1 Automatic and Conscious Processing of Social Information

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Interest in automatic processes is a natural accompaniment to our enduring fascination with the nature of consciousness. The recent surge of interest in automatic phenomena owes much to the current Zeitgeist of social cognition: the turn, in the middle of the last decade, away from the model of rational, scientific man and towards a model of man as cognitively limited and subject to all sorts of distortions as a result. Although opening shots had already been fired in this insurrection (e.g., Jones & Nisbett, 1971; Kanouse, 1971; Taylor & Fiske, 1975; Tversky & Kahneman, 1973, 1974), the breakthrough came with the Carnegie

Symposium of 1975 (Carroll & Payne, 1976). The basic assumption that people are rational, capable, and systematic processors of all information relevant to their judgments and decisions was undermined by the evidence that they heavily favor the use of concrete over abstract information (Abelson, 1976; Nisbett, Borgida, Crandall, & Reed, 1976), are severely limited in the ability to combine different sources of information (Dawes, 1976), and are biased simply by the natural and necessary use of simplifying categorization procedures (Hamilton, 1976). These and later findings of people's failure to consider all or even most of the available relevant information when making social judgments (e.g., Major, 1980; Nisbett & Ross, 1980; Snyder & Swann, 1978) have fostered the currently widely-held belief that people have only a limited conscious involvement with their social environment.

At about the same time, cognitive psychologists were developing the distinction between that mode of processing that was under the control of the person and that which was not (LaBerge & Samuels, 1974; Posner & Snyder, 1975; Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). Conscious or *control processes* were described as flexible and easily adapted to the particular features of the current situation, but severely restricted in scope at any given time by a limited processing capacity. *Automatic processes*, on the other hand, were said to be effortless and not restrained by capacity limitations. They are relatively static sequences of processing that developed out of frequent experience within a particular stimulus domain, and which are triggered by those stimuli without the necessity of conscious intent or control. Even though this phenomenon has been discussed by psychologists for more than a century (see James, 1890), it has only recently been empirically demonstrated with sufficient rigor to be widely and confidently accepted.

In the first part of this chapter, the historical development of the two-process model is traced, and the contemporary theoretical and empirical work of cognitive researchers such as Posner, Shiffrin and Schneider, and Logan is discussed in detail. Based on a critical examination of these more recent conceptualizations of automaticity, and the somewhat fuzzy line of demarcation that emerges between automatic and conscious processes, a clarification is proposed. This includes a consideration of just how much influence automatic processes should be expected to have on thought and behavior. The second part of the chapter consists of a review of the several areas of social cognition research that have applied (and misapplied) the automatic/conscious processing model, in order to evaluate what is and what is not automatic in social information processing.

As social cognition had ample evidence for half of this two-process model—namely, the limited conscious abilities of people to deal with social information—it is not surprising that the concept of automatic processing was quickly embraced as well. In the last 5 years it has been invoked as an explanation for (1) the disproportionate influence of salient information in social judgment (e.g., Taylor & Fiske, 1978), (2) causal attributions (e.g., Smith & Miller, 1979), (3) attitude-behavior consistency and discrepancy (e.g., Langer, 1978; Wicklund, 1982), (4) attitude change (Fiske & Dyer, 1982; Petty & Cacioppo, 1979), (5) objective self-awareness (Hull & Levy, 1979), (6) depression (Kuiper, Olinger, & MacDonald, in press), (7) social interaction (Langer, 1978, 1982), (8) the focal role of the self in phenomenal experience (Kuiper & Derry, 1981; Markus & Smith, 1981), and (9) category accessibility effects (Higgins & King, 1981). The widespread use of the concept illustrates the centrality of the automatic/controlled process distinction to social cognition. But there is a very real danger that the "automatic" label has been so widely applied that the distinction may cease to have any real meaning.

What Automaticity is Not

Automaticity as Irrationality. One way in which the term "automatic" can be misused is by equating it with "irrationality" itself. In this application, characteristic of the research on "mindlessness" (e.g., Langer, 1978), a failure to consider all available relevant information signifies the absence of conscious processing, which means, by default, the person must have been operating "on automatic." That is, a failure to properly use the relevant information is taken to be evidence that it was never consciously noticed in the first place. Since it has been pretty well established that people tend not to make the best use of information even when they *are* consciously dealing with it (e.g., Dawes, 1976; Nisbett & Ross, 1980), such reasoning not only obfuscates the real meaning of "automatic," but also, by implication, equates consciousness with rationality.

Automaticity as the Null Hypothesis. A second problem has been the seductiveness of using automaticity as a *deus ex machina* to be called in when no evidence of a mediating controlled process can be found for a given effect. For example, if no reliable correlation is obtained between, say, recall of behavioral information and attributions, it is concluded that the latter did not depend on any subsequent processing that should have been reflected in better memory for the information involved, and so must have been made automatically at the time the information was presented. While this explanation certainly is not ruled out by the lack of correlation, it equally certainly is not demonstrated, for the same reason that one cannot prove the null hypothesis.

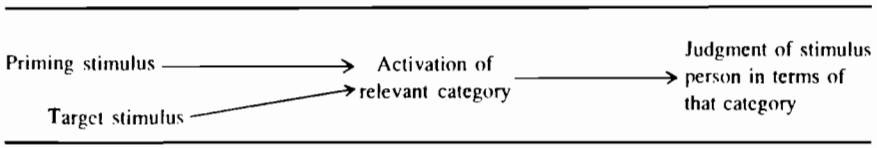
Automaticity as Lack of Awareness. Cognitive theorists (e.g., Posner & Snyder, 1975; Shiffrin & Schneider, 1977) have labeled as "automatic" those cognitive processes that proceed outside of awareness, whether they are stimulus-driven or consciously instigated. There seems to me to be a major difficulty with equating automaticity with lack of awareness, however. A person lacks awareness of nearly all his or her cognitive processes, even those consciously triggered. Thus, if every process to which a person did not have conscious access

was considered automatic, the vast majority of cognitive processes would be, and the automatic/conscious distinction would lose all meaning.

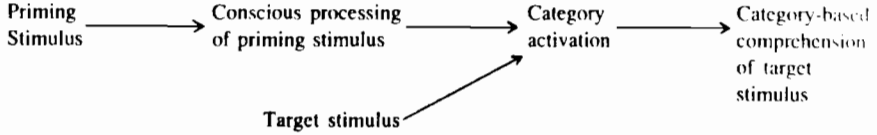
Take, as an example of the problem of defining automaticity of a cognitive process as a lack of awareness of that process, the study by Higgins, Rholes, and Jones (1977). Subjects in this study were not aware of the influence that a given mental category of social information (e.g., "reckless"), activated in a previous, apparently unrelated context, had on their later impressions of a target person. Based on the equation of automaticity with a lack of awareness in the cognitive literature, Higgins and King (1981) considered these findings, along with similar results by Srull and Wyer (1979, 1980), to be evidence of automatic category effects. Yet the subjects in these experiments were demonstrating the same lack of introspective access to their thought processes as did subjects in the experiments reported by Nisbett and his colleagues (Nisbett & Bellows, 1977; Nisbett & Wilson, 1977a, 1977b). In these latter studies, subjects also were presented with influential stimuli, and were even consciously using these stimuli to make judgments, but were *still* unable to distinguish influential from noninfluential stimuli any better than nonparticipating observers. Thus, lack of awareness of the influence of a stimulus is not sufficient evidence of an automatic process, for people apparently lack awareness even of processes that they are actively controlling. In fact, given the limited capacity of consciousness, it would be maladaptive to be conscious of much of *how* we know something, for this would mean less consciousness for *what* we need to know (Bateson, 1972). I propose, therefore, that lack of awareness of a process should not be a sufficient criterion of automaticity. There has to be something more to the concept of automaticity for it to be of real service.

Cause and Effect in Thought

If we ask what was the cause of the differential impressions formed by subjects in the Higgins et al. (1977) and Srull and Wyer (1979, 1980) studies, we can answer at two levels. In one sense the cause was the different categories that were temporarily active for subjects in the various conditions. Going back one step, we could say the cause was the different priming stimuli (trait terms or behavioral exemplars) to which subjects were exposed and which resulted in the activation of the different categories. Of course, both were causes of the effect, but the active category was the proximal or immediate cause, and the priming stimulus materials were the distal or remote cause:



Now we must ask if the subject's conscious intent or control played any role in this causal chain. We can see that it does, for the subject paid conscious attention to the priming stimuli during the first of the two experimental sessions. The causal chain is actually thus:



Thus the intervention of the subject's conscious control was necessary for the effect to occur. Subjects may not have been aware of the way in which the activated category influenced the later processing of the description of the stimulus person, but they *were* aware of the stimuli that activated the category in the first place. The important point is that the immediate cause of the effect was the conscious activation of the category, *not* the priming stimuli themselves. If a process requires conscious intent of any kind to be completed, we should not consider it automatic. Thus the effect of the priming stimuli on impressions of the stimulus person in these studies was not automatic, although the effect of the activated category could be argued to be so, as subjects were not aware or in control of its influence on their inferences. As discussed above, however, it is not very meaningful to label as automatic *internally* instigated processes (such as category activation resulting from conscious attention) that subsequently operate outside of consciousness. To do so would be analogous to arguing that a kicked football moves of its own accord once it loses contact with the foot. Therefore, we will here define automatic processes as *those which are under the immediate control of the environment.* All that an automatic process requires is the presence of a triggering stimulus configuration; no conscious intervention of any kind is necessary.

Distinguishing between immediate and ultimate causes in this way also helps to escape the "problem of volition" (Kimble & Perlmuter, 1970). It has been argued that models of information processing that include an "executive" or set of "control processes" are merely inserting a homunculus or "little man in the head" into the system, which is of course no explanation at all (see Neisser, 1967, pp. 292–295). Such mechanistic devices fill the same gap in our knowledge of cognition as did the *will*, and earlier, the *soul*. To locate ultimate causation of any kind in consciousness or the will is therefore unscientific, according to this reasoning, and so it is contended that *all* thought is under the control of the environment either directly or through its effect on associative mechanisms of the brain (e.g., Anderson & Bower, 1973; Skinner, 1971, p. 195). According to this perspective, then, every thought is automatic, and man is like Spinoza's conscious stone, believing it flies freely through the air only

because it is not aware of the source of its movement. I hope to preserve the utility of the automatic/conscious dichotomy by distinguishing between those cognitive processes *directly* instigated by external stimulation and those the immediate cause of which is some conscious and intentional process.

MODELS OF AUTOMATIC AND CONSCIOUS PROCESSING

Habit Formation

The division between mental processes that are under conscious control and those that are not is nothing new; in fact, as the principle of "habit formation" it is one of the oldest concepts in psychology. In his *Principles of Psychology* (1890), William James reviewed the arguments of several writers who had advocated such a model. James cites the physiologist Carpenter, writing over a hundred years ago:

> The psychical principles of *association*, indeed, and the physiological principles of *nutrition*, simply express—the former in terms of mind, the latter in terms of brain—the universally admitted fact that any sequence of mental action which has been frequently repeated tends to repeat itself; so that we find ourselves automatically prompted to *think, feel*, or *do* what we have been before accustomed to think, feel, or do, under like circumstances, without any consciously formed *purpose*, or anticipation of results. (in James, 1890, vol. 1, pp. 111–112)

James concluded that frequent use of a mental sequence results in its removal from conscious control, as well as from conscious awareness, and that this was absolutely necessary in order to free limited consciousness from the numerous mundane requirements of life (1890, vol. 1, pp. 113–114). He differentiated between *voluntary* and *involuntary* attention; the former characterized by its effortfulness, being directed by intentions and purposes, the latter by its ease and reflexiveness (1890, vol. 1, pp. 416–420). A further distinction was made between *immediate* and *derived* sources of involuntary attention. By "immediate" was meant those stimuli that naturally or instinctively draw our attention: either by their "mere force," i.e., those that are intense, looming, or suddenly changing; or are by their nature directly exciting to us as a species—in James's classic list, "strange things, moving things, wild animals, bright things, pretty things, metallic things, words, blows, blood, etc., etc., etc." (1890, vol. 1, p. 417). *Derived* involuntary attention is directed towards those areas of the environment in which one has considerable experience and familiarity. The function of voluntary attention was argued to be to preserve the focus of thought through inhibition of the processing of competing stimuli:

> Effort is felt only when there is a conflict of interest in the mind. . . . Dynamically, . . . that may mean . . . that the associative processes which make Z triumph are really the stronger, and in A's absence would make us give a passive and unimpeded attention to Z; but, so long as A is present, some of their force is used to inhibit the processes concerned with A. Such inhibition is a partial neutralization of the brain-energy which would otherwise be available for fluent thought. (vol. 1, p. 451)

To summarize James's processing model: due to the necessity of freeing limited consciousness, those stimulus events that are frequently experienced eventually come to be processed without the necessity of conscious involvement. Habitual mental sequences deal with the invariances in the environment, allowing conscious capacity to be flexibly allocated to variable situational and personal requirements. We shall see that the contemporary reawakening of interest in consciousness has resulted in a model that is not appreciably different from that outlined by James.

Initial Automatic Analysis of the Environment

It is widely recognized that an individual's conscious processing capacity is limited at any given time[1] (e.g., Boring, 1933, p. 194; Broadbent, 1958; Kahneman, 1973; Mischel, 1979; Norman & Bobrow, 1976; Posner & Snyder, 1975; Schneider & Shiffrin, 1977). On logical grounds alone it is clear that considerable amounts of cognitive work must go on outside of conscious awareness:

> Suppose that on the screen of consciousness there are reports from many parts of the total mind, and consider the addition to consciousness of those reports necessary to cover what is, at a given state of evolution, not already covered. . . The next step will be to cover the process and events occurring in the circuit structure which we have just added. And so on. Clearly the problem is insoluble, and every next step in the approach to total consciousness will involve a great increase in the circuitry required. It follows that all organisms must be content with rather little consciousness. . . (Bateson, 1972, pp. 142–143)

Up to a certain point, then, we are not aware of the analysis of environmental stimuli. How *much* analysis goes on prior to conscious awareness has been a

[1]The notable exception is Neisser (1976; Hirst, Spelke, Reaves, Caharack, & Neisser, 1980; Spelke, Hirst, & Neisser, 1976), who contends that the human ability to acquire complex skill demonstrates that capacity does not have fixed limits. Shiffrin and Dumais (1981) have called this position unreasonable in light of the consistent performance asymptote in their target detection paradigm, even with extensive practice. Still, the real difference here may be semantic, as most view skill acquisition as a process of reducing capacity demands through practice so that more and more can be accomplished within the fixed limits.

matter of some debate. Broadbent's (1958) original filter theory of attention, which reintroduced consciousness as a topic for research in experimental psychology, held that inputs were screened for entry into consciousness on their physical characteristics. But dichotic listening experiments by Moray (1959) and Treisman (1960) demonstrated that *meaningful* unattended inputs were also noticed by subjects. This led Deutsch and Deutsch (1963) to propose that all inputs were fully analyzed for meaning unconsciously, with entry into consciousness determined by this analysis.

The Moray (1959) and Treisman (1960) experiments had not shown *all* stimuli to break through the attentional barrier, however. In the Moray (1959) study, the only unattended stimulus to be noticed was the subject's own name (and then only a third of the time); in the Treisman (1960) study, only words with a high conditional probability of occurring were able to draw attention. More recently, experiments by Lewis (1970) and Corteen and Wood (1972) have been cited as evidence that all stimuli are fully analyzed for meaning prior to reaching consciousness, but their procedures do not permit such a conclusion to be drawn.[2] An experiment by Treisman and Geffen (1967) undermined the complete-analysis position, by showing that subjects are not able to detect targets in an unattended message as well as they can in an attended message. It appears, therefore, that stimuli reaching the sensory apparatus are automatically processed to a certain degree, perhaps up to the extraction of physical features, and that some, but not all, stimuli receive more extensive initial analysis.

What determines the level to which an environmental stimulus will be automatically processed? Bruner's (1957) discussion of categorization procedures posited a preconscious stage of "primitive categorization," in which a rather gross analysis of the environment into distinct objects or events takes place. This is followed by a process of cue search, which depending on the stimulus event can either be a continuation of the original automatic perceptual sequence, or a consciously-directed examination of the feature space. The amount of consistent

[2]Lewis (1970) presented stimuli to the unattended ear in a dichotic listening task, and found that unattended words that were semantically related to simultaneously-presented attended words interfered with their shadowing. Lewis concluded that words on the unattended channel receive full semantic analysis. Treisman, Squire, and Green (1974) replicated the Lewis (1970) experiment, however, and found the interference to occur only for words presented very early in the list, and *not* for all semantically-related word pairs. This suggested that it may take time for efficient focusing of attention to develop in the shadowing task. Before that occurs, some attention is given to the to-be-ignored channel, producing interference, which cannot therefore be attributed to any routine automatic analysis of all inputs.

Corteen and Wood (1972) obtained greater galvanic skin responses to the presentation of unattended words that had previously been associated with an electric shock. In a replication of this study, Dawson and Schell (1979) found the effect only for conditioned stimuli that had been given substantial amounts of *conscious* processing; i.e., those that were temporarily still active. Neither the Lewis (1970) nor the Corteen and Wood (1972) studies can be considered as evidence of full analysis of all sensory inputs.

experience one has had with the stimulus is said to determine how far it will be processed automatically:

> In highly practiced cases or in cases of high cue-category probability linkage, a second process of more precise placement based on additional cues may be equally silent or 'unconscious'. . . In such instances there is usually a good fit between the specifications of the category and the nature of the cues impinging on the organism. . . Where the fit to accessible categories is not precise, or when the linkage between cue and category is low in probability in the past experience of the organism, the conscious experience of cue searching occurs. (Bruner, 1957, p. 130)

Neisser (1967) also endorsed a model in which automatic analyses of the environment served as the grist for the mill of conscious processes. What he denoted as *preattentive processes* segregated the stimulus field into figural units, to which focal attention then gives further analysis. Like James, Neisser considered some preattentive processes to develop out of sufficient experience with the stimulus event, while others are innate (1967, p. 101). Like Bruner, he considered the perceiver to be an active explorer of the environment; perception involved a *construction* of the environment based on the output of the preattentive processes (pp. 193–198).

The Interaction of Conscious and Automatic Processes

Based on research in the Stroop and semantic priming paradigms, Posner and Snyder (1975) and Logan (1980) proposed models in which a stimulus automatically activates those mental structures that have been chronically associated with it. Conscious processing, however, is said to be able to inhibit competing automatic processes from entering consciousness. In the Stroop paradigm, subjects are instructed to report one dimension of a stimulus, such as the color in which a word is printed. Unreported dimensions of the stimulus, such as the word's meaning, interfere with the task if they are incompatible with the reported dimension (see Kahneman, 1973; Logan, 1980). The semantic priming paradigm requires subjects to make a judgment about a stimulus, such as whether or not it is a meaningful word. When a priming stimulus that is associatively related to the target word (e.g., FRUIT as a prime for APPLE) is presented just prior to the target, response time is facilitated (e.g., Schvaneveldt & Meyer, 1973). In both paradigms, subjects are to attend to only one stimulus dimension, but irrelevant dimensions influence subjects' responses despite their efforts to ignore the irrelevancies.

Posner and Snyder (1975) concluded from these studies that a stimulus will automatically activate a specific neural pathway, and that this activation will facilitate the processing of other stimuli that use the same pathway without interfering with other ongoing processing. Conscious activation of a pathway, on

the other hand, was also said to facilitate that pathway, but at a "widespread cost or inhibition in the ability of *any* other signals to rise to active attention" (p. 66). Posner and Snyder (1975, p. 55) proposed three operational criteria for an automatic process: it may occur (1) without intention, (2) without giving rise to conscious awareness, and (3) without producing interference with other ongoing mental activity. Conscious processing, on the other hand, requires attention, gives rise to awareness, and does interfere with other processing.

The most important contribution of the Posner-Snyder model is the specification of how the automatic and attentional processes interact. Automatic processing of stimulus inputs was characterized as proceeding in parallel and outside of conscious awareness, but inhibited from achieving consciousness by the conscious-attention mechanism. Neely (1977) provided a test of this hypothesized interaction. He presented subjects with words that either primed their own semantic category (e.g., BODY—heart), or, through a conscious expectancy induced by instructions from the experimenter, primed a different category (e.g., BODY—sparrow). In this latter condition, therefore, subjects had a conscious expectancy for a name of a type of bird when they saw the BODY prime, while BODY should also automatically prime its own category of body part names. It was found that BODY facilitated the decision of whether or not body part names were words at short intervals between prime and target (about 250 milliseconds). The BODY prime interfered with such decisions at longer intervals, however, when the conscious expectancy for bird names had had time to develop and to inhibit other processing, such as the automatic activation of body part names. In support of the Posner and Snyder (1975) theory, conscious attention worked to inhibit the results of automatic processing, reversing the usually facilitative semantic priming effect.

Logan and Zbrodoff (1979) reversed the usal Stroop effect in the same way. Subjects were to report the word that was presented either above or below a fixation point. Responses became faster to the word BELOW when it was above the fixation point, and to the word ABOVE when it was below the fixation point, when due to their greater frequency such trials came to be expected by subjects.

Logan (1980) has developed a model similar to that of Posner and Snyder to explain the Stroop and semantic priming phenomena. Automatic effects are assumed to be relatively permanent in sign (facilitative or inhibitory) and size over variations in situational context and the individual's purposes. The relatively flexible attentional effects are said to vary in sign and magnitude as current purposes demand. The model further assumes that the automatic and attentional effects associated with each stimulus dimension are combined additively in making a response decision. For example, in the Stroop test, the word RED printed in red ink has a facilitative or positive automatic weight associated with the irrelevant dimension of the word meaning, and so the magnitude of the attentional weight required to report the ink color is decreased. On the other hand, the word GREEN printed in red ink has an inhibitory or negative automatic weight associated with it, and so the attentional weight needed to achieve the response criterion and report the ink color as "red" is greater. *When automatic and attentional processes are dealing with the same environmental features, less conscious attention is needed; when they are concerned with different environmental features, more conscious attention is necessary to maintain its focus.*

As did the Bruner (1957) and Neisser (1967) models before them, those of Posner and Snyder (1975) and Logan (1980) consider automatic processes to be those set in motion by the presence of a stimulus, and not requiring the involvement of consciousness. They are contrasted with processes under the individual's control that are limited in focus at any given time. The Posner-Snyder and Logan models extend the earlier work by also treating how the conscious and automatic modes interact in the processing of stimulus events.

The Development of Automaticity

Based on a thoroughgoing series of experiments in the target detection paradigm, Shiffrin and Schneider (1977; Schneider & Shiffrin, 1977; Shiffrin & Dumais, 1981) developed the most comprehensive of the two-process theories. Before each experimental trial, subjects were presented with several items (either consonants or digits), called the *memory set*. Their task was to report the occurrence of any memory set members in the rapidly-presented series of 20 *frames* (each containing four elements—either digits, consonants, or random dot patterns). The dependent variables were the memory set size (the number of items in the memory set; either 1 or 4), the frame size (the number of characters presented in each frame), and the frame time (how many milliseconds each frame in a given trial was presented). Memory set size and frame size multiplicatively combined to determine the *memory load*.

Subjects were given extensive training in the detection paradigm, but the nature of this training procedure varied. In the *consistent-mapping* condition, the memory set targets were always digits and the distractors (items in the frames that were not in the memory set) were always consonants, across all trials. In addition, items in the memory set never appeared as distractors, and vice versa. In the *varied-mapping* condition, memory set items and distractors were randomly interchanged across trials, and were all from the same category (i.e., either all consonants or all digits).

Results of these experiments (Schneider & Shiffrin, 1977) showed that target detection performance in the varied-mapping conditions markedly deteriorated with increases in memory load, while the performance of subjects after thousands of trials in the consistent-mapping conditions was not affected by load. In other words, when the targets to be detected were frequent and consistent, they came to be noticed no matter how much processing capacity was being used to hold the target set in memory. When the nature of the targets was completely inconsistent, detection ability was dependent on the amount of available capaci

ty. Schneider and Shiffrin (1977) concluded that subjects in the consistent-mapping conditions learned *automatic-attention responses* for the memory set items, so that conscious attention was automatically drawn to them upon their presentation.

A further set of studies (Shiffrin & Schneider, 1977) found that when a consistently-mapped target subsequently appeared as a distractor, it still drew attention and so interfered with controlled processing. This occurred even when the consistently-mapped target was presented in a frame location that subjects were instructed to ignore as irrelevant.

Shiffrin and Schneider (1977) presented a general theory of information processing, focusing on the complementary roles played by automatic and controlled modes. Automatic processes are those that are well-learned and stored as a sequence of nodes in long-term memory, are not demanding of attention unless containing an automatic-attention component, are difficult to alter or suppress, are not affected by current demands on capacity, and which become active in response to particular internal or external inputs without the necessity of active control by the individual. Controlled processes are flexible and easily established and modified, are highly demanding of processing capacity, and so are very dependent upon the amount of capacity available for their successful operation. The two modes can and do operate simultaneously, although automatic processes perform the initial analysis of sensory inputs, and furnish the results to controlled processing.

A major contribution of the Shiffrin and Schneider research is the empirical demonstration of the development of automaticity. Considerable and consistent experience with a stimulus was found to be necessary. A further series of studies by Schneider and Fisk (1982a) has investigated the *degree* of consistency required. These experiments varied the percentage of trials that an item appeared as a target versus a distractor. It was found that as long as an item was equally or more likely to be a target than a distractor, automatic detection developed, but the more consistently an item was a target, the stronger the automatic processing component. Thus, it appears that automatic processes can develop where there is less than perfect consistency of experience with a stimulus, although the more consistent one's experience with the stimulus, the stronger the automatic process that develops.

Comparison of the Models

The Shiffrin-Schneider, Posner-Snyder, and Logan models are virtually identical. All view automatic and controlled processes as separate modes, and emphasize the role of intention in distinguishing between the two. Automatic processes can operate in parallel, are not affected by how much of the limited capacity is currently available, and are not under the person's control. Conscious or controlled processes, conversely, are serial in nature, are capacity-limited, and are

intentional on the part of the individual. Automatic processes develop out of considerable and relatively consistent experience with an environmental object or event, and so are comparatively fixed and inflexible, while control processes are adaptable to novel and unusual situations.

The Shiffrin-Schneider model differs from the others in its inclusion of automatic-attention responses. This violates two of Posner and Snyder's (1975) criteria for an automatic process, since automatic-attention responses theoretically give rise to conscious awareness and interfere with ongoing mental activity. Shiffrin and Dumais (1981) therefore proposed two "rules" of automaticity, and defined a process as automatic if it satisfied either of the rules. Rule 1 was that "any process that does not use general nonspecific processing resources and does not decrease the general nonspecific capacity available for other processes is automatic" (p. 116). On this criterion all three models would agree. Rule 2, however, proposed that "any process that always utilizes general resources and decreases general processing capacity whenever a given set of external initiating stimuli are presented, regardless of a subject's attempt to ignore or bypass the distraction, is automatic" (p. 117). The existence of such automatic attention responses, however, is not conclusively demonstrated by the Shiffrin-Schneider experiments. In their paradigm, the subject's very task was to search the frames for the presence of targets, and so they were devoting conscious attention to the stimuli. Even when an item was presented to a to-be-ignored frame location it was likely to receive at least some attention, especially when the subject's total concentration was directed to the visual information in front of him or her. In terms of Logan's (1980) model, it could well have been the presence of conscious attention *combined* with the automatic effect of the consistently mapped target that allowed it to enter consciousness. Thus, there is no real evidence against the Posner-Snyder and Logan position that control processes can override automatic processes when the two are in conflict. What is needed is data on the conscious awareness of automatically processed information when attention is demonstrably focused elsewhere.

Suggestive but not conclusive on this point are the dichotic listening studies of Moray (1959) and Nielsen and Sarason (1981) that found the subject's own name and sexual words, respectively, to *occasionally* break through the attentional barrier and be noticed. No other type of word was noticed, not simple words repeated 35 times in the Moray study, nor other emotionally salient words in the Nielsen and Sarason study. More importantly, these words did not *always* attract attention (for example, subjects in the Moray study noticed their name in the unattended channel only about one-third of the time on the average), which would be expected if the reaction to consciously attend was *automatic*. Furthermore, it is unclear from the very nature of the shadowing task employed in both studies whether the effect was not just due to a switching of *conscious* processing to the to-be-ignored channel. In the Nielsen and Sarason study, for instance, subjects who were presented the sexual words were much more likely than other

subjects to make errors in shadowing the attended channel, which indicates a possible focusing of conscious attention on the sexual word content and away from the target channel. A demonstration of automatic attention responses showing that the configuration of stimuli always draws attention when presented, and which rules out the involvement of conscious processing, has thus far not been made. The evidence therefore favors the Posner-Snyder-Logan position that automatic processing does not require attention, and that conscious processes dominate and inhibit automatic processes when the two are in conflict.

A second difference is that Shiffrin and Schneider include internally-instigated automatic processes as well as those that are set in motion by external stimulation alone. Logan (1979) restricts the scope of automaticity to those processes set in motion by an environmental event without the need of any conscious intervention:

> Attention refers to a central process that coordinates and controls performance in some task environment. Performance is considered automatic to the extent that it is coordinated without attentional control, and the development of automaticity with practice refers to a transfer of control from attention to reliable characteristics of the task environment. (p. 189)

The same conclusion has been reached by investigators of human problem-solving abilities (see, e.g., Kaplan & Kaplan, 1982, pp. 167–168). For example, deGroot's (1965) classic study of chess masters found that the only difference between masters and novices was in their initial perception of the problem, not in how they subsequently manipulated this information. In other words, the higher level of analysis and abstraction reached by the masters' automatic processing of the stimulus configuration, on which their control processing then operated, was the difference between them and the novices. I noted in the introduction the problems inherent in defining as automatic mental processes that are started by intention but then proceed without awareness. It is not that the automaticity of such processes is questioned so much as that the utility of the automatic/conscious distinction is essentially lost in this definition, given one's *general* lack of awareness of one's cognitive processes. For these reasons the "stimulus-driven" definition is strongly advocated here.

The Extent of Automatic Influence

Since automatic processes are under the immediate control of environmental stimuli, either due to innate predispositions or to frequent and consistent experience with those stimuli, it is apparent that their influence will be almost exclusively at the perceptual end of the information processing spectrum. The more abstract a mental representation—that is, the more removed it is from sensory experience—the later it will develop, and the less frequently it will become

active (Hebb, 1949; Kaplan, 1976; Newell & Rosenbloom, 1981). Therefore, the less likely it will be to become activated automatically. This would seem to be a very functional arrangement; it would be counterproductive for a species that uniquely possesses the flexibility of the conscious processing system to place very many behavioral responses under the control of the environment (see Campbell, 1974, pp. 332–337).

Perception, by most accounts, involves an interaction between the environmental stimuli that are currently present and the individual's readiness to perceive some over others. We have been concerned up to this point with structural readinesses, relatively fixed and permanent and developed out of long-term experience with a particular stimulus event. But such "top-down" influences can also be due to transitory mental states—temporary activation of certain representations due to current plans, goals, and needs that increase their power over perception and thought (Bruner, 1957; Erdelyi, 1974; Higgins & King, 1981; Neisser, 1967, 1976; Wyer & Srull, 1981). Automatic processes can exert their "bottom-up" influence and give prominence to some stimuli over others, but, as pointed out in the last section, active perceptual sets driven by motives and intentions can override these "suggestions" and grant emphasis to other stimuli that better suit present purposes. One can conceptualize motives as higher-order schemata that direct the controlled search of the environment (Cohen, 1981; Neisser, 1967, 1976), or as resulting in the temporary activation of certain representations that are then more sensitive to the presence of relevant stimuli (Erdelyi, 1974; Higgins & King, 1981). In either case, the subsequent recall of social information has been found to be markedly dependent on such transitory states (Cohen, 1981; Higgins, McCann, & Fondacaro, 1982; Jeffrey & Mischel, 1979). In his critique of the man-as-computer analogy, Dreyfus (1972) notes that a major difference between human and mechanical intelligence is that humans continually organize available information in terms of current needs. In other words, there is no objective factual knowledge to be had, because what is learned from a situation is dependent on one's situational goals. People are active explorers of their environment, not passive recipients of stimulation (Bruner, 1957; Neisser, 1976; Taylor, 1981), and this limits the potency of automatic effects.

Unless attention is directed to an automatically activated location in long-term memory, the activation will persist for only a second or two (Glucksberg & Cowen, 1970; Norman, 1969; Peterson & Kroener, 1964), and the result of such processing will not be stored in memory (Moray, 1959; Neisser, 1964; Schneider & Fisk, 1982b). In other words, a stimulus event must receive conscious attention if it is to be stored in long-term memory (Broadbent, 1958; Erdelyi, 1974; James, 1890; Neisser, 1967; Shiffrin & Schneider, 1977).[3] Moray (1959), for

[3] In studies that have been taken by some to be exceptions to this general rule, Hasher and Zacks (1979) contended that spatial location, time, frequency of occurrence, and word meaning are "en

example, found no recognition memory for words that had just been presented up to 35 times in the unattended channel. Erdelyi (1974) has pointed out the adaptiveness of such a processing system, which preserves the clarity of one's long-term cognitive map of the environment by not cluttering it with additional instances of what one already knows well.

AUTOMATIC AND CONSCIOUS PROCESSING OF SOCIAL INFORMATION

What are the implications of automatic processing for social psychology? It seems to be most clearly relevant for social perception, for a considerable amount of interpretive work could automatically occur for certain stimuli, with these elaborations being treated by the perceiver as being as unquestionably veridical as any other "raw sensory experience" (cf. James, 1890, vol. 2, p. 301). The power of self-relevant stimuli in social judgments (e.g., Markus & Smith, 1981) may be due to their favored status in the initial automatic analysis of sensory data. As another example, there may be automatic pathways associated with chronically accessible categories, so that stimuli consistent with them automatically activate the category itself (Bargh & Pietromonaco, 1982; Higgins, King, & Mavin, 1982). Some have argued that the negative mind-set that characterizes the depressive may be the result of just such automatic inferences (MacDonald & Kuiper, 1982). In addition, an automatic spread of activation from the internal representation of an environmental object to the attitude associated with it has been hypothesized recently to be necessary for attitude-behavior consistency (e.g., Fazio, Powell, & Herr, 1983).

These are effects driven solely by automatic processes. As we have seen, however, perception is also influenced by conscious control processes. Salience effects, as I will argue below, can be attributed to the greater degree of conscious attention given to unexpected stimuli, due to the absence of automatic assistance in their processing. A major focus of recent attitude change research has been on the role of involvement, which appears to modulate the role such active processes play (Chaiken, 1980; Petty & Cacioppo, 1979). With low message-recipient involvement, the automatic effects may be stronger than the attentional

coded automatically into memory" (p. 358), but they emphasized that "the person must be *attending* to the input in question" (p. 358–359) for this to occur. Kellogg (1980) had subjects look at faces while performing an auditory multiplication task, and found that subjects later reliably recognized these faces that, he claimed, they had not consciously attended. Subjects had been looking at the faces, and so it is hard to believe that they had not been consciously aware of them, at least momentarily. The only measure of awareness taken was a self-report based on subjects' memory of how much conscious attention they had given to the faces. A lack of memory does not mean a lack of momentary awareness (e.g., White, 1980), and the validity of the self-report measure of attention is questionable.

effects, whereas the reverse may be true under conditions of high involvement. Thus, which sources of information are more influential—those emphasized by automatic processing, or those augmented by conscious attention—will depend on the amount of conscious attention deployed. This line of research is doubly important because it concerns the conditions under which people are and are not in control of their perceptual experience.

This brings us to the question of the degree of control that is typically exerted, which is the focus of the research on "mindlessness." We have seen that there are good reasons to doubt that the stimulus environment directly and automatically controls much in the way of actual behavior, so Langer's (1978) rather strong claims about "automatic" social interaction should not be taken too literally. While the "mindlessness," salience, and attitude change evidence does not satisfy the criteria for automatic effects because of intervening conscious processing, it does show that automatic input into the controlled processing that *then* makes the response decision is the more powerful determinant under conditions of low conscious involvement. That is, to the extent that conscious processes do not play a role in perception, the information they operate on to make inferences and behavioral choices depends on automatic analyses of the environment. In terms of Logan's (1980) additive model, in such situations the permanently strong automatic effect outweighs the relatively weak attentional effect in the competition for conscious attention.

It has been noted that with all of the recent attention given to the structure and content of schematic representations of the social environment, there is a relative lack of knowledge of the processes that operate on these representations (Fiske & Linville, 1980; Wyer, 1980). Especially needed is an understanding of how the various representations become active to exert their influence on processing (Nisbett & Ross, 1980, p. 36). The automatic/controlled process model shows great promise in helping to fill this need, and has already found a home within social cognition. We will now review these relevant areas of social cognition research.

Innately Interesting Stimulus Properties

The more intense a stimulus event, the greater the resultant activation of the internal representations associated with it, and the more likely it is to be consciously noticed (Neisser, 1967). Intense stimuli contribute a greater automatic input into the perceptual process, requiring less attentional effort to be noticed, as is demonstrated by the decrease in reaction time to a stimulus with increases in its intensity (Teichner & Krebs, 1972). People also seem to be "prewired" to notice changing features of the environment, such as motion and contours, and this appears to be explainable in terms of its adaptive value (Neisser, 1967).

Another innate bias is the human preference for visual information over that from other sensory modalities. As a species we are highly dependent on visual

data (Campbell, 1974, p. 334; Kaplan, 1976), and we give it greater weight in social judgments. Vivid, concrete verbal information that is easily visually imaged has been argued to have a disproportionate impact on people's judgments relative to less easily imageable abstract statistical information (Nisbett et al., 1976; Nisbett & Ross, 1980; but see Taylor & Thompson, 1982). The person or other aspect of the environment on which visual attention is focused is usually judged to be the causal agent in the social situation (Fiske, Kenny, & Taylor, 1982; Jones & Nisbett, 1971; McArthur & Post, 1977; Storms, 1973; Taylor & Fiske, 1975), even when the perceiver is highly distracted from the verbal content of the situation (Taylor, Crocker, Fiske, Sprinzen, & Winkler, 1979). The conclusion that the effect of visual information on social judgments constitutes an automatic response to stimulus qualities (Taylor et al., 1979; also by McArthur, 1980, 1981) is not justified, however, because subjects were intentionally attending visually to the stimulus persons. Furthermore, the study by Fiske et al. (1982) showed that recall of visual information considered relevant by the subjects to judgments of causality was a significant mediator of such judgments. Since memory requires conscious attention, it appears that the influence of visual information on causal judgments is not automatic, but rather reflects the greater automatic perceptual emphasis given to visual data, thus affording it more weight in the subsequent conscious judgment. This was the conclusion reached by Fiske et al. (1982, p. 123).

Salience Effects

Other stimuli are given figural emphasis not because of their own properties per se, but because of the contrast between them and the current context or the perceiver's temporary or long-term expectancies.[4] This emphasis is due to differential *conscious* attention to unexpected stimuli, and has been argued to be a very adaptive use of limited attention (Fiske, 1980; Hastie, 1981; Shiffrin & Schneider, 1977). In terms of the present discussion, unexpected or novel information is given little if any automatic processing in the initial perceptual analysis, and therefore requires relatively greater amounts of conscious attention in order to be processed once it is

[4]In defining salience as stimulus features that, by virtue of their situational or general unexpectedness, attract greater amounts of conscious attention, I depart from the somewhat broader definition recently proposed by Fiske and Taylor (1984). They defined salience as features of stimuli in context that usually, but not necessarily, attract attention. Included in their set of salient stimuli, however, are those that would attract attention for reasons other than their unexpectedness, such as goal-relevant stimuli and those that dominate the field. I believe that limiting the concept of salience to apply only to those stimuli that attract attention due to their inconsistency with temporary or long-term perceptual hypotheses is useful, because attention allocation attributable to salience defined in this way can be more easily differentiated from that driven by needs and motivation or by properties of the stimulus itself such as size or intensity.

consciously noticed. For example, Fiske (1980) presented subjects with slides depicting either extremely or moderately positive or negative behaviors. Extreme and negative behaviors were given more attention (measured in terms of looking time) and subsequently had more impact on impression ratings. Fiske (1980) argued that social perceivers have a chronic expectancy for people to behave in a mildly positive manner in public, so that negative or extremely positive behavior is unexpected and draws more attention. Friedman (1979) found the same result in the processing of common scenes, such as kitchens, farms, and living rooms. She measured first eye fixations to these pictures, and showed that first fixations to unexpected items, such as a hippopotamus in the farm pond, were approximately twice as long as those to expected items.

It therefore appears that stimuli consistent with expectancies are more likely to be noticed but are then given minimal conscious attention, while unexpected events are less likely to be noticed, but, if they are, draw considerable attention. If the expectancy is a chronic, long-term feature of the perceptual system, the advantage of consistent stimuli is due to automatic processing; if the expectancy is temporary it is attributable to an active conscious set (Bargh, 1982; Higgins & King, 1981). A demonstration of the processing effects of an active expectancy was made by Hastie and Kumar (1979). They presented subjects with a series of behaviors that were either consistent, inconsistent, or irrelevant with regard to an initial description of the stimulus person. For example, the stimulus person was described as "honest and sincere," and then subjects read behavioral descriptions of that person, some of which were of dishonest, some of honest, and others of neutral acts. The proportion of consistent to inconsistent behaviors was varied in different experimental conditions. It was found that subjects best recalled inconsistent behaviors, followed by consistent and then neutral behaviors. Furthermore, the advantage of inconsistent items in recall was greater the fewer inconsistent behaviors that were presented. Hastie and Kumar (1979) concluded that the items that were inconsistent with the initial expectancy were more informative as to the subject's character, and so received more attention and were consequently easier to recall. It also appeared that the active expectancy changed over the course of the experiment in response to the actual mix of consistent and inconsistent behaviors presented, for the recall advantage of inconsistent behaviors diminished as the mix approached equality. This is testimony to the flexibility and adaptiveness of conscious perceptual sets.

Hastie (1981) argued that such effects should only occur when the perceiver has sufficient time to devote differential attention to the inconsistent items. In support of this, Srull (1981, Experiment 4) found that in a replication of the Hastie and Kumar study, loading conscious attention with a simultaneously performed secondary task eliminated the recall advantage of incongruent behaviors. Therefore, when information is available only briefly, and is being presented at a fast rate, automatic processes should play a greater role. Bargh, Thein

and Friedman (1983) conducted a replication of the Hastie and Kumar (1979) study,[5] but controlled the presentation rate of the behavioral information so that subjects could not allocate different amounts of attention to the various items. Each behavioral description was presented for just enough time for subjects to read through the behavior once before the next one was presented.

Two groups of subjects participated: those who did ("Chronics") and those who did not ("Nonchronics") possess a chronically accessible mental category for stimuli related to honesty. Following the selection criteria of Higgins et al. (1982), subjects were considered to have a chronic sensitivity to stimuli consistent with those personality trait categories that first came to mind when they were asked to describe various types of people. It was assumed that the subjects used this category so frequently in social perception and judgment that they were capable of automatically processing information consistent with it.

Subjects were instructed to form an impression of the stimulus person while reading the behavioral descriptions. Half of the subjects read about a person who performed mainly honest behaviors, while the remaining subjects read mainly dishonest behavioral descriptions. It was predicted that Nonchronics would not be able to discriminate in their impressions between the stimulus person who was mainly dishonest and the one who was mainly honest. This was because they were assumed to lack the ability to automatically process honest or dishonest behavioral information, and because they were not given the time necessary to allocate different amounts of conscious processing to the two types of behavior. Chronics, on the other hand, were hypothesized to be sensitive to the difference between the honest and the dishonest stimulus persons. Being able to automatically process the honest behavioral stimuli would free the load on memory caused by the rapid presentation rate, and so Chronics would be able to devote some attention to the dishonest behaviors. Consequently, their impressions of the honest and dishonest stimulus persons should differ. This was what was found (see Table 1.1).

It thus appears that salient information in the environment is that which must be given relatively greater (conscious) attentional processing, either because it does not receive much in the way of automatic processing, or because its internal representation is not part of a currently active conscious set. This follows directly from Logan's (1980) additive model of attentional effects: the amount of attention needed to consciously process a stimulus is lessened by the amount of automatic processing and the amount of conscious activation it is already receiving.

Some have contended that causal attributions are made automatically, based on salient stimuli, as part of the act of perception (McArthur, 1980; Smith & Miller, 1979; Taylor et al., 1979; Taylor & Fiske, 1978), but given that the possibility of conscious involvement was not ruled out by the design of these studies, and the differences found between attributions and impressions made under versus not under time pressure (Strack, Erber, & Wicklund, 1982), this conclusion does not seem warranted at this time. Rather, the available evidence supports the view that the disproportionate impact of salient information is due to the greater conscious attention it receives, resulting in its greater likelihood to be used in subsequent conscious inferential procedures.

[5]We are grateful to Reid Hastie for providing the stimulus behaviors used in the Hastie and Kumar experiment.

TABLE 1.1
Mean Overall Impression Rating of the Stimulus Person by the Chronicity of the Subject and the Behavior Proportion Presented (Bargh, Thein, & Friedman, 1983)

	Proportion of Behaviors Presented	
	12 Honest/ 6 Dishonest	*12 Dishonest/ 6 Honest*
Honest Chronics	5.50[a] (19)	3.73[b] (23)
Nonchronics	5.29[a] (22)	4.68[a] (22)

Ratings ranged from 0 to 10; 10 is highly positive. *N*'s per cell in parentheses. Means with different superscripts in the same row are reliably different at $p < .01$; means with different superscripts in the same column are reliably different at $p < .04$. Means with the same superscript are not reliably different at $p > .25$.

Self-Relevance and Chronically Accessible Categories

Another kind of information that has a disproportionate influence on later judgments and memory is that which has been frequently experienced. Such stimuli come to have automatic pathways associated with them that ensure that they will be noticed upon their detection by the sensory apparatus, unless this will conflict with ongoing conscious purposes. The results of the Bargh et al. (1983) experiment implied that behavioral stimuli consistent with an individual's chronically accessible categories are automatically processed.

There are alternative interpretations of such automatic effects. One view, already mentioned, is that certain categories of social stimuli are so frequently experienced that they are eventually able to activate their internal abstract representation automatically (Bargh & Pietromonaco, 1982; Higgins & King, 1981). Another hypothesis is that the self-representation, or self-schema, automatically screens stimuli for further processing (Hull & Levy, 1979; Kuiper & Derry, 1981; Markus & Smith, 1981). A third possibility considers the emotional sali-

ence of the inputs to be the determining factor (Nielsen & Sarason, 1981). Each of these alternatives will be considered in turn.

Automatic Processing of Self-relevant Information. If frequency of processing is the key to the development of automatic processing of a given stimulus, then those stimuli that are self-relevant should be given extensive automatic analysis. People are constantly experiencing events with themselves as the central focus (e.g., Greenwald, 1980), and so those dimensions of environmental information that comprise one's internal representation of oneself should correspond to extremely accessible mental categories. Indeed, self-relevant information has been found to be more efficiently processed and more easily accessed in memory (Markus, 1977; Ross & Sicoly, 1979). Self-relevant stimuli easily attract one's attention as well (Brenner, 1973; Geller & Shaver, 1976; Hull & Levy, 1979).

Geller and Shaver (1976) made some subjects self-aware by placing a mirror and a videocamera in front of them while they performed a variant of the Stroop task. Other subjects performed without the mirror and camera present. Some of the words used in the Stroop test were "self-relevant" for people in general, as determined by pretest ratings; these were such words as "disliked," "proud," and "popular." Geller and Shaver found that these self-relevant words resulted in markedly greater interference in naming the ink color of the word, but only for the self-aware subjects. Based on this result, and especially the fact that the temporarily self-aware subjects did *not* show any greater interference on the self-irrelevant control words than did the non-self-aware subjects, Hull and Levy (1979) proposed that self-awareness does not correspond to greater *conscious* attention to self-relevant information (as theorized by Duval & Wicklund, 1972), but to an automatic emphasis in perception. That is, if self-awareness constituted a conscious attentional focus on self-relevant stimuli, this would mean less attentional capacity would be available for the Stroop task, and so it should have resulted in an *overall* decrement in color-naming speed for Geller and Shaver's (1976) self-aware subjects. Since there was no decrement shown for the control words, Hull and Levy (1979) argued that interference was due to an automatic and not a conscious process.

Hull and Levy (1979) attempted to show that dispositionally self-aware people showed the same sensitivity to self-relevant information as did the situationally self-aware subjects in the Geller and Shaver (1976) study. High and low self-conscious subjects judged each of 30 words on its length, meaningfulness, or self-descriptiveness. High self-conscious subjects recalled more words judged as self-relevant than did low self-conscious subjects.

The results of the Geller and Shaver (1976) and Hull and Levy (1979) experiments do not provide evidence of automatic processing of self-relevant information, as claimed by Hull and Levy. For one thing, the manipulations of self-awareness used have been shown to focus *conscious* attention on the self (Wicklund & Hormuth, 1981), and so the obtained results depend on the self-representation being already activated in memory and not solely on the presence of the self-relevant information. Secondly, Hull and Levy's (1979) results concern the *recall* of self-relevant information, and do not demonstrate any attentional difference—the obtained advantage for dispositionally self-aware subjects could instead be due to a more accessible structure operating during retrieval.

To provide a strict test of automatic processing of self-relevant stimuli, Bargh (1982) conducted a variation of the dichotic listening paradigm. Subjects were selected for the experiment based on whether or not they considered the trait of independence to be an important part of their self-concept, following the procedure of Markus (1977). Their task was to repeat out loud (shadow) the words played to one ear, while ignoring the words played to the other ear. This was a difficult task, as the words followed each other at a very fast rate (less than a second each).

One channel contained common nouns, the other contained trait adjectives. At the same time a noun was played to one ear, an adjective was played to the other. Some subjects shadowed the noun channel, while others shadowed the adjective channel. One section of the adjective list was comprised of trait words related to independence, such as "leader" and "assertive," while the preceding and succeeding sections were of adjectives unrelated to independence.

Several measures of subjects' degree of awareness of the contents of the unattended channel were taken. A recognition memory test on unattended stimuli was administered to all subjects at the conclusion of the shadowing task. The number of shadowing errors made during the task were tabulated. Finally, in a momentary-awareness control condition, a separate group of subjects engaged in the shadowing task but were stopped halfway through the word list and questioned on their awareness of the unattended stimuli. None of these measures revealed that subjects had any awareness of the unattended channel contents.

At several times during the shadowing task, subjects responded as quickly as they could to a light that went on at unpredictable intervals. Reaction time to this probe stimulus constituted the measure of how much attentional capacity was taken at that moment by the shadowing task (Kantowitz, 1974; Posner & Boies, 1971). Assuming a limited conscious processing capacity, the more attention being allocated to the primary shadowing task, the less would be available for reacting to the probe stimulus, and the longer the reaction times should be. Capacity usage was assessed before, during, and after presentation of the independent trait adjectives.

If the independent trait words are automatically processed by those subjects for whom they are self-relevant, whether because of the words' self-relevance per se or because they correspond to very frequently-activated mental categories (see next section), two predictions can be made from Logan's (1980) additive model. First, the automatic effect associated with the independent-related words should necessitate *less* conscious attention for the shadowing task when the

independent adjectives are presented to the attended channel. This is because the focus of the attentional and automatic processes is the same. Second, automatic processing of the independent adjectives presented to the unattended channel should require relatively *greater* amounts of conscious attention to be allocated to the shadowing task in order to keep the independent words from consciousness. Both of these predictions were upheld. Subjects for whom the independent words were self-relevant took less time to respond to the probe light when they shadowed the independent adjectives, but took more time to react when the independent adjectives were in the unattended channel, relative to subjects for whom the independent stimuli were not self-relevant. There were no reaction time differences between the two groups of subjects on the probes taken when the independent words were not being presented. These results provide strong support for the existence of automatic processing of social stimuli: subjects were not aware of such processing, it occurred despite their intention not to process the contents of the unattended channel, and it did not interfere with their performance on the shadowing task.

Automatic Category Activation. Are these automatic processes attributable to the self-relevance of the independent-related words, as argued by those who postulate that the self-representation acts as an automatic filter for incoming stimuli (Hull & Levy, 1979; Kuiper & Derry, 1981; Markus & Smith, 1981)? Or do automatic effects occur for any frequently-encountered category of social information, of which those that are self-relevant are a subset? Higgins et al. (1982) argued that an individual possesses a certain limited set of chronically accessible categories that develop out of extensive experience with certain kinds of social information, and that are more readily employed in the processing of any social stimulus event, self-relevant or otherwise.

Higgins et al. (1982) had each subject read a behavioral description of a target person, containing information relevant both to that subject's accessible and inaccessible trait categories. The accessibilities of subjects' trait categories were determined by their responses to a free-response measure taken weeks earlier, on which they provided trait descriptions of various types of people. In two experiments, more inaccessible than accessible trait-relevant behavioral information was deleted from subjects' reproductions of the stimulus material and from their impressions of the target person.

Earlier studies (Higgins et al., 1977; Srull & Wyer, 1979, 1980) had found recently-active categories to exert a greater influence on the interpretation of ambiguous social information, but the Higgins et al. (1982) findings are attributable instead to long-term structural differences in category accessibility among subjects. The *locus* of this effect cannot be determined from the results of the study, however, for the differential retention could be due to the advantage of the more accessible structure in retrieval, or to an automatic perceptual emphasis on stimuli consistent with the chronic categories, or both. An experiment by

Bargh and Pietromonaco (1982) furnished results that address both this issue of the locus of chronic category accessibility effects, and that of the necessity of self-relevance in automatic processing effects for social information.

The content of self-representations has been found to be heavily biased toward positive information (Bradley, 1978; Greenwald, 1980; Markus, 1980). Thus, information consistent with chronically accessible but *negatively*-valued trait categories should *not* be automatically processed if the determinant of such effects is self-relevance, but *should* be automatically processed if the criterion is chronic accessibility. It was assumed (somewhat pessimistically, perhaps) that stimuli related to the trait concept of hostility would have been frequently processed by people in general, and so would correspond to a chronically accessible category for the average person. Because of its negative quality, however, we assumed that hostility would not be part of the average person's self-representation.[6]

Category-consistent stimuli were presented to subjects below the threshold of conscious awareness, to see whether this resulted in the activation of the hostile trait category. Subjects first performed a vigilance task in which they detected very brief flashes of light on a monitor screen. The flashes were actually words, although subjects were not informed of this. The subject's task was to press a button as quickly as possible every time a flash occurred. The location and time of appearance of each flash was made unpredictable, and combined with their brief presentation ensured that subjects had no conscious awareness of the word contents. Several manipulation checks confirmed this.

Depending on the condition to which the subject had been assigned, either 0, 20, or 80 of the 100 trials consisted of hostile-related words, with the remainder neutral control words. Immediately after completing the vigilance task, subjects read a brief behavior description of a stimulus person that was ambiguous with respect to the trait of hostility. Their subsequent ratings of the stimulus person, on trait dimensions related and unrelated to hostility, revealed that the greater the proportion of hostile words to which a subject was exposed outside of awareness, the more hostile and negative was his impression. Thus it appears that the hostile-related stimuli were automatically processed, resulting in differing levels of activation of the hostile-trait category (or some more general category such as "unpleasant"; see below) depending on the proportion of hostile-related stimuli presented.

These results suggest that chronically accessible categories for social information are automatically activated by the presence of category-consistent information in the environment. They also argue against the position that it is self-relevance alone that is critical in the screening of the stimulus field, as people are

[6]A later survey of 560 students at New York University confirmed this assumption: less than one percent could be considered as having hostility as a dimension of their self-representation, using the Markus (1977) criteria.

also vigilant for the presence of frequently-processed but not self-relevant stimuli as well. Furthermore, both the Bargh (1982) and the Bargh and Pietromonaco (1982) findings support the Posner and Snyder (1975) and Logan (1980) position that conscious processing dominates automatic processing and inhibits it from reaching awareness. Such results run counter to the hypothesized existence of automatic attention responses (Shiffrin & Schneider, 1977), because even such frequently-processed stimuli as those that are self-relevant can be inhibited from attaining consciousness when controlled processing is fully deployed on other stimuli.

Automatic Processing of Emotionally Salient Stimuli. It is not clear from either the Bargh et al. (1983) or the Bargh and Pietromonaco (1982) results *which* social category was automatically activated. In both studies, the same pattern of ratings was obtained for traits related and unrelated to the stimulus trait dimension. Thus one cannot tell from these experiments whether the stimulus automatically activated the specific relevant category (i.e., that for honesty or hostility) with this activation then spreading to associated trait categories, or that some more global concept, such as "pleasant" or "evil," was directly activated. Higgins et al. (1977) found that only trait adjectives that were relevant to the description of the stimulus person had an influence on subsequent impressions, however; positive and negative adjectives that were not related to the description had no effect. Therefore, it appears that consciously-attended trait stimuli directly activate their specific relevant categories, and not some more global affective representation (although the activation of the specific category can then spread to evaluatively similar trait categories that are associated with it in memory; see Srull & Wyer, 1979, 1980), but whether or not this is also true of automatically processed trait stimuli remains to be seen.

It is also possible that *no* specific category activation took place in the Bargh (1982) and Bargh and Pietromonaco (1982) experiments, and that subjects were automatically processing the emotional content of the stimuli. Both self-relevant and hostile stimuli are emotionally salient; the former type because information implicating the self is highly affect-laden (cf. Zajonc, 1980a). Zajonc (1980b) and Nielsen and Sarason (1981) have recently argued, in keeping with the classic New Look position (cf. Erdelyi, 1974), that the affective quality of a stimulus can be processed outside of conscious awareness. Although frequency of processing has been strongly supported in the experimental literature as the cause of automatic effects, in studies in which single characters (Shiffrin & Schneider, 1977) or nonsocial category members (Neely, 1977) have been used as stimuli, this does not mean that it is necessarily a sufficient cause of such effects where more complex social information is concerned.

Bargh and Bond (1983) pitted the frequency and emotional salience hypotheses against each other by replicating the Bargh and Pietromonaco (1982) study for both an emotionally salient and an emotionally neutral trait (as determined by pretesting), with people who either had or did not have a chronically accessible category for such trait information as subjects. If the subconscious priming effect found by Bargh and Pietromonaco occurred only for subjects exposed to the emotionally salient trait primes, regardless of the accessibility of the subjects' cognitive categories for that trait, the emotional salience of the stimuli would be found to be the critical factor in producing the effect. If, on the other hand, only those subjects in possession of a chronically accessible category corresponding to the trait stimuli showed the effect, regardless of the emotionality of the trait dimension, then category accessibility and not stimulus emotionality would be supported as the causal factor.

The analysis of the impression ratings (see Table 1.2) revealed reliable main effects for priming (F (1,77) = 4.78, p = .03) and trait emotionality (F (1,77) = 6.83, p = .01) for Chronics, but no interaction between the two factors (p > .25). No reliable effects were found for Nonchronics. Thus, category accessibility was required for automatic processing of the primes, but among those subjects possessing an accessible category, trait emotionality independently elevated impression ratings. In other words, it is not the emotional salience of the stimulus that causes it to be processed outside of awareness, but a sensitivity to the presence of that stimulus by the relevant category born of frequency of use. If that activated category contains an affective response, however, then the emotionality of the trait dimension comes into play and exerts an independent influence on impressions. This effect of emotional salience also occurs if the category is activated consciously by the behavioral description itself, as evidenced by the main effect of emotionality in Chronics' ratings and the absence of an interaction of trait emotionality with priming. The clear implication is that affective responses depend on category activation, supporting the traditional category-based model of affect (e.g., Bartlett, 1932) over stimulus- or feature-based models. Moreover, the apparently additive nature of the effects of chronicity, emotionality, and priming, verified by a subsequent hierarchical multiple regression

TABLE 1.2
Mean Impression Ratings by Trait Emotionality, Category Accessibility, and Priming (Bargh & Bond, 1983)

		Emotionally Salient Trait (Kindness)	*Emotionally Neutral Trait (Shyness)*
Chronics			
	Priming	7.39	6.52
	No Priming	6.63	6.22
Nonchronics			
	Priming	6.24	6.39
	No Priming	6.18	6.17

Ratings ranged from 0 to 10; a rating of 10 indicated extremely kind or shy.

analysis, suggests an additive model of category accessibility. Frequency of use (chronicity), recency of use (priming), and affect associated with the category seem to independently increase the accessibility and thus the influence of that category in information processing.

Summary. The evidence supports a close correspondence between the concepts of automatic processing and chronic category accessibility. Both are assumed to develop from frequent processing of a certain set of stimuli, and both have been found to exert their influence without the need of conscious direction. The individual differences in chronic accessibility found by Bargh (1982), Higgins et al. (1982), Bargh and Bond (1983), and Bargh et al. (1983) underscore the fact that the extent and content of the automatic analysis of the social environment varies among people. The automatic inferences made by people involved in the same social situation may be very different, yet feel just as unshakably real to each individual involved, because the inferences are not the outcome of any process the person is aware of or has control over. That a person one has just met is "friendly," or "sinister," or "manipulative" may seem just as self-evident as that he has a beard or that she talks very fast.

APPLICATIONS TO SPECIFIC RESEARCH DOMAINS

Up to this point the emphasis has been on the theoretical mechanisms underlying automatic and conscious processing. The final section focuses on more specific areas of social psychological research that have been reinterpreted recently in terms of the automatic/conscious processing distinction.

Depression

It may be that automatic inferences play a role in the development and maintenance of depression. Beck (1967) has argued that the depressive's negative affect is a response to an automatic negative categorization of his or her behavior and the reactions of other people to it. The depressed person is not aware of this inferential procedure, just of the bad feelings that result from the conclusion. Higgins et al. (1982) and Kuiper and Derry (1981) have recently suggested that the depressive possesses relatively accessible negative categories and relatively inaccessible positive ones, so that negative information is more likely to survive the initial automatic screening of the environment and be consciously noticed. To elaborate a bit on this idea, it could be that the negative automatic input into conscious processes leads to a greater likelihood of negative responses by the depressive to the situation in turn, resulting in a greater probability of negative feedback, and so on. It is easy to see how a temporary negative mood state could lead to chronic depression if the negative mental categories become very frequently used due to the operation of this vicious cycle. Furthermore, one reason for the syndrome's resistance to change may be that the depressive is not aware of his or her automatic negative bias, and so cannot correct for it with conscious processes. When information comes into consciousness with a strong subjective feeling of truth to it, it must be very difficult to unequivocably accept another's (or your own) word that things aren't really so bad.

Currently, the only account of an experimental test for automaticity in depressives' information processing is an experiment by MacDonald and Kuiper (1982; see also Kuiper, Olinger, & MacDonald, in press). Three groups of subjects participated: clinically depressed, normals, and nondepressed psychiatric controls. All rated 30 depressed and 30 nondepressed content adjectives on their self-descriptiveness. While performing the self-rating task, half of the subjects also engaged in a memory task, in which their attentional capacity was loaded by having to remember six digits during each adjective rating trial. According to Logan (1979), loading memory in this way will interfere with a task to the extent that it requires attention in order to be performed. The effect of the memory load should be larger in treatment conditions that demand more attention and smaller in those that require less attention. In the MacDonald and Kuiper (1982) experiment, the conditions requiring less attention should be those in which subjects rate adjectives consistent with their hypothesized accessible categories (i.e., depressives rating depressed-content adjectives and normals rating nondepressed-content adjectives) and the conditions demanding more attention should be those in which subjects rate adjectives which are not consistent with their chronic perceptual set (i.e., depressives rating nondepressed-content adjectives and normals rating depressed-content adjectives). Therefore, a null interaction between the memory load and the other factors in the analysis of adjective rating time variance would indicate an automatic component in the self-ratings for both depressed and normal subjects, while an interaction would indicate an attentional process.

MacDonald and Kuiper (1982) reported that memory load did not interact with the other factors, and so concluded that automaticity was involved in the self-referent processing of all subjects. As noted above, however, a null interaction indicates automaticity only when there is a task dimension that creates different levels of attentional demand. Examination of the average rating times showed that *both* depressed and normal subjects took longer to say "yes" to depressed than to nondepressed-content adjectives, so the category-consistency dimension apparently did *not* produce different levels of attention demand as hoped by the investigators. Also, the subjects' conscious intent and awareness were engaged in processing the adjectives, which clouds the interpretation of the effect as an automatic process. Another difficulty is that the authors do not report the p-value of the null interaction; since they are in effect trying to prove the null hypothesis, a very lenient criterion value for nonsignificance should have been employed (such as $p > .25$) to protect against a Type II error. Thus it appears

that the MacDonald and Kuiper data cannot be taken as evidence of automaticity in depressive self-reference.

More convincing on this issue would be demonstration of an *absence* of a main effect for memory load in depressives' processing of negative content, accompanied by the existence of an effect in their processing of positive content. The reverse pattern would be expected for normals. Such a "zero-slope" memory load test is considered by Logan (1979) to be a stronger demonstration of the presence of automatic processing (see also Shiffrin & Schneider, 1977). The question of whether such automatic effects occur only in the processing of self-relevant information (a position advocated by Kuiper & Derry, 1981) or reflect the operation of chronically accessible categories that influence the processing of information about others as well (Higgins et al., 1982) could be addressed by having subjects make both self- and other-ratings on the positive and negative dimensions. Another possibility would be to have depressed and normal subjects perform a lexical decision task (i.e., "Is this a meaningful word?"; Schvaneveldt & Meyer, 1973) on positive, neutral, and negative adjectives and nonwords presented below the threshold of conscious awareness. Automatic processing would be indicated by a greater-than-chance performance on the task for a certain type of content, along with faster decision times.

Attitude-Behavior Consistency

Several researchers have now argued that, for one reason or another, the low degree of consistency between measured attitudes and overt behavior is due to a weak association between the mental representations of the object and the attitude toward it. Langer (1978) noted that the inconsistency may be due to the fact that people typically don't think about their attitudes toward the stimulus when they act towards it. Abelson (1976) has pointed out the importance of direct experience with an attitude object in increasing consistency. Wicklund (1982) also emphasized that the responses involved in answering attitude items and those involved in the behavior toward the attitude object may be completely separate and distinct in memory. The common theme is that attitude-behavior consistency is poor because the representation of the object and the representation of the attitude are only weakly connected in long-term memory. Thus, the solution to the problem is to strengthen this associative bond, either by having the person consciously think about his or her attitude before behaving (Langer, 1978; Wicklund, 1982), or by giving the person direct experience with the attitude object (Abelson, 1976).

Fazio and his colleagues have recently shown that strengthening the association in memory between an object representation and its evaluation does indeed improve consistency. In one study (Fazio, Chen, McDonel, & Sherman, 1982), the accessibility of some subjects' attitudes towards various puzzles was increased by having them copy their responses to the attitude questions onto blank

forms. These subjects then showed greater consistency between their stated attitudes towards the puzzles and their subsequent choice of puzzles to work on during a 'free-play' period, than did subjects who only marked down their evaluations of the puzzles one time. Fazio, Powell, and Herr (1983) gave subjects either direct or indirect experience with various puzzles, before assessing their evaluations. Again, some subjects made extra copies of their evaluations, and the remaining subjects did not. In a second, purportedly unrelated experiment on "color perception," subjects were exposed to either their most or least preferred puzzle in order to unobtrusively activate subjects' mental representation of the puzzle. Finally, in a third study, their attitudes toward puzzles in general were assessed by having them judge whether another person's willingness to work on a series of problems for the experimenter was due to extrinsic reasons or an intrinsic liking for solving puzzles. These final ratings were in the direction of the puzzle-attitude that had been recently activated, but only when the object-attitude link was strong (i.e., only in the direct experience and repeated expression conditions).

Fazio et al. (1983) propose a model in which one's perception of an attitude object is mainly responsible for one's behavior towards it. Thus, if the attitude is so strongly associated with the object representation that when the latter is automatically activated in perception, activation automatically continues to spread to the attitude representation, the attitude will have an influence on behavior toward that object. Such a model is clearly in line with the criteria for an automatic effect, but since the subjects in the Fazio et al. (1982) and Fazio et al. (1983) studies differed only in the *temporary* activation state of their mental apparatus, these studies do not conclusively demonstrate automatic attitude activation. This is because conscious attention was necessary to activate the attitude and produce the effect. It remains to be shown that the same process occurs *without* the need of consciously-produced activation manipulations; that is, for long-term attitudes formed on the basis of considerable direct experience. The results of the studies by Fazio and his colleagues make such a finding seem quite likely.

Attitude Change

For information to be stored in long-term memory, conscious processing is required. Generally, the more extensive the conscious processing, the more accessible the memory. This is why direct experience with an attitude object and conscious consideration of the attitude were hypothesized to increase attitude-behavior consistency. In the same vein, persuasion researchers have recently suggested that attitude changes resulting from deliberate conscious attention to the contents of the persuasive message are more permanent and predictive of behavior towards the attitude object than are changes that are due to message-irrelevant cues such as the source's attractiveness or expertise (Chaiken, 1980;

Cialdini, Petty, & Cacioppo, 1981; Petty & Cacioppo, 1979, 1981; Petty, Cacioppo, & Goldman, 1981). Attitude shifts due to careful conscious evaluation of the message have been labelled the "central route," and those attributable to non-content stimuli have been called the "peripheral route" to persuasion (Petty & Cacioppo, 1981). Chaiken (1980) referred to the two forms as "systematic" and "heuristic" message processing.

One major factor in determining which type of processing the recipient will give the message has been found to be his or her *involvement* with the attitude issue. For example, Chaiken (1980) manipulated the subjects' involvement with the message topic by having some of them believe that they would be discussing the topic again in the near future. Petty and Cacioppo (1979) presented subjects with a message advocating decreased dormitory visitation privileges; some subjects were told the plan was to go into effect at their school (high involvement), and others were informed the proposal concerned another university (low involvement). In both studies, the final attitudes of the involved subjects were more dependent on the quality of the arguments in the persuasive message, while those of the noninvolved subjects were determined more by superficial features of the situation, such as the sheer number of supporting arguments regardless of their quality (Chaiken, 1980), or the expertise of the source (Petty & Cacioppo, 1979; Petty et al., 1981).

Petty and Cacioppo (1979), Chaiken (1980), and Fiske and Dyer (1982) have proposed that personal involvement with the attitude issue results in more cognitive effort devoted to the message contents; low involvement leads to less effort made. Petty and Cacioppo (1979) and Fiske and Dyer (1982) contend that low involvement is characterized by the use of automatic processing strategies in the situation, while high involvement leads to the use of controlled processing. Chaiken (1980) argued that degree of involvement determines whether a heuristic (reliance on more accessible information) or a systematic (careful evaluation of arguments) processing strategy will be employed. Chaiken's conceptualization of the roles of consciousness and automaticity in attitude change is probably closer to the mark, as there is no evidence that the attitude change *itself* is the result of an automatic process, just that with low conscious involvement there is less conscious control exerted over the perceptual process, and thus automatically furnished data play a greater role. High involvement results in a greater conscious role in the selection of stimuli for further processing, inhibiting the automatic inputs from having much of a say in the subsequent conscious evaluation of the message. The attitude change itself is therefore not automatic but the result of a conscious process. The informational input into that process, however, is determined largely by the automatic, effortless perceptual analysis of the situation under conditions of low involvement, and by a consciously-directed perceptual search when there is high involvement.

A very valuable feature of this research is its concern with the interaction of automatic and controlled processes dealing with social information. The personal relevance of an attitude issue appears to influence the relative power of automatically-produced versus consciously-produced data in the message evaluation process. Involvement produces greater attentional effort, which increases the size of the attentional effects on perception relative to the automatic effects; under conditions of low involvement/effort, the latter may be the stronger of the two. An important question for future research is *how* the personal relevance of an issue occasions greater attention to the message arguments. One possibility is given by Fiske and Dyer (1982), who suggest that those personally involved in an issue possess more efficient knowledge structures for issue-relevant information, so that more processing capacity remains for consideration of the arguments. This does not explain why making the *same* issue more or less personally relevant (e.g., visitation rule changes at the subject's or a different university; Petty & Cacioppo, 1979) has the same effect. Perhaps self-relevance of an issue results in the frequently-used categories relevant to the self-concept being used to process the information, requiring less conscious attention to do so, again with relatively greater capacity left over. In either case, it is clear that without *some* help in relieving the strain on capacity, there may not be enough to simultaneously weigh the quality of several arguments in a persuasive message, as evidenced by people's typically poor ability to integrate multiple pieces of information (Dawes, 1976; Posner, 1973).

Scripts and "Mindlessness"

Langer and her colleagues (Langer, 1975, 1978, 1982; Langer, Blank, & Chanowitz, 1978; Langer & Imber, 1979) have argued that the degree of conscious control exerted in social information processing is usually very low. They have characterized this phenomenon as "mindlessness"—not consciously making use of all of the relevant information in a given situation. Langer has contended that mindlessness can result from overlearning situational cues so that behavior in these routine situations is "performed automatically" (1978, p. 36):

> We typically have assumed that virtually all behavior other than overlearned motor acts are performed with conscious awareness. Perhaps a more efficacious strategy is one that assumes that by the time a person reaches adulthood, (s)he has achieved a state of 'ignorance' whereby virtually all behavior may be performed without awareness . . . unless forced to engage in conscious thought. (1978, p. 40)

The concept of mindlessness is based on script theory (Abelson, 1976, 1981; Schank & Abelson, 1977). A *script* is a mental representation of a type of situation, abstracted from many encounters with it, that preserves its recurring features and the temporal order in which they occur. Like any other knowledge structure, scripts provide expectations for what is likely to occur next. Langer (1978, p. 39) argued that these well-learned scripts take control of behavior away from conscious consideration of relevant situational cues.

The evidence offered in support of this claim comes from studies of compliance to routine requests, in which compliance rate differed as a function of

how the request was phrased. In the Langer et al. (1978) study, for example, people using a copying machine were interrupted and asked in various ways to let another person use the machine. The person asked to be allowed to make either a small (5) or large (20) number of copies. When the request followed the form assumed to be the routine one by the experimenters, with the statement of the favor followed by a reason for the request (e.g., "Excuse me, I have five pages. May I use the xerox machine, because . . . ?"), compliance in the small request condition was the same regardless of the legitimacy of the reason given ("because I have to make copies" versus "because I'm in a rush"). Compliance was lower if no reason was given at all. In the large request condition, the quality of the request did make a difference in the rate of compliance. Langer et al. (1978) argued that as long as the effort involved in acceding to the request was low (as in the five-copy condition) and the request followed the expected structure (i.e., polite and with a reason given), the request was processed mindlessly and compliance behavior was automatic. The necessity of high effort expenditure (20 copies to be made) or the failure of the request to follow the expected format resulted in the involvement of conscious attention, with the quality of the reason given making a difference in the rate of compliance.

The major difficulty with interpreting this study or the others like it as demonstrating automatic social behavior is that there seems to be no reason to rule out conscious involvement in the compliance decision, in any of the experimental conditions. First, attention must be paid to the size of the request to determine how effortful compliance would be. Next, a conscious judgment of the worthiness of the request could be made based on the quality (or lack) of the reason given (see Abelson, 1981, p. 721). With a small request, the quality of the request needed for compliance is not great, so that saying "because I have to make copies" is sufficient.[7] With a large request, the hurdle is set higher: now the reason had better be a good one. This was Abelson's (1981, p. 721) analysis of the Langer et al. (1978) experiment, and he emphasized the role of consciousness in script enactment:

> The present concept of scripts does not necessarily imply total automaticity of performance and is not equivalent to Langer's concept of 'mindless' behavior. One obvious way in which 'mindful' behavior enters scripts is that acts of thinking can appear explicitly in the specified event sequence. (Abelson, 1981, p. 723)

Although this is only one of several studies Langer and her associates have conducted in order to demonstrate that social behavior can be performed without ongoing active conscious information processing, in none of these studies is

[7]The phrasing of what was intended by Langer et al. to be a "placebic" reason is unfortunate, because "I *have* to make copies" strongly implies the presence of a good reason. A more convincing placebo would have been "because I *want* to make copies."

there sufficient evidence to rule out conscious direction of behavior. In fact, what they *do* indicate is that well-learned scripts function as do any other mental representation or schema, and direct the search of the environment for needed information. That is, the features of the situation automatically activate the relevant script, which then directs the *conscious* process of searching for further cues to verify the script as an adequate model of the situation (Bruner, 1957; Neisser, 1976). The result is that certain pieces of information are selected by the script over others that may actually be more relevant and useful in the current situation, but which are not part of the script. Such a model can account for the results of other "mindlessness" studies as well. In the "illusion of control" experiments (Langer, 1975), the activation of a skill script rather than a chance script biases the interpretation of the chance situation that follows. Similarly, the loss of access to details of task performance by those who have overlearned the task (Langer & Imber, 1979) can be attributed to the development of a more abstract script for the task that deals with higher-level units of information. Thus, experiments that Langer has considered to be evidence of "automatic" social behavior can be seen instead as good support for a processing model in which an automatic analysis of the social environment is followed by a consciously directed exploration and response production.

It should be emphasized that if the definition of "mindlessness" is restricted to refer just to the phenomenon that certain relevant information is overlooked or not used as rationally as it should have been, there is certainly plenty of evidence in support of it. Chronic and temporary perceptual sets, visual information, and intense stimuli all result in biases in both the selection and the evidential weight of environmental information. Our limited processing capacity means that we will miss a lot of what is going on around us, and will have a hard time thinking very straight about it even if we do notice it. But Langer equates mindlessness with a state of "reduced cognitive activity" in which "conscious attention is not being expended" (1982), arguing that individuals can conduct complex interactions automatically (1978), and such a position is certainly not justified by the data. Unfortunately, this latter sense of the concept is what researchers and the lay public alike tend to come away with from these experiments. A better summary of the mindlessness studies would be that, as with the salience and persuasion research, when people exert little conscious effort in examining their environment they are at the mercy of automatically-produced interpretations.

The degree of attention typically exerted in social interaction, the effect that different levels of conscious engagement have, and the determinants of such involvement are important topics for further study. It appears that conscious involvement is in part a function of the routineness of the situation. What percentage of the social situations an individual participates in are routine, necessitating only minimal conscious attention? How much attention is actually given to these routine situations? For example, how complete and accurate are people's memories of what just occurred (e.g., the contents of a seemingly routine but

illegitimate request)? Given that consistency of experience is an important determinant of the development of automatic processing, the greater consistency of social behavior within situations than within people (cf. Mischel, 1968; Nisbett & Ross, 1980) would mean that automatically-activated situational representations (i.e., scripts) are likely to exert a major influence on all aspects of social cognition.

CONCLUSIONS

The most useful conceptualization of automatic processing of social stimuli is one that considers as automatic those cognitive processes that are directly under the control of the environment, and that do not require conscious processing of any kind. Automaticity characterizes the initial analysis of all sensory data, but the extent of this analysis is greater for some stimuli than others. Those with which one has had more frequent and consistent experience, such as those that are self-relevant and consistent with chronically accessible categories, receive more elaborate initial processing. Also, with direct experience or enough conscious consideration of one's attitude toward an environmental object or event, that attitude comes to be automatically activated when the object or event is perceived, increasing attitude-behavior consistency. Thus, automatic processes in perception emphasize information that is consistent with one's expectations. This leaves the limited conscious attention to be reserved for unexpected, salient stimuli that are of greater potential danger or informativeness. Conscious perceptual sets are able to override these automatic suggestions, however, and direct attention to those stimuli that best fit current purposes or observational goals.

Because the more abstract mental representations are activated less frequently, they are less likely to become active automatically. Automatic effects are therefore typically limited to the perceptual stage of processing, with conscious processing then operating on the automatically-furnished data. There is no evidence supporting the belief that social behavior is often, or even sometimes, automatically determined. Under what is probably the more common condition of low conscious participation in the perceptual process, however, automatically-accentuated stimuli are more likely to be used in subsequent conscious decisions and to be stored in memory. Thus, when one is not involved in an attitude issue, different features of a persuasion situation may be consciously processed than when one is highly involved, and this has consequences for the outcome of the persuasion attempt.

Automatic processing is a natural and necessary part of how people divide up their cognitive workload. It results occasionally in biases and misinterpretations and ignorance of relevant information, but that does not mean that our minds are stuck in low gear. Far from characterizing a state of diminished cognitive activity, or "mindlessness," which needs to be rectified by an increased conscious awareness of the environment, automatic processing delivers to the quite limited conscious processing vastly more information than it could ever provide for itself. The system seems to be quite functional as it stands.

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