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TARGET ARTICLE

The Law of Cognitive Structure Activation

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Recent psychological research has provided abundant evidence that when a stimulus is ambiguous enough to be encodable as an instance of multiple cognitive structures (e.g., constructs, scripts, events, or specific objects) the stimulus will be encoded as an instance of the structure that is the most highly active in memory and the most semantically similar to the stimulus. We suggest that this robust phenomenon be labeled the law of cognitive structure activation. *In the first part of the article, parameters of the law are discussed. In the second part, possible applications of the law to judgmental, personality, and behavioral processes that span cognitive, clinical, developmental, and social psychology are explored.*

Psychology has often been criticized for its inability to produce general laws that can bridge different areas of research. As Koch (1981) pointed out, "When the details of psychology's 100-year history are consulted, the patent tendency is toward theoretical and substantive fractionation (and increasing insularity among the `specialties'), not integration" (p. 268). Similar views are expressed by C. Taylor (1973): "Psychology is a vast and ramified discipline 'containing] many mansions [and] intellectually divided against itself" (p. 55).

Furthermore, psychology has been taken to task because of the seemingly temporary nature of many of its theoretical constructs. Consider Campbell and Misanin's (1969) comments on the once-dominant idea of a generalized drive state:

> Few, if any psychologists now believe that those conditions once labeled basic drives, such as hunger, thirst, sex, and maternal behavior, are predominantly governed by some common underlying generalized drive state. Even if there is some activating or energizing state common to many basic drives, it is clear that the specific behaviors elicited by those drives are controlled by a complex of interactions among environ-mental stimuli, hormonal states, physiological imbalance, previous experience, etc., and that the basic drive concept is of little value in unraveling these complexities. (p. 77)

Certain philosophers of science have argued that this demonstrated inability to discover and develop lasting laws of psychology should be expected: The pursuit of general laws that can be used to explain human thought and behavior is inherently a futile endeavor. As Koch (1981) put it,

> On an a priori basis, nothing so awesome as the total domain comprised by the functioning of all organisms (not to mention persons) could possibly be the subject matter of a coherent discipline. . . . It should be emphasized that paradigms, theories, models (or what-ever one's labels for conceptual ordering devices) can never prove preclusive of alternative organizations. (p. 268)

Despite these criticisms, we believe that general laws can explain behavior across a wide range of circumstances. (Koch labeled this belief as reflective of "moral bankruptcy" [p. 269] - a label that we suspect our students, friends, and spouses would definitely agree is applicable to us.) In particular, we believe that the law of cognitive structure activation can significantly enhance our understanding of thought and behavior and can provide a "theoretical umbrella" to unite the empirical findings from several diverse content areas within psychology. In this article, we present the law of cognitive structure activation, selectively review some of the illustrative empirical results from cognitive and social psychology that demonstrate how cognitive structure activation affects the processing of social and nonsocial stimuli, and discuss the application of the law to several different content areas in psychology.

Activation of Cognitive Structures and Impact on Thought Processes

One of the fundamental propositions of modern psychology has been that a primary determinant of how people under-stand and interpret new stimuli is past knowledge. That is, people understand the world by relating what they are currently experiencing to the knowledge that they have previously accumulated. Much of this knowledge is thought to be organized into cognitive structures. A cognitive structure is the mental representation of an object or idea. Examples of cognitive structures are the mental representations of general semantic categories (personality traits, university pro-

fessors, introverted people), scripts (going to a restaurant, changing a tire, going to a football game), procedures (making an inference, solving a problem, executing a well-practiced behavior), specific event memories (your graduation day, your wedding day, your trip to Europe), and specific people or objects (your mom, your computer, your pet).

Obviously, we have a large number of cognitive structures that could be applied to new stimulus input. After all, many people, objects, and events are multifaceted: They can be understood in terms of a variety of cognitive structures. However, people, objects, and events seem typically to be thought of in terms of only one or two cognitive structures at a time. As an example, consider the 1988 presidential candidacy of Rev. Jesse Jackson. Many people seemed to think of his candidacy only in racial terms. Yet, there were other legitimate ways that one could have thought of his campaign. Why did people not typically think of Rev. Jackson in terms of the issue of "a political preacher," an issue that was brought up frequently with respect to another candidate, Rev. Pat Robertson? Or, why did people not typically think of Rev. Jackson in terms of his progressive political agenda?

We believe that one answer to these types of questions lies in the notion of cognitive structure activation. Available cognitive structures in memory can be activated to various degrees. Activated cognitive structures, in turn, are likely to be employed in the processing of new stimulus input. The law of cognitive structure activation is an empirical generalization that specifies the conditions under which an activated structure will be used to process new stimulus input. The law can formally be stated as follows:

> When a stimulus is ambiguous enough to be encodable as an instance of multiple cognitive structures, the stimulus will be most likely encoded as an instance of that cognitive structure that is the most activated in memory and is the most semantically similar to the stimulus. This encoding will, in turn, affect structure-relevant judgmental and behavioral processes.

Hence, when several different cognitive structures are semantically similar to a given stimulus, the law of cognitive structure activation states that the most active structure will capture the stimulus input. An example of the idea of "capturing the stimulus input" comes from studies in social psychology. When an experimental procedure activates a particular structure in subjects' memory, and if that structure is semantically applicable to a stimulus person's behavior, subjects will tend to categorize the stimulus person's behavior as an instance of that structure and will subsequently label the stimulus person in accordance with the structure.

Typical of such studies is research reported by Higgins, Rholes, and Jones (1977). In this study, subjects were first required to perform a task that involved exposure to a number of different trait constructs. In one condition, subjects were exposed to synonyms of the trait "adventurous," whereas other subjects were exposed to synonyms of the trait "reckless." In an ostensibly unrelated subsequent experiment, subjects were given an ambiguous behavioral description of a stimulus person that could be interpreted as either reckless or adventurous. Subjects who had had prior exposure to the "adventurous" construct perceived the stimulus person as more adventurous, whereas subjects who had had prior exposure to the "reckless" construct perceived the stimulus person as more reckless.

Thus, how one understands one's social world is, in part, a function of the cognitive structures that one uses to encode stimulus input. Structure activation plays a crucial role in this process, because activated structures are more likely to be used in subsequent information processing than nonactivated structures (Higgins, 1989).

At this point, an important digression is in order. The chief objective of our article is not to claim the discovery of a new psychological phenomenon. Rather, the objectives of the article are to highlight (a) the pervasiveness of the phenomenon of cognitive structure activation in virtually every aspect of human functioning and (b) the ability of the law of cognitive structure activation to explain and integrate empirical findings within broad areas of psychology.

The Role of Cognitive Structure Activation in Information Processing

The influence of activated cognitive structures extends into every stage of information processing. The stimuli that are given attention, how those stimuli are encoded, the organization and storage of those stimuli in memory, the retrieval and reconstruction of those stimuli, and judgments made after the retrieval of the information are all partially dependent on the structures activated at both the time of encoding and the time of retrieval. A growing research literature in social and in cognitive psychology convincingly documents the effects of activated structures on all information processing stages, and we illustrate these effects through a few representative research examples. Note that there does not appear to be a substantial difference between momentarily and chronically activated cognitive structures in terms of their judgmental and possibly behavioral effects (Higgins, 1990; Sedikides & Skowronski, 1990).

Attention. Activated cognitive structures affect attention. An experiment by White and Carlston (1983; see also Brewer, Dull, & Lui, 1981) nicely demonstrated this point. In this experiment, subjects were told that one of the stimulus persons they were about to view on videotape had a particular personality characteristic. Telling subjects to expect that a stimulus person has a given personality trait should activate that construct in subjects' memory. When subjects were subsequently given the opportunity to view a videotape of the stimulus person, they tended to spend more time attending to a behavior when that behavior was expectancy inconsistent (i.e., trait-inconsistent) than when that same behavior was not expectancy-inconsistent.

The inconsistent behaviors in the White and Carlston study were obviously relevant to the subjects' conscious goal of forming an impression of the target person. However, such conscious goals are not necessary for accessible constructs to affect attention. These effects can be involuntary and uncontrollable. For example, in a study by Bargh and Pratto (1986), subjects participated in a Stroop task (cf. Logan, 1980). Subjects had to name the color in which words were printed; some of these words were constructs that were either chronically accessible or chronically inaccessible. Bargh and Pratto found that chronically accessible constructs interfered with performance on the color-naming task. That is, words

relating to chronically accessible constructs caused subjects to attend to the words, despite the subjects' best efforts to perform another task (color naming).

Thus, these experiments demonstrate that the features that one attends to in a stimulus array are partially determined by the cognitive structures that are accessible when the information is received. However, the impact of cognitive structures on attention may differ depending on whether the construct is consciously or automatically activated. This conscious–automatic distinction appears frequently in the literature (cf. Bargh, 1989; Posner, 1978), and we discuss this distinction more thoroughly later in this article.

Encoding. Activated cognitive structures affect one's ability to encode relevant information and also affect the substance of the encodings that one derives from that information. As an example, consider the sentence *The notes were sour because the seams split.* This sentence is puzzling, because it does not give enough clues to permit easy retrieval of an applicable construct. However, if such a construct is provided *(bagpipe),* the sentence is quite understandable (Bransford & Johnson, 1973). A similar point is made by experiments demonstrating that subjects who have a highly activated relevant construct can identify masked or degraded stimuli faster than subjects who have a less activated relevant construct (Warrington & Weiskrantz, 1968; see also Bargh, Bond, Lombardi, & Tota, 1986; Bargh & Thein, 1985). Thus, our ability to encode information depends on the level of activation of relevant cognitive structures in memory.

The level of activation of cognitive structures affects not only our ability to encode new stimulus information, but also how we understand new information. The fact that activated constructs affect the substance of encoding is illustrated by the Higgins et al. (1977) study cited earlier, in which the inferences drawn about a stimulus person were influenced by the constructs that were highly accessible at the time of en-coding. A similar point is made by research demonstrating that subjects who have highly accessible gender-related cognitive structures tend to process new information in terms of gender (S. L. Bern, 1981; Frable & S. L. Beni, 1985; Mark-us, Crane, Bernstein, & Siladi, 1982; Mills, 1983; Stangor, 1988; S. E. Taylor & Falcone, 1982). How one understands one's world is, in part, a function of the constructs one uses to encode stimulus input.

It should be noted that the effects of structure activation on these social encodings often appear to be automatic, in the sense that subjects seem not to consciously evaluate the stimulus persons in terms of the activated trait. Recent research by Lombardi, Higgins, and Bargh (1987) and by Martin (1986) highlights this distinction between automatic effects, occurring at encoding, and strategic or controlled effects, which more likely occur at the judgment stage of processing (for a discussion of the automatic–controlled distinction, see Posner, 1978; Shiffrin & Schneider, 1977). These studies demonstrate that subjects who are unaware of the heightened activation level of a construct consistently bias their perception of the stimulus person in the direction of the activated construct. By comparison, subjects who are aware of the heightened activation level of the construct do not show evidence of consistent biasing. Instead, their responses are likely affected by the degree of fit between the behaviors of the stimulus person and the activated construct, a process reflective of the judgment stage of information processing rather than the encoding stage (also see Skowronski, Carl-ston, & Isham, 1990).

Storage and retrieval. The effects of activated cognitive structures on memory are illustrated by numerous experiments demonstrating that activated structures cause alternative memory organizations to be produced, and cause concurrent changes in one's ability to recall information. An illustrative example of both these processes was provided in an experiment by Bower, Clark, Lesgold, and Winzenz (1969). In this experiment, subjects were asked to learn words. Some of the subjects were given hierarchical "organizational trees" of categories and subcategories along with the words. This procedure allowed subjects to encode the words in the list as instances of the various categories and subcategories in the hierarchical structure. On a subsequent recall test, subjects who encoded the words in the list in terms of the activated constructs remembered many more words than subjects who did not. Similarly, research in social psychology indicates that:

1. Memory for personality characteristics is enhanced by instructions in which subjects are told to "form an impression" of the stimulus person (i.e., activate a trait construct and encode the information about the stimulus person in terms of the trait; Hamilton, Katz, & Leirer, 1980; see also C. E. Cohen & Ebbesen, 1979; Hoffman, Mischel, & Mazze, 1981).
2. The specific items whose probability of recall is enhanced tend to be either trait consistent or trait inconsistent (Brewer et al., 1981).
3. Encoding information in terms of activated trait constructs causes relevant information to be recalled in "clusters" of trait-related items (Ostrom, Pryor, & Simpson, 1981).

Hence, because using constructs at encoding seems to enhance and organize memory for construct-relevant information, heightening the activation level of some constructs relative to other constructs will obviously have an effect on the information that is recalled and on how that information is organized at recall.

A more subtle demonstration of the effects of cognitive structure activation on memory comes from studies investigating the effects of semantic priming. These studies often assume that information is stored in semantic memory in a network of related concepts, and that when one of the concepts is activated (e.g., by an environmental stimulus), other concepts that are closely linked to the activated concept will also experience an increase in activation (for further details on spreading activation models, see Anderson, 1983; A. M. Collins & Loftus, 1975; A. M. Collins & Quillian, 1969; for an alternative view of priming research, see Ratcliff & McKoon, 1981, 1988). Hence, these closely related concepts should be more easily retrieved because they have received this priming "boost." This effect has been repeatedly obtained. For example, many studies demonstrate that the speed with which we recognize a word, pronounce a word, or name a picture is increased if we have just previously seen a semantically related word (e.g., Carr, McCauley, Sperber, &

Parmelee, 1982; Meyer & Schvaneveldt, 1971; Neely, 1977; Ratcliff & McKoon, 1981; Warren, 1972).

Priming effects do not seem to be limited to single words or ,o recognition tasks. Priming effects have been found for the speed with which we can recognize facts from a single story (Ratcliff & McKoon, 1988) or from thematically related stories (Seifert, McKoon, Abelson, & Ratcliff, 1986), for the ability to complete word fragments (Tulving, Schacter, & Stark, 1982), and for responses in stem-completion and free-association tasks (Graf, Shimamura, & Squire, 1985; Shimamura, 1986). In a related finding from social psychology, habitually activated constructs facilitate recall of relevant stimuli (Higgins, King, & Mavin, 1982; King & Sorrentino, 1988). Variations of priming tasks have also been used for probing the memory of 2- to 3-month-olds (Rovee-Collier, 1988) and of 3- to 5-year-olds (Nelson, 1988), as well as for understanding memorial properties of language-impaired children (Kail, 1988). In short, research indicates that activating information seems to make other related information "easier" to recognize or retrieve.

Other research demonstrates that the constructs used to encode and retrieve information can sometimes cause memory to be distorted. In an early study by Carmichael, Hogan, and Walter (1932), subjects were presented with simple line drawings. For instance, some subjects were given a sketch that was essentially comprised of two circles connected by a slightly curved line. However, in addition to the drawing, subjects were also given verbal labels. The labels that were provided for the drawing just described were *eyeglasses* and *dumbbells*. When asked to remember the figure and to reproduce what they saw, the figures that subjects drew were often assimilated to the constructs used to encode the information: Subjects given the *eyeglasses* label distorted their drawing so that it resembled a pair of eyeglasses, whereas subjects given the *dumbbells* label distorted their drawing so that it resembled a dumbbell. Similar distortions can be produced by increasing the activation level of relevant constructs at retrieval, as illustrated by Loftus's research on eyewitness testimony (Loftus, 1975). This research found that changing the activation level of constructs by changing the wording of questions distorted subjects' memories of an auto accident that they had observed. Regardless of whether memory is enhanced, as in the research by Bower et al. (1969), or is distorted, as in Loftus's research, it is clear that activated cognitive structures do have a discernible impact on memory.

Determinants of Activation

Given the pervasive influence of activated structures on information processing, it is important to delineate the factors that cause structure activation. Research indicates that such factors include:

1. A person's expectations.
2. A person's motivations and goals.
3. How recently the structure has been activated.
4. How frequently the structure has been activated.
5. The relation between the structure in question and other structures that have recently been activated.
6. The "inherent and relational features of stored constructs" (Higgins 1989, p. 115; for a thorough discussion of these factors, see Higgins & King, 1981).

Because there are a host of specific instances of these six general factors, and different permutations of the factors, the number of potential influences on cognitive structure activation is obviously very large. The specification of the interactive effects of these factors and the discovery of additional factors influencing cognitive structure activation is an important task for future research.

Dimensions of Activation

Controlled versus automatic processes in cognitive structure activation. In the course of investigating these influences on cognitive structure activation, researchers have found that there are two particularly interesting and important aspects of activation. The first of these aspects is that cognitive structures can be activated either through con-trolled processes or through automatic processes (Posner, 1978). Controlled processes are presumed to be effortful and intentional, to consume rather extensive cognitive capacity, and to be relatively slow. In contrast, automatic processes are assumed to be fast, effortless, unintentional, and capacity-free (Bargh, 1984; for recent discussions arguing against a rigid automatic—controlled dichotomy, see Bargh, 1989; Logan, 1989; Uleman, 1987).

Cognitive structures can be activated by conscious effort, or without any conscious involvement. The automatic aspect of structure activation is particularly important, because it implies that the way people process information, and hence, the way in which people view the world, can vary depending on slight changes in their day-to-day lives. This proposition is supported by the previously mentioned priming research (Lombardi et al., 1987; Martin, 1986; Skowronski et al., 1990; see also Erdley & D'Agostino, 1988). In these studies, judgments produced by subjects who did not consciously notice that there was a "theme" in priming stimuli were influenced by those stimuli. Further, those judgments were different from the judgments made by the subjects who were aware of that theme.

However, more definitive support for the proposal that these priming effects are automatic has been provided by the work of Bargh and Pietromonaco (1982), which was conceptually similar to the work of Marcel (1983a, 1983b). Using techniques of subliminal presentation, Marcel found that activated constructs affected subjects' performance on lexical decision tasks even when subjects could not consciously recognize the subliminal priming stimuli used in those tasks. Bargh and Pietromonaco reasoned that this effect could be used to demonstrate the automatic nature of the effects obtained in some of the priming research. Bargh and Pietromonaco used subliminal techniques to expose different groups of subjects to differing numbers of hostility-related words (i.e., primes). In a subsequent session, these subjects were asked to rate the hostility of a stimulus person whose hostility level was ambiguous. Bargh and Pietromonaco found that the rated hostility of the stimulus person depended on the number of times the word had been primed: The greater the number of primes, the higher the rated hostility. Manipulation checks indicated that the primes were not recognizable, so that the effects of the primes on rated hostility could not have been due to controlled processes. Thus, a person's view of the social world can be manipulated through automatic activation of cognitive structures without that person's knowledge, a proposition that fits in nicely with re-

search indicating that we often do not have introspective access to the causes of our behavior (Nisbett & Wilson, 1977; for additional research on unconscious effects of activated cognitive structures on judgment, see Jacoby & Kelley, 1987; Jacoby, Kelley, Brown, & Jasechko, 1989).

Duration of the effects of activated cognitive structures. The second important dimension on which the influence of cognitive structure activation can vary concerns the length of time that a structure will remain active. In some cases, heightened activation will be only fleeting. For in-stance, in the lexical decision tasks often used in cognitive psychology, priming effects typically persist for relatively short periods (Neely, 1977; Warren, 1972). Other researchers have found effects of activated structures that persist for much longer periods of time (N. J. Cohen, 1984; Jacoby, 1983; Kolers, 1976; Scarborough, Cortese, & Scarborough, 1977; Srull & Wyer, 1980).

As Ratcliff and McKoon (1988) noted, theorists have often been puzzled by the wide variability that has been obtained in the duration of priming effects. This variability has led some theorists to question whether the findings obtained in some studies can accurately be labeled *priming.* In one sense, this criticism is valid: The word *priming* has been applied to experimental procedures that often differ greatly from the original procedures to which the label was applied. However, all these different priming procedures are linked by a common explanatory concept: the intent of activating a structure and observing the consequences of that activation on some aspect of information processing. We believe that the debate in this area should not revolve around whether or not a set of experiments demonstrates "true" priming effects. Instead, researchers should accept the fact that some procedures seem to produce longer term effects than other procedures, and should attempt to explain why these differential-duration priming effects occur.

There are already some preliminary clues about the causes of these long-term effects. For example, one important difference between the priming procedures used in various experiments involves repetition of the priming cues. Some cognitive procedures, particularly those concerned with tests of spreading activation, typically assess effects that are present after only one presentation of a priming cue. In comparison, other paradigms present multiple primes (often 10 or more) before assessing the impact of those primes. The importance of this procedural difference was confirmed by Ratcliff, Hockley, and McKoon (1985), who found that even a single repetition of a prime produced a long-term facilitation of lexical decisions. Hence, repetition seems to be one factor responsible for the heightened long-term activation level of constructs, allowing those constructs to exert an influence long after the termination of the activation-inducing stimuli. This finding is consistent with Higgins's argument that some constructs (particularly self-relevant ones) might be activated so frequently that they become chronically active or accessible (Higgins & King, 1981; Higgins et al., 1982; see also Bargh, 1984; Bargh, Lombardi, & Higgins, 1988; Bargh & Pietromonaco, 1982).

Physical context may be another important determinant of the duration of priming effects. In some experiments, subjects are exposed to primes in an initial experimental session, and the effects of those primes are assessed in a second session. The physical context in which the first experimental session takes place may itself act as a prime when subjects return for a second experimental session (Wyer & Srull, 1981). That is, returning to the same room might cause subjects to think about the stimuli in the previous experimental session, and this reminiscence may cause a priming effect to occur.

The nature of the judgmental task may be an additional determinant of the duration of priming effects. In many studies in which short-term priming effects are observed, subjects' judgmental task consists of having to make a binary decision (e.g., Neely, 1977; Warren, 1972). In many studies finding long-term priming effects, however, subjects' task consists of drawing inferences about the stimulus person (e.g., Higgins et al., 1977; Srull & Wyer, 1980). It is possible that, in these social inference experiments, subjects form inferences about the stimulus person in the first experimental session, and they simply recall their past inferences in the subsequent experimental session (cf. Carlston, 1980; Hastie & Park, 1986).

Regardless of the reasons underlying priming effects of differing duration, the fact that activated cognitive structures may vary in the amount of time they remain active has profound implications for human thought and behavior. As motives and goals change, as recent past experience changes, as mood changes, and as specific memories intensify, weaken and distort, so too might the thought and behavior processes dependent on them change. Furthermore, some structures may be overly activated, becoming so accessible that they dominate one's thought processes. It should be readily apparent from these examples that the notion of cognitive structure activation can serve to explain and integrate research findings from various domains. The remainder of this article is devoted to some of these potential applications.

Applications of the Law of Cognitive Structure Activation

Space limitations preclude exploring all possible applications of the law of cognitive structure activation. In lieu of a comprehensive review, we illustrate the applicability of the law to judgmental processes, personality processes, and behavioral processes in selected psychology content areas.

Judgmental Processes

Many of the studies investigating the effects of cognitive structure activation have focused on the impact that differences in activation have on judgmental processes. Here are examples from several areas of psychology.

Effects of physical appearance on judgment. One of the underlying themes that runs through social psychological research is that a person's physical appearance affects judgments of that person's behavior. This finding seems to hold true for a wide range of important appearance cues, including ethnicity, sex, attractiveness, and clothing style.

One example of the effects of physical appearance on judgment comes from a study by B. L. Duncan (1976). Duncan asked subjects to watch a videotape of two people who were discussing a problem. The identities of the two people were concealed by ski masks. Subjects were provided with appearance cues in the form of verbal labels. Some of the subjects thought that the two discussants were both White;

other subjects thought that one of the discussants was White and the other Black. The discussion ended when one of the discussants shoved the other. When subjects thought that the Black discussant had done the shoving, they perceived the behavior as violent; when they thought that the White discussant had done it, they perceived the behavior as nonviolent.

This research can be thought of as illustrating the effects of cognitive structure activation on judgment. Appearance cues (race) are linked to expectations about what people with a given appearance cue should be like (Blacks are violent). Further, appearance cues are highly salient to perceivers and are typically encountered prior to observation of an interpretable action. Hence, the paradigm used in research such as Duncan's corresponds exactly to the common cognitive structure activation paradigm: Present a cue (Blacks) that activates a cognitive structure (violence), present a behavior (a shove) that is relevant to the structure, and examine subjects' response for evidence of biasing by the activated structure (judgment of the behavior as more violent when executed by a Black than a White).

Perhaps it would not be surprising to know that this effect occurred in the general population; what is surprising is that the effect seems to occur even in college students, individuals who are likely to be highly sensitive to evidence that they are guilty of racism and discrimination. It is also surprising that this effect occurs for Blacks, as well as for Whites (Sagar & Schofield, 1980). This effect can be explained by (a) recognizing that stereotypes are learned, and frequently over-learned, from one's culture, even if those stereotypes are not believed and (b) recognizing that processes involving activation of stereotypes can occur automatically. Stereotypic beliefs, in tum, automatically bias subsequent encoding, even in those who may be sensitive to concerns about making stereotypic judgments (Devine, 1989; Lewicki, 1985).

The obvious implication of this analysis is that biased judgments cannot be totally eradicated in those who have overlearned the stereotype. If one is to eliminate these kinds of processes, one must reduce or totally prevent the communication of these stereotypes. The efficiency of television as a medium for stereotype communication makes us rather pessimistic concerning the possibility that these stereotypes will be eradicated.

Problem solving. Activation level of a cognitive structure affects success or failure in problem solving. Research by Kahneman and Tversky (1973) depicted subjects as victims of the base-rate fallacy (i.e., underutilization of base-rate information). Zukier and Pepitone (1984) reasoned that subjects may commit the base-rate fallacy only when they are situationally cued to adopt a narrative mode of judgment making. This mode is exemplified by a case-history approach, in which the judge focuses on the specific characteristics of the task at hand rather than background information that may be relevant to the task. Further, Zukier and Pepitone reasoned that subjects may avoid the base-rate fallacy when they are situationally cued to adopt a paradigmatic mode of judgment making, which exemplifies the scientific way of thinking. In the language of our analysis, Zukier and Pepitone postulated that the activation of the judgmental mode has a significant impact on the final judgment: Base-rate effects should occur when the narrative mode is activated, and those effects should disappear when the scientific mode is activated.

In their initial experiment, which utilized Kahneman and Tversky's (1973) materials, Zukier and Pepitone instructed half the subjects to adopt the paradigmatic mode of judgment and the remaining half to adopt the narrative mode of judgment. The results of this experiment indicated that the base-rate fallacy disappeared when subjects adopted the paradigmatic mode of thinking. In a second experiment, Zukier and Pepitone showed that subjects' solution to a number of base-rate problems was affected by the way the experimenter formulated the problem. Finally, in a third experiment, these investigators demonstrated that people in whom the paradigmatic mode of judgment is chronically accessible through habitual activation (e.g. , resident physicians) tended to avoid the base-rate fallacy altogether; in fact, these subjects even showed a tendency to overutilize base-rate information. In conclusion, Zukier and Pepitone's work suggests that both cognitive structures that are momentarily activated through experimental instructions or problem formulation and cognitive structures that are chronically active determine peoples' susceptibility to the base-rate fallacy and, hence, their success in problem solving.

Other findings consistent with this conclusion have been reported by researchers investigating the problem-solving strategies of middle-aged and elderly people, and by researchers investigating novice–expert differences in problem solving. Elderly people become more efficient problem solvers when a successful strategy is activated through appropriate framing of the problem (Denney, 1979, 1980). Work on expert–novice differences in a variety of domains (e.g., Chase & Simon, 1973; Chi, Glaser, & Rees, 1982) has documented the efficiency of experts in problem solving relative to novices, an efficiency that reflects, in part, a heightened activation level of problem-related structures. (For additional demonstrations of the effects of activated cognitive structures on problem solving, see Higgins & Chaires, 1980.)

Judgments of life satisfaction. Activated cognitive structures have been found to affect judgments of happiness and life satisfaction. Schwarz and Clore (1983) showed that recall of recently occurring positive events can lead to higher ratings of life satisfaction, and recall of negative events can lead to lower ratings of life satisfaction (congruency effects). Strack, Schwarz, and Gschneidinger (1985) replicated and extended this finding by demonstrating that recalled positive and negative events had a congruent impact on reported well-being when the events elicited strong affect, but an impact in the opposite direction (i.e., a contrast effect) when they did not elicit strong affect. It seems reasonable to speculate that these opposing effects reflect fundamentally different processes. In fact, they may reflect the automatic versus controlled dimension discussed earlier. Specifically, it is reasonable to speculate that the congruency effects occur as a result of automatic processes (subjects unknowingly use their current level of affect as a cue for the life satisfaction question), whereas the contrast effects occur as a result of controlled processing strategies (the weak affect may al-low people to use the recalled event as a "standard-of-comparison," and one's life may be judged in relation to that standard).

Cognitive structure activation and judgments of frequency and recency. Estimations of event frequency, which are partially dependent on information stored in memory, are influenced by the activation level of the information received. This point was nicely demonstrated by Tversky and Kahneman's (1974) work on the availability heuristic (see also Gabrielcik & Fazio, 1984; Jonides & Naveh-Benjamin, 1987; Lewandowsky & Smith, 1983; Williams & Durso, 1986). Tversky and Kahneman hypothesized that the activation level of an information item affects judgments about that item. In particular, easily recalled facts should be judged to have occurred more often or more recently than difficult-to-recall facts.

Tversky and Kahneman (1974) gave subjects a list of celebrities and then asked the subjects if the list contained more men or more women. Given that the famous names should be chronically active (due to frequency of activation) and, hence, more easily recalled, the relative fame of the people on the list should distort subjects' memory-based judgments about the composition of the list. This hypothesis was con-firmed. When the list included very famous men and less famous women, subjects judged that the list contained more male names than female names. When many of the women's names on the list were very well known in comparison to the men's names, subjects judged the list to contain more female names than male names.

The cognitive structure activation explanation is ubiquitous: It has surfaced as an explanatory mechanism for many memory-based estimation phenomena. For example, re-search in social psychology has demonstrated that there is an illusory correlation in person perception: Subjects presumably overreport the frequency with which salient people per-form salient behaviors because of the ease with which those episodes are recalled (Hamilton & Gifford, 1976; Hamilton & Rose, 1980). Similarly, Bradburn, Rips, and Shevell (1987) reported that a subject's estimate of the age of an event was influenced by the activation level of the event in memory. Although of equivalent age, events that were more accessible were judged to have occurred sooner than events that were more difficult to recall.

Similar results have been obtained by investigators of the phenomenon of reality monitoring. The concept of reality monitoring refers to the ability of a perceiver to distinguish between real and imagined memories. Structure activation may provide an explanation for the occasional blurring of the line between fantasy and reality. The typical research paradigm in this body of literature (Johnson & Raye, 1981; John-son, Raye, Wang, & T. H. Taylor, 1979; Johnson, T. H. Taylor, & Raye, 1977; Slusher & Anderson, 1987) presents subjects with various stimuli (i.e., primes) and asks them to generate (or imagine) additional corresponding stimuli for each prime. Sometimes subjects are asked to imagine some of the stimuli actually used as the primes. Subsequently, aspects of subjects' memory for the real stimuli are assessed. The outcome of this research has generally indicated that increases in the frequencies with which subjects are asked to imagine a prime produce corresponding increases in the estimated actual frequency of presentation of that prime. More simply, repeatedly imagining a stimulus caused subjects to think that it was presented more frequently than it actually was. Similarly, imagining a hypothetical scenario leads to inflated probability estimates of the occurrence of the scenario (Sherman, Cialdini, Schwartzman, & Reynolds, 1985; Wells, B. R. Taylor, & Turtle, 1987). Hence, increases in cognitive structure activation produced by repeated thought result in less successful reality monitoring.

Personality Processes

The law of cognitive structure activation has implications for personality and developmental processes. We attempt to demonstrate the impact of the law in the following areas: test taking, the processing of information about the self, cognitive malfunctioning, individual differences and develop-mental phases, and the person–situation debate.

Personality tests. Activated constructs influence the responses reported on personality tests. For instance, Knowles (1988) demonstrated that, when taking a multi-item single-construct test (e.g., the Locus of Control Scale), the construct the test examines becomes more and more activated as subjects move through the test items. Accordingly, subjects' responses in later portions of the questionnaire become more consistent, more polarized, and more reliable (i.e., better predictors of the total test score). Similarly, research by Ostrom, Betz, and Skowronski (in press) demonstrated that grouping test items affected both subjects' responses to the items and subjects' recall for the items: Thematic effects on item responses and on recall were strongest when the items were grouped by theme.

Processing of information about the self. Self-relevant constructs are habitually activated and should power-fully regulate the processing of new information that is self-relevant. Indeed, such constructs have been shown to increase the speed and confidence with which new self-descriptive information is processed (Markus, 1977) and to improve the recall and recognition of self-relevant information (Bower & Gilligan, 1979; Hull & Levy, 1979).

The law of structure activation may also help to clarify a continuing theoretical controversy in the literature concerning the self. There has been a controversy in this literature as to whether self-relevant constructs tend predominantly to assimilate information that is consistent with the self-concept (Curtis & Miller, 1986; Shrauger & Lund, 1975; Swann', 1983, 1987), that enhances the self-concept (Greenwald, 1980; Schlenker, 1980; Steele, 1988; S. E. Taylor & Brown, 1988; Tesser, 1988), or that is diagnostic of the self-concept (Alicke, 1985; Strube, Lott, Le-Xuan-Hy, Oxenberg, & Deichmann, 1986; Strube & Roemmele, 1985). An approach to this controversy focusing on cognitive structure activation would help to reconcile these differing positions by postulating (a) that there are individual differences in people's chronically active self-relevant constructs or processing tendencies, which determine the new processing strategies to be used, and (b) that people could possibly utilize any or all of these three processing strategies depending on which one becomes momentarily activated.

Activated cognitive structures can also affect the process of self-evaluation. The process of self-evaluation utilizes either factual or acquired standards (Higgins, Strauman, & Klein, 1986). Activated standards can affect both the outcome of self-evaluation (Duval & Wicklund, 1972; McGuire & Padawer-Singer, 1976; Morse & Gergen, 1970; Rogers,

Smith, & Coleman, 1978) and the type of emotion experienced (Strauman & Higgins, 1987). Furthermore, activated constructs have motivational qualities. They contribute to the formation and mental representation of possible selves (Markus & Nurius, 1986), and, as such, they guide behavior toward desired goals.

Cognitive malfunctioning. Cognitive theories of depression (e.g., Beck, 1967a, 1967b) associate the cause of depression with a negative, deprecatory, and pessimistic attitude toward the self. Thinking disturbances such as overgeneralization (drawing unjustified negative conclusions about the self on the basis of limited evidence) and selective abstraction (attending selectively to negative facets of the self) are postulated to lead to mood disturbances in times of stress.

Cognitive therapy (Beck, 1967a) postulates that there are three stages in the cure of depression: (a) identification of negative thoughts about the self, (b) realization by the patient that negative thoughts distort reality, and (c) generating and reciting arguments as to why the negative thoughts about the self are invalid. These statements can be translated into the language of our review. Cognitive theorists conceptualize depression as a psychological state in which negative constructs referring to the self are chronically active. Cognitive therapy involves attempts to make the depressed individuals conscious of the biased content of their thoughts.

The translation of theories of depression into the language of structure activation is not unique to our article; other researchers have been thinking along similar lines. For example, Bargh and Tota (1988) speculated that negative thoughts are more easily activated in depressives, and they provide evidence that such thoughts tend to be automatically activated.

The proposition that negative thoughts are easily activated in depressives is supported by several additional studies. Gotlib and McCann (1984) had subjects participate in a version of a Stroop task that asked subjects to name the colors in which words were projected. These experimenters theorized that depressed subjects would be particularly distracted by words that were of depressive content and, hence, should take longer to name the color in which those words were presented. Depressed subjects did have longer response latencies to words of depressive content than to words of nondepressive content. Similar evidence is provided by Wenzlaff, Wegner, and Roper (1988), who asked subjects to participate in a sentence unscrambling task. Their sentences could be unscrambled to form either positive or negative sentences. Depressed subjects unscrambled fewer positive sentences and more negative sentences than nondepressed subjects. Finally, in analyzing subjects' stream-of-thought protocols, Wenzlaff (1988) found that depressed subjects seemed to have a larger number of negative intrusive thoughts than did nondepressed subjects and demonstrated that depressed people are generally unable to suppress unwanted negative thoughts. Collectively, these studies suggest that negative constructs are more easily activated in depressed subjects than in nondepressed subjects (see also Moretti & Shaw, 1989; Strauman, 1989).

An analysis of depression in terms of cognitive structure activation suggests the therapeutic avenue of frequently activating positive self-referents, either through subtle (Bargh & Pietromonaco, 1982; Higgins et al., 1977; Srull & Wyer, 1979) or through blatant (i.e., persuasive) techniques. In essence, such techniques involve "retraining" thought processes, an approach that has already met with some success in related areas, such as student responses to failure (Dweck, 1975; Dweck & Goetz, 1978).

Dweck chose as her subjects individuals who chronically exhibited extreme negative responses to failure. Dweck postulated that these individuals chronically blamed their own abilities for their task failure, and hypothesized that changing the cognitive responses of these people to failure would result in improved task performance. Operating in the context of attribution theory, Dweck taught some of these chronic negative subjects to attribute their task failures to lack of effort rather than to lack of ability. In essence, this manipulation caused an increase in the activation level of a construct that could be used to replace the construct that was previously invoked in failure situations. This manipulation was successful: Follow-up sessions indicated that these retrained subjects showed improvements in both task persistence and task performance.

A cognitive-structure-activation approach also has implications for the phenomenon of variability in depressive symptoms. Given the fluctuations and occasional sparks in depressive mood (Beck, 1967b; Fieve, 1975; Goodwin, 1977; Needles & Abramson, 1990; Oliver & Burkham, 1979), it is reasonable to ask why the "ups" are much shorter than the "downs." Research by Bargh et al. (1988; see also Bargh & Thein, 1985; Higgins, Bargh, & Lombardi, 1985) provides some clues. These investigators showed that recently activated constructs influenced subjects' impressions of a stimulus person, but, over time, frequently activated constructs had the major influence on impressions. Extrapolating the results of this research to depression, recently activated (positively toned) structures may account for the mood uplifts, but frequently activated (negatively toned) structures will have more persistent effects on depressive mood.

A cognitive-structure-activation analysis may also be applied to other uncomfortable psychological states, such as loneliness. Loneliness involves the subjective belief that adequate social support is lacking or that too few intimate friendships exist (Perlman & Peplau, 1982). Our formulation suggests that, at least in some cases, activating counter-loneliness constructs (e.g., constructs supporting a self-sufficiency idea) may lead to a reduction of the uncomfortable feeling of loneliness.

Anxiety disorders can be conceptualized in a similar manner. Obsession, for instance, involves thought domination by a certain (irrational) construct or constructs. This domination implies that such constructs are chronically active in the course of the individual's everyday life. Compulsions are behaviors that dominate an individual's behavioral routine. Compulsions can be thought of in terms of the chronic activation of behavioral plans or scripts (Schank & Abelson, 1977). Similar reasoning can be offered for general anxiety disorder and social phobia (for a related point, see Schacter, 1987).

One other issue that may be amenable to a cognitive structure-activation analysis is the issue of the seeming suddenness of the onset of certain disorders (Davison & Neale, 1986). For a dysfunctional construct to manifest itself in the form of disorderly thought or behavior, the construct may first have to become frequently fed by situational contingencies, so that it reaches a low activation threshold (Marcel & Forrin, 1974; Reder, 1983). After this low threshold is

reached, the construct may be easily activated through even subtle environmental cues. As a result, the construct's first manifestation is likely to give the impression of suddenness for the disorderly thought or behavior.

Given that activated cognitive structures may play a role in the development of some disorders, it is reasonable to assume that this approach would also direct therapies for those disorders. One interesting aspect of the application of cognitive-structure-activation techniques to the modification of cognitive content is that such techniques do not necessarily demand the complete eradication of the maladaptive influence (e.g., the social environment) from the patient's life. Of course, a change in the social environment could facilitate a reduction of the impact of the maladaptive chronically active cognitive structure. This law is often demonstrated in the techniques of "brainwashers" and "deprogrammers," both of whom employ isolation from the previous environment as a part of their cognitive modification programs. However, the establishment of new adaptive cognitive structures can be achieved without dramatic changes in the patient's everyday routine (Higgins & King, 1981).

In fact, one can argue that the modern psychotherapeutic process is substantially based on the law of cognitive change. That is, we maintain that one of the reasons all major therapeutic schools can demonstrate success (Lambert, Shapiro, & Bergin, 1986) is that all involve the modification of cognitive content in one way or another. Changes in the chronicity of active structures has proportional judgmental and behavioral consequences.

Individual differences and developmental phases. The law of cognitive structure activation can help to explain individual differences in motives, aptitudes, and abilities, individual differences due to social class and age, as well as more general developmental patterns.

That individuals differ in terms of motives such as power (McClelland, 1975), achievement (McClelland, 1961), and affiliation (Schachter, 1959) has been well documented. Motivation or personal expectations can activate relevant cognitive structures in memory, and activation of these structures can affect subsequent information processing. For example, the need for affiliation may lead individuals to interpret ambiguous situations in accordance with their activated affiliation-relevant constructs (e.g., interpreting others' behavior as friendlier than under other circumstances).

Consistent individual differences in general vocational and artistic aptitudes have been identified, as have differences in special abilities such as creativity and cognitive style (i.e., field dependence–independence; for a review, see Minton & Schneider, 1980). One interpretation of such differences can be provided in terms of the law of cognitive structure activation. Socialization history or family background may maintain certain constructs, mental sets, or cognitive orientations at a state of high readiness through frequent activation of those constructs. For example, a child from an artistic family may be repeatedly exposed to works of art and the art-making process and may be ably reinforced for starting individual creative endeavors. That creative problem solving can be a consequence of relevant activated structures has been empirically documented (Higgins & Chaires, 1980).

Pronounced social-class differences have been reported on a number of psychological dimensions, such as values. Lower social classes tend to value cleanliness, obedience, and affiliation, whereas higher social classes tend to value imagination, intellect, and a sense of accomplishment and inner harmony (Rokeach, 1973). Such value differences can be interpreted with respect to socialization histories, which render different structures (e.g., life tasks) chronically active. Social-class differences in other domains, such as academic achievement (O. D. Duncan, Featherman, & B. L. Duncan, 1972; Kaufman & Doppelt, 1976), may, in part, be accounted for by differences in the motivational qualities of the cognitive structures that are active in the lower versus the higher classes.

In their effort to understand human development, some psychologists (Erikson, 1950; Levinson, Darrow, Klein, Levinson, & MacKee, 1978; Loevinger, 1966, 1976; Maslow, 1954) have postulated the existence of developmental or life phases, each with certain discrete characteristics. In each life phase, different goals are set by the individual, and different tasks and activities become self-relevant. In our terms (see also Higgins & Wells, 1986), each life phase involves the availability and activation of different cognitive structures to guide behavior.

For example, Levinson et al.'s (1978) analysis postulates three stages of adult development: early adulthood, middle adulthood, and late adulthood. The early adulthood stage is composed of four periods: the early adult transition period (characterized by the individual's quest for independence), the early adulthood period (marked by entering an occupation and exploring one's options), the mid-30s transition (during which the individual feels obligated to make lifelong commitments), and the settling-down stage (during which the main task becomes securing one's own position). However, one could raise several questions concerning this analysis. What are the origins of the stages or the periods? How are they initiated? Cultural expectations may be the ultimate cause, but what are the mediating social-cognitive mechanisms? Cognitive structure activation may be the proximate cause of the developmental stages. Different constructs, tasks, or activities become active in each of the life stages (perhaps due to cultural influences), which in turn guide behavioral choices.

The person–situation debate. The person–situation debate has been in the spotlight for more than two decades' (Allport, 1966; D. J. Bern & Allen, 1974; D. J. Bern & Funder, 1978; Epstein & O'Brien, 1985; Higgins, 1990; Mischel, 1968, 1983; for a recent review, see Kenrick & Funder, 1988). Major issues in the debate have been whether personality traits are reliable and significant predictors of behavior and the degree to which behavior is consistent across situations. We accept the empirical fact that people sometimes behave inconsistently. From the perspective of this article, the more interesting question is why both cross-situational variability and cross-situational consistency are observed.

The law of cognitive structure activation can be applied to this problem. Cross-situational consistency may be enhanced when the same chronically or momentarily active structure is applied to the interpretation of relatively similar situations. The structure will lead to assimilation effects, with the situations being perceived as instances of the structure. As a result, behavior will be similar across these similarly interpreted situations. There is evidence supporting this hypothesis. Lord (1982) demonstrated that similarities in

people's perceptions of situations predict whether their behavior will be consistent across different situations.

On the other hand, cross-situational variability in behavior should be enhanced when no chronically or momentarily active structure is applied to situations, but, instead, different structures are used to interpret each unique situation. Because each situation is interpreted differently, the resulting behavior will also differ across the situations. Thus, although people may show a thread of consistency in thought and behavior across situations due to constructs that are chronically active, there should also be variability in people's thoughts and behaviors from situation to situation because of the different constructs that are activated by the cues unique to each situation.

This approach does not conceptualize personality traits as permanent dispositions and does not contend that asserting the "existence" of traits is necessary for understanding the relation between cognitive content and behavior. Instead, we suggest that, to uncover accurate predictors of behavior, psychologists should explore people's chronically or momentarily active constructs prior to the emission of behavioral responses (for a similar approach, see Kihlstrom & Cantor, 1984).

Behavioral Processes

In this article, we have argued that cognitive structure activation should affect peoples' behavior. An implicit assumption—which we now make explicit—in our argument is that how people interpret a situation will affect how they respond in that situation. This assumption has often been made by theorists interested in the interaction etween thought and behavior (Darley & Fazio, 1980; Stryker & Statham, 1984), and a number of studies (e.g., Lord, 1982) demonstrate this point.

More precisely, according to the law of cognitive structure activation, the mediation of behavior by mental processes involves two steps. First, cognitive structures are activated through the influence of any of the six factors outlined in the theoretical discussion presented earlier as "Determinants of Activation" (a person's expectations, motivations, etc.). Then, if applicable, these structures will be used in turn to interpret new situations and to guide behavioral choices. We assert that much of what we know about social behavior can be explained, in part, by the law of cognitive structure activation.

Aggressive behavior. A classic finding in aggression research is that the presence of environmental cues can facilitate the expression of aggression. An experiment by Berkowitz and LePage (1967) illustrates the point. Frustrated subjects were more likely to behave aggressively in the presence of an aggressive cue (i.e., a weapon) than in the presence of a nonaggressive cue (i.e., badminton rackets; see also Frodi, 1975; Leyens & Parke, 1975). In terms of our analysis, the salience of weapons in this experiment activated aggression-relevant cognitive structures (e.g., constructs and scripts). These aggression-relevant structures filtered subsequent thoughts related to behavioral choices, and as a result, behavioral choices were aggressive.

This explanation is not merely speculative: It is backed by research (Berkowitz, 1970; Carver, Ganellen, Froming, & Chambers 1983; Srull & Wyer, 1979, 1980). For example, in Srull and Wyer's studies, subjects with activated hostility-relevant constructs perceived an ambiguous stimulus person's behavior as more hostile than did subjects in whom the hostility-relevant constructs were less active. Carver et al. (1983) extended Srull and Wyer's (1979, 1980) findings to the behavioral realm, demonstrating that subjects with activated aggression-relevant constructs both judged a stimulus person as more aggressive and behaved more aggressively in a different context than subjects in whom the aggression-relevant constructs were less active.

The law of cognitive structure activation can also account for individual variation in aggressive behavior. For example, it has been reported that males tend to be more aggressive than females (Buss, 1963; U.S. Department of Justice, 1983; but see Hyde, 1984). One explanation for this sex difference may be that males and females differ in the chronic activation of aggression-related cognitive structures. Because of cultural expectations, aggression-related structures may be more frequently activated in developing males than in females and, hence, should be more chronically active in males. As a result, males will more frequently behave aggressively in social situations. Indirect support for this argument was provided by Dodge (1980), who found that children with chronically active aggression-relevant constructs (as shown in their interpretation of other people's behavior) tended to behave more aggressively than children in whom such constructs were chronically inactive.

Similar issues are raised by research examining the relation between television viewing and aggressive behavior. Several lines of this research suggest that exposure to violent television is associated with increases in aggressive behavior in both children (Drabman & Thomas, 1974; Leyens, Camino, Parke, & Berkowitz, 1975; Leifer & Roberts, 1972; Liebert & Baron, 1972) and adults (Loye, Gorney, & Steele, 1977; Malamuth & Check, 1981; Phillips, 1983, 1986). The results of this research fit in nicely with the cognitive-structure-activation approach advocated here.

Prosocial behavior. One of the findings of research into altruistic behavior is that people help when someone else does. For instance, Bryan and Test (1967) reported that drivers were more likely to help a fellow driver change a flat tire when they had just recently observed someone else helping in a similar situation. In a second experiment, these authors found that people were more likely to donate money to a Salvation Army kettle if someone else had already done so. Rushton and Campbell (1977) found that people were more likely to donate blood after noting that others had already donated. Applying the law of cognitive structure activation to these studies, it is reasonable to suppose that observing others' performance in helping situations activated helping-relevant constructs. Such constructs influenced both the interpretation of subsequent similar encounters and the activation of relevant scripts to guide behavior (see also Blackman & Hornstein, 1977; W. Collins & Getz, 1976; Holloway, Tucker, & Hornstein, 1977; Hornstein, LaKind, Frankel, & Manne, 1975).

The law of cognitive structure activation could also explain individual variation in prosocial behavior. Recent research has demonstrated that people high in empathy and self-efficacy and people low in masculinity are more likely to exhibit altruistic behavior than their counterparts (e.g., Batson, Bolen, Cross, & Neuringer-Benefiel, 1986; Tice &

Baumeister, 1985). This may be due to the chronic activation of altruism-related constructs in such individuals, constructs that lead them to interpret relatively ambiguous situations as needing their intervention.

Competitive behavior. Cognitive structure activation may influence competitive behavior. Evidence for this proposal was provided by Neuberg (1988), who exposed subjects to either neutral or competitive subliminal primes. On a subsequent prisoner's dilemma task, subjects exposed to the competitive primes more frequently exhibited competitive behavior than subjects exposed to the neutral primes. Further-more, subjects exposed to competitive primes also tended to play more competitively. That is, not only the frequency of competitive behavior, but the intensity of competitive behavior as well, was influenced by the subliminal primes.

Interpersonal relationships. Cognitive structure activation may mediate the initiation of interpersonal rela tionships. Research indicates that factors affecting the forma-tion of social relationships include the fami liarity of the partners (Brockner & Swap, 1976), the proximity of the partners (Festinger, Schachter, & Back, 1950), and the similarity of the partner to the self (Newcomb, 1961). Similarity may be thought of in terms of activation; similar others share similar chronically active constructs. Moreover, we would claim that familiarity and proximity contribute to the forma-tion of relationships through their indirect effects on similarity. Familiarity and proximity provide the individual an opportunity either to discover commonalities (i.e., shared active constructs) or to create commonalities through gradual changes in cognitive content.

Cognitive structure activation may also mediate the dura-tion and quality of social relationships. Shared active con-structs shape the way that partners interpret their social milieu. Thus, these constructs are partially responsible for such rewarding processes as mutual validation of social reality and the mutual boost of self-esteem. On the other hand, temporary dissimilarity of active constructs between partners can have negative effects on the relationship, as when partners disagree in their evaluation of a common acquaintance (Heider, 1958; Higgins & King, 1981). Thus, the establishment of dissimilar, chronically active constructs may con-tribute to the dissolution of relationships.

Mood. A growing literature is concerned with the effects of mood on judgment and behavior (e.g., Isen, 1984, 1987). In the typical mood experiment, a mood-induction procedure (e.g., finding a dime in a telephone booth, receiving a free sample, succeeding or failing in a task) is adminis tered, and the effects of that procedure are observed in subjects' judgmental or behavioral responses (e.g., recall of self-relevant events, altruistic behavior; for a discussion of the disparity of the effects produced by positive and negative mood-induction procedures, see Morris & Reilly, 1987).

The law of cognitive structure activation has several im-plications for this area of research. First, the effects of mood can be understood as structure activation effects. Mood-induction manipulations activate positively toned or negatively toned constructs that color the interpretation of events, the activation of relevant behavior patterns, and the retrieval of affect-relevant memories (cf. Bower, 1981; Clark & Isen, 1982; Iyengar, Kinder, Peters, & Krosnick, 1984; Leventhal, 1980).

Second, mood swings may be conceptualized as resulting from the differential activation level of different cognitive structures. People can switch from one affective state to an-other as a function of the evaluative character of activated constructs. Given the multitude of factors that can activate constructs, mood stability should probably be the exception rather than the rule. An activation formulation also predicts that people who experience frequent novel situations or who engage in nonroutine occupations may experience more fre-quent mood swings compared to people who are exposed to relatively invariant social environments, and, further, that their behavior should be affected accordingly.

A third implication of the law of cognitive structure activa-tion for mood research relates to the issue of whether subjects are conscious of the sources of mood activation. The majority of mood activation experiments involve procedures in which subjects are aware of the mood-induction technique (for a summary of this research, see Isen, 1987; for an exception, see Bower, 1981). That is, subjects' mood in these experiments is activated via conscious cognitive processes involving attention to the source and effortful processing (Bargh, 1984). However, it is also possible to activate mood through automatic rather than conscious cognitive processes, as work by Fazio and his colleagues (Fazio, 1986; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; see also Niedenthal & Cantor, 1986) has indicated.

The implications of automatic mood induction are pro-found. For example, imagine walking down the street on your way to work, perhaps passing by hundreds of pedestri-ans. You may arrive at your office in a bad mood for no apparent reason. This mood alteration may have been due to a host of factors that exerted their influence via automatic processes. Examples of such factors may have been crowd-ing, a passerby who reminded you of a cruel and dislikable neighbor who was known in childhood, or a passerby who reminded you of an unhappy romantic relationship. Auto-matic activation of mood may be one reason why it is some-times difficult for people to understand the origins of their mood (cf. Spielman, Pratto, & Bargh, 1988).

Concluding Remarks

In this article, we have explored the implications of the law of cognitive structure activation for several areas of psycho-logical inquiry. We have attempted to demonstrate that the law can provide a satisfactory account for the results of re-search in these areas and in some cases can help to reconcile diverse empirical findings. However, the law has implica-tions for other longstanding issues in the behavioral sciences, as well.

Social scientists have been puzzled by the variability of human behavior. How can humans be both altruistic and aggressive, caring and indifferent, peaceful and hostile, gen-erous and stingy? The present approach offers an explanation for variability in human behavior. That is, behavior is, in part, a function of the cognitive structures that happen to be active at any given time, and as such, behavior will vary as long as structures can vary.

Similarly, philosophers have often debated the fundamental qualities of human nature. Is human nature of gentle, benign character (Rousseau, 1762/1948) or of savage, brutal

character (Hobbes, 1650)? We believe that human nature is an elusive and overgeneralized concept. We argue that humans are neither fundamentally good nor fundamentally evil. Instead, the varying demands of situations and the varying content of frequent and recent personal experiences suggest that humans are variable. The vast differences among various human societies (Kagitcibasi & Berry, 1989; Murphy, 1989) provide persuasive evidence of this fact.

The structure-activation analysis has implications for another longstanding topic, the issue of whether humans are rational or irrational. Conceptions of humans have varied from irrational (i.e., governed by drives or motives: Bradley, 1978; Festinger, 1957; Freud, 1915/1959, 1923/1961) to rational (i.e., governed by thought: Lachman, Lachman, & Butterfield, 1979; Miller & Ross, 1975; Piaget, 1952). Further, conceptions of humans as rational have also varied, from depictions of humans as capable inferential machines (Kelley, 1967; Peterson & Beach, 1967) to depictions of humans as deficient inferential systems (Ross, 1977; Smedslund, 1963; Ward & Jenkins, 1965).

The work we have discussed suggests that humans can appear to be both rational and irrational. As long as the proper cognitive structures or inferential processes are activated at the proper time, humans will appear to be rational. Of course, the appearance of irrationality will be governed by the same mechanisms.

To some, these types of answers (humans can be both rational and irrational, both good and bad) might indicate that a cognitive-structure-activation analysis is too "soft" or nonspecific to be rigorously applied as a law of human behavior. Yet, in our own defense, we point to the research presented in this article, research that empirically demonstrates this flexibility. Furthermore, that investigators in many areas are actively discovering structure-activation effects on both thought and behavior gives us great comfort. Psychologists may yet be able to demonstrate that we can do the "impossible": find general laws that will be useful within the entirety of the many-roomed house of psychology.

Notes

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