, formal hypothesis testing is known to be inefficient, and some claim that it is subject to a confirmatory bias. Thus, again, if individuals seek to test their attributional hypotheses, they will retain incorrect ones longer than would be the case if they sought out diagnostic information.

In either case, it seems unlikely that people will subject their initial causal judgments, however derived, to rigorous testing. Left to their own devices, the normal and the schizophrenic alike will fail to turn up much information that definitively contradicts their hypotheses. And when confronted with representative data, people selectively encode and retrieve events that are consistent with it. The most clever, faced with incongruent information, will find a way to discount or rationalize it, and perhaps incorporate the rationalization into the explanatory system itself. For these reasons, delusions and other irrational explanations would not seem to be self-correcting as long as the anomalous experiences that they are designed to explain persist, and in the absence of any better explanation. In this context, we note with interest a report that delusions remit as schizophrenics recover from the acute phase of illness (Sacks, Carpenter, & Strauss, 1974), and a case study in which a nonpsychotic patient's delusional belief was corrected by means of attributional therapy (Johnson, Ross, & Mastria, 1977).

### **Why Are Schizophrenics so Vulnerable to Delusions?**

The judgments and inferences made by ordinary people are often governed by heuristics, and so are subject to certain shortcomings and biases, at least to some degree. However, ordinary people are not usually thought of as delusional. So what makes schizophrenics special in this respect? One answer, of course, is that schizophrenics have more anomalistic experiences to explain, and the fact that these schizophrenic anomalies are relatively rare in the population means that there aren't readily available the sorts of normative explanations that the rest of us use—when, for example, we get a headache or toothache. Schizophrenics have more to explain, and more that is mysterious, which means that they have more need to reduce anxiety by



finding a causal explanation. Normals, whose anomalies (if indeed they have them at all) are quite minor, may be more likely to pass the episodes off as "just one of those things."

Just as important, we have the evidence from Chapman and Chapman (1973; see also their chapter in this volume) that schizophrenics manifest excessive yielding to normal response biases. Heuristics are employed, when they are employed, in order to save cognitive effort. They reduce complex judgmental tasks to manageable proportions, and diminish task demands on information processing. In this context, we note in passing the important role historically ascribed to attentional deficits in schizophrenia. If schizophrenics have less attentional capacity than normals, or less ability to deploy attention effectively, they will be even more reliant on heuristics, and so more likely to exhibit the delusions and other disorders of thought that reflect the operation of judgmental heuristics.

Moreover, because schizophrenia tends to run in families, these cognitive biases and shortcomings are likely to be shared by other individuals around him or her. This means that a young schizophrenic has a social environment that provides lots of opportunities to pick up delusional explanations through social learning—by example, if not precept. This factor, of course, is what saves us from the possibility that judgmental biases and shortcomings are not as prevalent as claimed. Nobody asserts that human judgment and inference are perfectly rational, and unerringly follow the rules of normative inference. All the argument requires is that people fall short at least a little—a tendency that could be magnified by schizophrenia.

## SOME NEW DIRECTIONS FOR RESEARCH

On the basis of our analysis, we can offer some directions for studying the nature of delusions. First, to return to the title of this chapter, there is the use of hypnosis and other special states of consciousness as laboratory models for the study of the formation of delusions and other symptoms of psychopathology. Hypnosis is of special interest here, because it seems to afford, in hypnotizable subjects, a means of inducing subjectively compelling anomalies in experience, thought, and action. The research of Zimbardo et al. (1981) opens up a new avenue of approach to experimental work on the delusional process, using hypnotic and posthypnotic suggestion as a laboratory model. Of course, the success of the model is determined wholly by the degree to which hypnotic subjects are denied access to correct explanations for their experiences. In fact, hypnosis permits just such a denial of information. For example, posthypnotic responses can occur outside the experimental setting in which they were suggested, and even in the absence of the

hypnotist. This reduces the likelihood that subjects will (correctly) attribute their anomalous experiences to some prior hypnotic session. The likelihood is reduced still further by the fact that subjects' memories for the suggestion can be controlled by means of suggestions for amnesia. If the attributional explanation is correct, delusions should form, as they did in the Zimbardo experiment, when subjects are amnesic for the hypnotic suggestion that is the true source of their experience; but they should drop the delusion as soon as the amnesia suggestion is canceled, and memory restored.

Other sorts of advantages accrue to the use of hypnosis as a laboratory model. For example, posthypnotic suggestions and their accompanying amnesias can remain in effect over a considerable period of time. This would allow the investigator the opportunity to watch delusions evolve and solidify over time. Moreover, the use of explicit hypnotic suggestions gives the investigator a great deal of control over the nature of the anomaly to be induced. For example, it would be possible to disrupt perception, memory, voluntary action, or any combination of the three, and see if delusions changed accordingly. It would also be possible, as the Zimbardo experiment shows, to induce anomalies of varying degrees of subtlety. Finally, the effects of hypnotic suggestion are easily reversible, so that it should be possible to observe the fate of the delusion when the true source of the anomalies and discontinuities is made known to the subject.

Next, of course, there is the study of deluded individuals themselves. Beginning with the work of Von Domarus, Goldstein and Scheerer, and others, there has been a long tradition of the study of thought disorder in schizophrenic individuals (Chapman & Chapman, 1973). The judgmental heuristics approach puts a new perspective on schizophrenic thought disorder by providing a new theoretical perspective and a new set of experimental tasks. We may look forward to a host of studies in which the paradigms now used to study normal judgment and inference are applied to the pathological case (for analogous expectations in the domains of perception and attention, see Kihlstrom, 1983). Of particular interest would be the longitudinal study of people who are at risk for the kinds of syndromes in which delusions appear. It should be possible to inoculate such people against delusions, even if it is not possible to prevent them from suffering the primary psychological deficits.

Moreover, there is the continued study of the shortcomings of normal judgment and inference. As Hastie (1983) and Sherman and Corty (1984) have noted, the judgmental heuristics approach is currently incomplete. We know relatively little about such matters as the conditions that invoke heuristic as opposed to normative inference procedures, or the types of tasks in which one heuristic will be employed as opposed to another. Experimental psychopathology will advance only with improved theoretical understanding of normal cognitive, social, developmental, and psychobiological processes.

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