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Automatic and controlled processes in leadership recognition: Investigating the impact of information load, need for leadership, and time delay

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AUTOMATIC AND CONTROLLED PROCESSES IN LEADERSHIP RECOGNITION:
INVESTIGATING THE IMPACT OF INFORMATION LOAD, NEED FOR LEADERSHIP, AND TIME DELAY

by

CYNTHIA EMRICH WILLIS

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE DOCTOR OF PHILOSOPHY

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ABSTRACT

Automatic and Controlled Processes in Leadership Recognition:
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Cynthia Emrich Willis

It has been theorized that leadership recognition is the product of an automatic categorization process in which individuals compare a set of observed behaviors to a leadership prototype and then, given a sufficient match, automatically recognize the target individual as a leader (Lord, Foti, & DeVader, 1984). The first goal of this research was to test this theory. A second goal was to investigate three potential moderators of the cognitive processes mediating leadership recognition: information load, need for leadership, and time delay. Three experiments were conducted in which subjects assumed the role of a work team coordinator for a small computer company. Their task was to identify an individual to fill an opening in a work team. During a study phase, subjects read a series of behavioral descriptions that were taken from recommendations written about former employees and one job candidate. A test phase followed in which the primary task was Jacoby's (1991) process-dissociation procedure (PDP), a recognition memory that generates estimates of automatic and controlled processes. Results from the experiments revealed that leadership recognition was mediated by a combination of automatic and controlled processes, with the balance clearly favoring automatic processes. That is, individuals operated in a primarily unintentional, unavoidable, and effortless manner when processing and
integrating behavioral information about a potential leader. This balance of automatic and controlled cognitive processes was moderated by subjects' perceptions of the extent to which the work team needed a leader (Experiment 2 - Need for Leadership). Specifically, high-need-for-leadership subjects employed a more focused strategy of information processing than did their low-need counterparts. They appeared to expect and to give less scrutiny to behaviors that were consistent with leadership (increase in automatic processes), and to work more diligently to make sense of and integrate behaviors that were irrelevant to leadership (increase in controlled processes). The general primacy of automatic processes found in these experiments suggests that individuals are adept at forming impressions of potential leaders. This ability to identify leaders in a primarily effortless fashion is largely adaptive in light of the attentional scarcity that characterizes much of everyday life.
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Introduction

Automatic and Controlled Processes in Leadership Recognition:
Investigating the Impact of Information Load,
Need for Leadership, and Time Delay

by
Cynthia Emrich Willis

How do individuals identify and recognize leaders in organizational settings? Many times, recognition is facilitated by knowledge of performance outcomes. When outcomes are known, leadership recognition operates through a retrospective process in which leadership is inferred on the basis of favorable performance outcomes. This inferential process has been well documented in the research literature (e.g., Phillips & Lord, 1981; Staw, 1980). Many times, however, organization members lack information about performance outcomes. For this reason, a theory is needed to explain and predict leadership recognition based on directly observable behaviors. Surprisingly, very little is known about this type of leadership recognition. Lord and his colleagues (Lord, 1985; Lord, Foti, & DeVader, 1984; Lord, Foti, & Phillips, 1982) have proposed a theory of leadership recognition based largely on Rosch's theory of object categorization (Mervis & Rosch, 1981; Rosch, 1978). Lord argues that leadership recognition is the result of an automatic categorization process in which individuals compare a set of observed behaviors to a leadership prototype. This categorization process is assumed to be automatic in that it
is unintentional, unavoidable, and effortless. That is, upon observing an individual behaving in a "leader-like" fashion, one would recognize the individual as a leader without intending to do so and would, in fact, be unable to avoid making this categorization. In addition, this process of leadership recognition would require no cognitive resources or effort so that the observer could recognize a potential leader even when operating in conditions of attentional scarcity. Many researchers have argued that attentional scarcity is the norm, rather than the exception, in everyday life (Dawes, 1976).

**Lord's Theory of Leadership Recognition**

Lord first introduced his theory of leadership recognition in a series of experiments conducted in 1984 (Lord, Foti, and DeVader) in which he and his colleagues set out to investigate the nature of the leadership category. In the initial experiment, they discovered that the category followed a family resemblance rather than critical feature structure. A family resemblance category is one in which the various "subcategories" (e.g., political and business leader) share some proportion of features with other subcategories within the larger category (i.e., leader). Contrary to categories with a critical feature structure, there is no feature or set of features that is critical or necessary for membership in a family resemblance category. In a second experiment, Lord and his colleagues discovered that behaviors were ordered along a continuum of prototypicality such that individuals were able to more quickly and easily access behaviors that were typical of leadership as opposed to behaviors that were either atypical or neutral with respect to leadership. Finally,
once the leadership category was invoked, it influenced individuals' judgments in a variety of ways. Specifically, individuals based their expectations for future target behavior on the leader vignette such that they expected future leadership behaviors given past leadership behaviors (and vice versa). Also, applying a leadership prototype affected individuals' causal ascriptions and ratings of the target's leadership skills and abilities. This led them to ascribe responsibility for success to the target in the highly typical vignette and to rate the target as possessing a high degree of leadership skills and abilities.

The introduction of an information processing theory of leadership recognition represents an important achievement in the field of industrial and organizational psychology. First, Lord and his colleagues filled a considerable gap in our knowledge of leadership emergence and recognition. Prior to the introduction of Lord's theory, much was known about the consequences of being classified a leader, but very little about the manner in which leaders emerge and are identified. Second, Lord recognized that to fill this gap, it was necessary to go beyond the field of industrial and organizational psychology and incorporate the research of both cognitive and social psychologists. However, Lord's theory remains partially untested. Specifically, the assumption that an automatic categorization process mediates leadership recognition is just that -- an assumption.

Initially, the issue of whether an automatic categorization process mediates leadership recognition may seem trivial. However, as Lord points out, the implications of automaticity are significant. For example, Lord
(1985) argues that automaticity in leadership recognition would benefit organizations in that it would allow individuals to identify leaders in a fast-paced or frenetic work environment. Alternatively, if controlled processes mediate leadership recognition, it would be difficult for individuals to recognize leaders while simultaneously engaging in other cognitively demanding tasks (Shiffrin & Schneider, 1977). It should be noted that a cognitively demanding environment is, probably, the norm in much of daily life, and organizational life appears to be no exception. Given these demands, it is critical to discover the extent to which individuals are able to easily and readily recognize leaders.

The extent to which automatic categorization mediates leadership recognition remains unanswered for at least two reasons. First, research conducted to date (Cronshaw & Lord, 1987; Lord, Foti, & DeVader, 1984; Phillips, 1984; Rush & Russell, 1988), has relied on self reports or reactive measures in an attempt to draw inferences regarding the processes mediating leadership recognition. Lord himself recommended that future researchers explore alternative methodologies for investigating his theory (Lord, Foti, & DeVader, 1984). Second, Lord's theory ignores more recent thinking and research on the distinction between automatic versus controlled processes. For example, Bargh (1989) criticizes the dichotomous view of cognition as an all-or-none proposition given that the criteria typically imposed in defining automaticity are almost never satisfied. Instead, he proposes that automaticity be redefined in terms of varying levels of control—that is, some combination of automatic and controlled processes (see also Neumann, 1984). In a similar vein, Feldman
(1981) maintains that "even after the controlled process is invoked, the data recalled and brought to bear on the problem may have been influenced by the previous automatic processes" (p. 129).

The trend in theory and research, then, is clearly one of viewing judgment, memory, and perception as resulting from some combination of automatic and controlled processes. Given this viewpoint and the limitations of Lord's research paradigms, the time is ripe to revisit Lord's theory in an effort to determine whether leadership recognition is mediated by an automatic categorization process. Whether the process is automatic or controlled, the recognition of leaders in organizations has tremendous consequences. For example, formal recognition of leadership has been demonstrated to influence the labeling of and memory for specific behaviors (e.g., Foti & Lord, 1987; Lord, Foti, & Phillips, 1982; Rush & Russell, 1988). It is important to recognize, however, that there probably would be no formal designation of leadership without informal leadership recognition (Feldman, 1981). At present, much is known about formal evaluations of leadership, but very little about informal leadership recognition. The irony in this is that organizations collect formal evaluations only occasionally, perhaps once or twice a year, whereas employees are active perceivers each and every working day. A final benefit of this type of research lies in the possibility that an increased understanding of the cognitive processes that mediate leadership recognition may provide valuable insight into the nature of bias and error in organizational decision making. This insight can then be applied to problems in organizations. For example, researchers could develop
training programs to facilitate leadership recognition in the event that controlled processes mediate leadership recognition. A theory-based training program could reduce the amount of cognitive resources necessary for leadership recognition so that the identification and recognition of leaders would not be hampered by simultaneous work demands. Additional theoretical and practical implications of the present research are discussed in some detail in the paragraphs that follow.

**Consequences of Automatic Processes in Leadership Recognition**

The current consensus definition of automaticity is that it is unintentional, involuntary, effortless, autonomous, and occurring outside of awareness (Bargh, 1989; Johnson & Hasher, 1987; Posner & Snyder, 1975; Shiffrin & Schneider, 1977.). Given the nature of automaticity, several researchers have argued that "when...interpretive processes operate automatically...their products are experienced as direct or 'true' perceptions rather than as consciously-mediated interpretations" (Jacoby, Toth, Lindsay, & Debner, 1992, p. 11, see also Lewicki, Hill, & Sasaki, 1989; McArthur & Baron, 1983). It could be that individuals arrive at this erroneous conclusion due to the fact that they have no awareness of processing, interpreting, and integrating information. This lack of awareness may underlie individuals' sense that there is a direct, one-to-one correspondence between reality and their perceptions or impressions. Regardless of the explanation underlying this perceptual phenomenon, there are significant practical and theoretical implications for leadership recognition. If, as Lord argues, automatic categorization mediates leadership recognition, then this recognition would be regarded as the
result of a veridical perception or objective fact rather than an interpretation or belief. One practical consequence is that the observer would then be more likely to attribute "cause" solely to the individual and to ignore any situational factors that may have facilitated leadership recognition. At a theoretical level, it is possible that the veridical or factual status attributed to automatic perception and categorization underlies the layperson's belief that "leaders are born, not made." Perhaps, the layperson reasons that leadership is a fundamental and inherent aspect of a select few rather than an acquired skill because of the "unambiguous and direct" manner in which it is communicated.

Consequences of Controlled Processes in Leadership Recognition

Unlike automatic processes, controlled processes are characterized as intentional, voluntary, cognitively demanding, and occurring above the threshold of awareness. This suggests at least two potential problems if leadership recognition is mediated by controlled processes. One, the recognition of leaders in organizations often takes place during times characterized by crisis or dramatic upheaval. In other words, organization members are never so compelled to identify a leader as when things are going badly. Crisis situations place a tremendous strain on individuals' cognitive resources. By nature and definition, controlled processing of leadership information constitutes yet another demand on a limited human resource. This means that prudent judgments of leadership potential may be most difficult to obtain during times in which they are most critical.

A second consequence has to do with the recognition of women leaders. Two theories have been offered to explain the "glass ceiling"
phenomenon. One draws on a goodness-of-fit explanation—that is, individuals do not believe that women possess the qualities necessary to be effective in leadership positions (e.g., Heilman, Block, Martell, & Simon, 1989). Another explanation is that all social perception begins with an automatic categorization along visually salient characteristics such as race, age, and gender (Brewer, 1988). This initial categorization operates to constrain subsequent information processing such that individuals must expend additional cognitive capacity to combat deeply ingrained stereotypes about women (e.g., Fiske, 1989) in order to "individuate" their perceptions regarding a given female target (e.g., Brewer, 1988). This additional cognitive capacity may not be available in the typical organizational environment. Another possibility is that individuals may not be motivated to individuate. Regardless of whether it is a problem of cognitive capacity or motivation, the result would be that a qualified female would be less likely to emerge and be recognized as a leader than an equally qualified male.

The dilemma of women seeking to advance through the ranks of organizations suggests a broader scope for the type of research discussed here. That is, leadership recognition represents a special case of a general area of investigation—social categorization and judgment. Humans, being social creatures, can be categorized in a multitude of ways depending on a number of different factors (e.g., situational demands, individual characteristics of the observer, observers' expectations and goals, etc.). Methods used to investigate the cognitive processes that mediate leadership recognition can be applied to the study of how individuals are categorized
as reckless, blue collar, Black, or intelligent. In short, the consequences of one's knowledge structures, whether they be constructs, categories, beliefs, or stereotypes, necessarily depend on the type of processing brought to bear in the act of perceiving another. This has been demonstrated in the social cognition literature in investigations of the impact of stereotypes of women (Fiske, 1989), Blacks (Devine, 1989), and Asians (Gilbert & Hixon, 1991). This issue is an important one for researchers studying individuals in organizations. Although the categories may change, the potential for significant human impact remains the same.

**Investigating Automatic and Controlled Processes in Social Categorization**

It is difficult to investigate the processes that mediate social judgment and categorization. The experimental methodology must be nonreactive. Otherwise, one runs the risk of significantly altering subjects' interpretation, encoding, and retrieval of pertinent information (Feldman & Lynch, 1988; Sandelands & Larson, 1985). The key, then, is to select a methodology that can provide the necessary insight without altering or disturbing the way in which people naturally think about their world and those with whom they come in contact.

With this in mind, many researchers have turned to tests of recognition memory as a window into the nature of social categorization. The assumption here is that recognition memory tests provide valuable information regarding the manner in which information is interpreted and encoded. This assumption seems reasonable given current theorizing on the effects of schematic processing of information on human memory. For example, Fiske and Taylor (1991) discuss the fact that categorizing or
labeling an individual makes him or her seem more similar to other category members. How would this be evidenced in a test of recognition memory? The act of categorizing or labeling the individual would make it difficult for subjects to distinguish between actions or attributes that can be assigned legitimately to the individual versus actions or attributes that are merely characteristic of the category prototype or exemplars. This type of "confusion" results in what has been termed "schematic intrusions" in tests of recognition memory in that subjects falsely recognize a new item or piece of information as "old" on the basis of the item's overlap with or similarity to an old item (e.g., Bransford & Franks, 1971; Foti, 1983; Kosslyn & Bower, 1974; Phillips, 1984; Phillips & Lord, 1982; Woll & Graesser, 1982).

Other researchers have used recognition memory tests to distinguish between on-line and memory-based judgment. For example, Park found that on-line judgments of a target individual eliminated "fan effects" for true, schema-consistent facts. The term "fan effect" refers to the finding that "as the number of facts associated with a particular character increases, so too does the time to retrieve these facts..." (Park, 1989, p. 55). How are fan effects eliminated? Park argues that the category or label provides a means of integrating and interconnecting facts. At time of test, each integrated or interconnected fact enjoys a higher level of memory activation than a comparable, nonintegrated fact. This increased activation reduces the subject's time to verify true, schema-consistent items. However, schemas and categories are not without their costs as illustrated by the fact that subjects were "very slow at rejecting false items that were
consistent with the trait concept paired with that character, and this was even more true as set size increased" (Park, 1989, p. 55). In summary, consistent items, whether studied or not, received an activation boost resulting in an elimination of the fan effect for true, but not for false items. From this finding, Park concluded that subjects had engaged in on-line categorization of the target individual.

Just as in social cognition, the area of cognitive psychology has experienced a resurgence of interest in what variously has been termed implicit perception, unconscious processes, or perception without awareness. Many cognitive experiments have relied on tests of recognition memory to make inferences about what has taken place at time of stimulus presentation. Kihlstrom, Barnhardt, and Tataryn (1992) discuss the potential problems associated with this approach and offer the following argument in support of memory measures as a window into perception:

A somewhat thornier problem is that most demonstrations of implicit perception rely on memory. Thus,...tasks occur some appreciable time after the stimulus has been presented. For [this] reason, it would be easy to classify [such] experiments...as instances of implicit memory rather than implicit perception. It would be easy, perhaps, but it would be wrong. As William James noted, all introspection is retrospection; enforcing such a standard would inevitably collapse perception into memory...Still, it should be admitted that the distinction between implicit perception and implicit memory is a little fuzzy at the edges. After all, if memory is the residual trace of
a perceptual activity, then even implicit percepts should be recorded in memory. (p. 24)

This author makes the same argument as that of Kihlstrom, Barnhardt, and Tataryn (1992). To demand that all investigations of unintentional or automatic processes employ "on-line" measures would have a stifling affect on research in this topic area. Instead, it would be more fruitful to acknowledge that both on-line and retrospective methodologies have their place, with each addressing slightly different questions. On-line methodologies provide a "snapshot" of the processes employed at the point at which individuals are forced to suspend information processing to engage in some type of on-line judgment. Retrospective methodologies bear the burden of inference, but are likely to yield information that more faithfully reflects information processing in the real world by virtue of allowing individuals to pursue their information-processing strategies to some logical and meaningful conclusion.

The Process-Dissociation Procedure (PDP)

In the present study, a process-dissociation procedure (PDP) was used to investigate whether individuals automatically categorize and recognize leaders based on behavioral information. This procedure was developed recently by Jacoby and his colleagues (e.g., Jacoby, 1991; Jacoby, Lindsay, & Toth, 1992; Jacoby, Ste-Marie, & Toth, in press; Jacoby, Toth, Lindsay, & Debner, 1992; Jennings & Jacoby, under review) and represents a significant breakthrough in the study of the processes underlying human cognition. The PDP was developed to estimate the
concurrent contributions of automatic and controlled influences of memory and perception in a variety of tasks. In the current study, the PDP represents a test of recognition memory with an added "twist" that will be described in detail in the paragraphs that follow.

The rationale for applying the PDP to the study of whether automatic categorization mediates leadership recognition is the same as that of Park's (1989) research on whether individuals assign traits on-line. It is assumed that what individuals "remember" provides valuable insight into the way they interpreted, encoded, and retrieved information. That is, careful, piecemeal consideration of information promotes controlled influences of memory. This type of processing allows individuals to distinguish between information that is true of an individual and that which is merely consistent with a relevant schema or category. In contrast, schematic and less effortful processing facilitates automatic influences of memory. Automatic influences do not support the ability to distinguish between information that is true as opposed to false with respect to a particular individual. It is this type of processing that underlies the tendency to attribute schema- or category-consistent information to an individual regardless of whether it is true or false. Before discussing the specifics of the present study, some space will be devoted to the introduction of Jacoby's method and the way it can be modified to address the issue at hand.

The main premise of the PDP is that controlled or intentional processes "can be measured as the difference between performance when a person is trying to as compared with trying not to use information from
some particular source" (Jacoby, 1991, p. 526). Jennings and Jacoby (under review) provide the following example of parental control to illustrate this logic: "If a child is as likely to engage in an act when told to as when told not to, the parent has no control. Control cannot be measured by only telling a child to or not to engage in some act; rather, control is assessed by the difference in performance between the two conditions" (p. 11). Jacoby incorporates both conditions in the PDP by combining results from a facilitation test with those from an interference test. Facilitation tests are those in which automatic processes facilitate task performance. An example of this would be a shorter response time for recognizing "leader" as a word (versus nonword) if it had appeared in a previously studied word list. Interference tests are those in which automatic processes interfere with task performance. The Stroop color naming task (Stroop, 1935) is, perhaps, the most well-known interference test. In this task, using study list words in the test list would interfere with subjects' ability to ignore the printed word in the interest of quickly naming the ink color.

The PDP has been used to demonstrate empirically the concurrent contributions of automatic and controlled processes in a number of recent studies. In the initial study using the PDP, Jacoby (1991) investigated the effect of dividing attention on automatic versus controlled influences of memory. Subjects in this study participated in several phases, the first of which required them to solve anagrams and to read words. They then heard a list of words that they were told to remember for a later recognition memory test. In the "inclusion" test phase (a facilitation test), subjects were instructed to call a word "old" if they remembered having
either solved the word as an anagram, read the word, or heard the word in the study phase. Otherwise, they were to respond "new." In the "exclusion" test phase (an interference test), subjects were instructed to call a test word "old" only if the word was one that they had heard earlier. The rationale here is that if responding is under conscious control, then subjects will respond differently to words solved as anagrams or read depending on the test instructions. If responding is solely the product of automatic influences of memory, then subjects, like the child in the earlier example, will be just as likely to respond "old" to a word solved as an anagram or read when instructed to (inclusion test) as when instructed not to (exclusion test). In summary, controlled processes support subjects' ability to "selectively respond" or to alter their responses to comply with test instructions in a test of recognition memory. In contrast, automatic processes fail to provide this same kind of support with the result that subjects cannot control their responding in the PDP. By combining subjects' data from the inclusion and exclusion tests, Jacoby was able to pinpoint that controlled processes, rather than automatic processes, were impaired when attention was divided at time of test.

In another study, Jennings and Jacoby (under review) investigated whether divided attention and aging affected automatic or controlled processes in a fame judgment task. In the first phase of their study, groups of young and elderly adults devoted full attention to reading a list of nonfamous names. A second group of young adults read the same list of names, but under conditions of divided attention. All three groups then participated in an inclusion test in phase 2, followed by an exclusion test in
phase 3. For the inclusion test, subjects were misinformed that all of the names presented in phase 1 were names of obscure, famous individuals so that if they remembered having read the name earlier, they were to respond "famous." For the exclusion test, subjects were correctly informed that the names presented in phase 1 were, in fact, nonfamous. If they recollected reading a name in phase 1, they could be certain that the name should be called "nonfamous." Again, the logic underlying the PDP is that the same name can invoke a different response in the exclusion versus inclusion test only to the extent that subjects can correctly recollect whether the name was presented earlier. Young subjects under conditions of divided attention and elderly subjects experienced similar decrements in controlled processes in the fame judgment task, but no decrement in automatic processes.

**Applying the PDP to the Investigation of Leadership Recognition.**

Past research using the PDP has been presented both to introduce the procedure and to demonstrate its utility in investigating a number of different issues. The discussion that follows will illustrate the way in which Jacoby's procedure was applied to the study of leadership recognition. Imagine that you have just encountered a stranger and that you observe this person's behavior for some period of time. She is exhibiting numerous behaviors characteristic of leaders and, from these, you are able to infer a number of leadership attributes. From past research on schematic processing, it seems likely that you will remember not only the behaviors and attributes that you actually "observed," but additional behaviors and attributes consistent with your leadership schema or category
(e.g., Foti & Lord, 1987; Phillips, 1984). In essence, schematic processing of information makes it difficult for you to distinguish between behaviors and attributes that can be legitimately attributed to the present "leader" versus those that are typically associated with leaders based on past knowledge and experience. On the other hand, if you have processed and integrated information in a more piecemeal fashion, taking great care to consider the present "leader" as an individual rather than merely an instance of a category, you will be in a good position to make the distinction between what is true of the individual and what is merely characteristic of individuals who are similar to the present "leader."

According to Jacoby and his colleagues, the ability to selectively respond or distinguish between these two types of items in the PDP is the essence of controlled processes. Automaticity is then defined in relation to this estimate of control.

Jacoby's PDP is extremely versatile in that it can be used to investigate a myriad of issues in the area of human cognition with only slight modifications. In the present study, subjects read behavior descriptions rather than names or words, but the underlying logic remained the same. That is, subjects' responses to various behavioral descriptions in an inclusion and exclusion test were used to compute estimates of controlled and automatic processes in leadership recognition. A brief overview of the procedure follows.

In the present study, subjects were asked to assume the role of a teams coordinator for a small computer company. Their first task was to find a replacement for a team that had recently lost a member to a
competing computer company. After reading a brief description of the team, subjects read 32 behavioral descriptions in the former employee phase. The former employee phase was presented as an opportunity for subjects to familiarize themselves with the type of information that they would need to consider when selecting a new team member. During the next phase, the candidate phase, subjects read 32 behavioral descriptions that were written about the "first" (in reality, only) job candidate. The behavioral descriptions in each phase included 16 leadership-consistent and 16 leadership-irrelevant descriptions. The test phase consisted of two tests: an inclusion and exclusion test. Each test included 64 behavioral descriptions: 16 from the former employee phase, 16 from the candidate phase, and 32 "distractors" (i.e., not presented in either phase). The two sets of descriptions presented in the inclusion and exclusion tests were mutually exclusive (i.e., an item was never tested in both the inclusion and exclusion tests). In the inclusion test, subjects were instructed to respond "yes" to an item if they remembered having read the statement in either the former employee or candidate phase of the experiment. Otherwise, they were instructed to respond "no." In the exclusion test, subjects were instructed to respond "yes" to an item only if they remembered having read the statement in the candidate phase. They were cautioned that if they remembered having read the statement in the former employee phase, then they could be certain that it had not appeared in the candidate phase and should, therefore, respond "no." The critical aspect of the PDP is that only controlled processes support selective responding: in this case, "yes" responses to former employee phase items in the inclusion test and "no"
responses to these items in the exclusion test. Alternatively, automatic processes would make former employee items seem sufficiently familiar to warrant "yes" responses in the inclusion test, but provide insufficient recollection to select against or respond "no" to these items in the exclusion test. This is the critical distinction between controlled and automatic processes in the PDP.

At this point, the way in which Jacoby's PDP addresses the issue of the processes underlying subjects' leadership recognition may still be a bit unclear. The key to this approach lies in the fact that the contributions of automatic and controlled processes vary to the extent that subjects processed information about the job candidate in a typically schematic manner or, like the parent in Jacoby's example, were able to exert some control and maintain the distinction between items describing the job candidate versus those that described former employees. In essence, subjects in the present study were asked to make this distinction in the PDP. The inclusion test represented a condition in which subjects needed to select for behaviors descriptive of the job candidate and former employees, and select against distractor behaviors (i.e., behaviors never presented). Then, in the exclusion test, subjects were asked to make a finer distinction by selecting for only those behaviors that were used to describe the job candidate while selecting against those behaviors that were used to describe former employees or distractor behaviors.

Distinguishing between former employee and candidate phase behaviors becomes difficult insofar as a leadership category guides subjects' processing of information about a potential leader. In fact, failure
to make this distinction translates into a low estimate of control or selective responding in the PDP. One might also expect a large contribution of automatic processes to the extent that behaviors are sufficiently "familiar" to evoke a "yes" response given a failure in control. Alternatively, if subjects adopt a more controlled or piecemeal information processing strategy (Fiske & Neuberg, 1990), they are in a position to accurately recollect and then assign behaviors to the appropriate source (i.e., former employee versus candidate phase). In summary, differences in performance between the two conditions in which subjects try to versus trying not to use behavioral information reflect controlled or intentional processes in the PDP. Automatic processes are then defined in relation to this estimate of controlled processes.

Leadership recognition based on behavioral information is an important area of investigation. Until now, there has been no way to accurately assess the degree to which automatic versus controlled processes mediate this type of leadership recognition. Jacoby's PDP provided the means for testing Lord's proposition that leadership recognition is mediated by an automatic categorization process in which individuals compare a set of observed behaviors to a leadership prototype. In keeping with more recent theorizing on the nature of human information processing (Bargh, 1989; Feldman, 1981; and Neumann, 1984), it has been argued here that leadership recognition proceeds from some combination of automatic and controlled or intentional processes.
Potential Moderators of Automatic and Controlled Processes in Leadership Recognition

A second goal of this research was to consider the influence of three contextual variables on individuals' recognition of a potential leader. Changes in tasks and situations have long been recognized to influence the way in which individuals consciously process information. Conversely, automatic processing traditionally has been viewed as a purely stimulus-driven process—that is, totally dependent on the properties of the stimulus and independent of changes in tasks and situations. This viewpoint is now being challenged by researchers such as Bargh (1989), Jacoby (1991), and Neumann (1984) who argue that automatic processing is context dependent and, therefore, just as susceptible to an individual's current motivations, intentions, and attention as are controlled processes.

Information Load. What organizational or contextual variables moderate the contributions of automatic and controlled processes to leadership recognition? One factor of both theoretical and practical importance is the degree to which individuals operate under conditions of "information overload." In conditions of information overload, information is presented at a rate that is rapid enough to preclude in-depth processing of information (Bargh & Thein, 1985). Many researchers have argued that "attentional scarcity" is the norm in everyday life and, certainly, few would argue that the pace in organizations is any less frenetic (Dawes, 1976). For this reason, it is important to gauge the impact of information overload on the processes that mediate leadership recognition.
The consequences of information overload can vary along a continuum of impeding social categorization or judgment altogether to having little or no impact. The critical factor here is the degree to which individuals possess knowledge structures that are adequate to process incoming information when attentional resources are severely restricted (Bargh & Thein, 1985). Efficient knowledge structures are those that one uses often enough that they become chronically accessible. This notion of efficient knowledge structures is consistent with Wundt's concept of "habit" (1903) and Shiffrin and Schneider's view of automatic processes (1977). This line of reasoning suggests that information overload would impact leadership recognition to the extent that individuals must expend cognitive resources to recognize leaders (see Bargh & Thein, 1985, p. 1132).

In the present study, information load was manipulated by assigning subjects to a condition in which they had plenty of time to read and to consider each piece of behavioral information or a second condition in which they had hardly enough time to read each behavioral description through one time. This is very similar to the manipulation employed by Bargh and Thein (1985). Lord's theory of automatic leadership recognition suggests that individuals possess efficient knowledge structures for processing leadership information. If this is true, manipulating information load should have little, if any, impact on the processes underlying leadership recognition because the contribution of controlled processes would be negligible in both conditions. If Lord is incorrect and leadership recognition is mediated substantially by controlled processes, then information overload would reduce the estimate of control as
individuals are prevented from engaging in an effortful examination of the behavioral information (Schneider, Dumais, & Shiffrin, 1984).

**Need for Leadership.** A second contextual or organizational variable of interest is the degree to which individuals perceive a need to identify a leader. This notion of need for leadership corresponds to Bruner's work on need and values as organizing principles in perception (Bruner, 1957; Bruner & Goodman, 1947). In essence, Bruner argued that individuals are "perceptually ready" to perceive that which they need or value. According to this view, individuals who perceive a need for leadership would be predisposed or "primed" to recognize a potential leader. Lord, Foti, & DeVader (1984) attempted to prime the leadership category in their original study. Their priming manipulation failed, but the practical consequences of priming or making a category accessible are well documented. Arguably, the most compelling demonstration is the work of Higgins, Rholes, and Jones (1977) in which they found that priming a trait category influenced the interpretation of ambiguous behavioral information in the direction of the primed category (see also Smith & Branscombe, 1988). What is not clear, at this point, is whether increasing accessibility in this manner promotes automatic or controlled processes. The answer likely depends on whether the observer is aware of the category at time of information processing.

In the present study, the description of the work team was altered to manipulate need for leadership. In the high need for leadership condition, the team was depicted as experiencing difficulty in areas that indicated a need for leadership: for example, outlining a strategy, setting reasonable
and challenging goals, motivating others, and so forth. In the low need description, the team was depicted as doing well in these same areas. Both teams were depicted as facing a challenging task; however, the intention was for high need subjects to be more inclined to process leadership behaviors according to a leadership category as opposed to some other relevant category. If Lord is correct, and automatic processes mediate leadership recognition, leadership categorization is inevitable. In this case, need for leadership would have little, if any, impact because the automatic estimate would be high in both conditions. Alternatively, if both automatic and controlled processes mediate leadership recognition, high (versus low) need for leadership would reduce controlled processes and increase automatic processes for leadership behaviors due to increased accessibility of the leadership category. This increase in leadership accessibility would promote schematic processing of information for category-consistent behaviors and, as a result, reduce selective responding (control) and increase the likelihood that subjects would endorse a leadership behavior given a failure in selective responding (automaticity).

Time Delay Between Former Employee and Candidate Phases. A third variable was investigated to discover whether the estimates of automaticity and control in leadership recognition might be dependent on the way in which the PDP is implemented. Specifically, it seems reasonable to argue that one could boost the controlled estimate and, perhaps, decrease the automatic estimate by providing a clear demarcation between the former employee and candidate phases of the experiment. One way to do this would be to introduce a space of time between the two
phases so that subjects would be better able to distinguish between behaviors that were read in the former employee as opposed to the candidate phase.

In this experiment, half of the subjects completed a 10-minute budget task immediately after reading the behavioral descriptions in the former employee phase. The actual delay amounted to approximately 14 minutes including time to distribute, explain, and collect the budget task. The remaining subjects moved from the former employee phase immediately into the candidate phase of the experiment. It was predicted that providing this delay between the two phases would increase subjects' ability to selectively respond to the behavioral descriptions in the PDP (an increase in control) and, possibly, reduce the probability of subjects' endorsing a behavioral description given a failure in control (a decrease in automaticity).

The issue of whether the PDP estimates of control and automaticity are sensitive to variations in experimental procedure is, primarily, a methodological one. Of course, it is important to fully understand the nature and, perhaps, limitations of a new procedure or paradigm. However, this issue has practical implications as well. For all the reasons outlined in previous paragraphs, it matters whether leadership recognition is mediated by a controlled as opposed to an automatic categorization process. Given the practical implications of this question, it seems reasonable to conduct a series of experiments rather than a single experiment to gain an accurate estimate of the extent to which an automatic versus controlled categorization process mediates leadership recognition.
Goals and Implications of Present Study

In the preceding pages, a case has been outlined for pinpointing whether automatic versus controlled processes mediate leadership recognition. Lord and his colleagues (Lord, Foti, & DeVader, 1984; Lord, Foti, & Phillips; 1982) made a significant contribution in their introduction of the first leadership theory based on information processing research in cognitive psychology (see House & Singh, 1987, for a more in-depth treatment of this point). The recent development of the PDP (Jacoby, 1991) made it possible to investigate the issue of automaticity of leadership recognition in a way that was previously impossible. This was the first goal of the present study. A second goal was to investigate three potential moderators of the processes underlying leadership recognition: information load, need for leadership, and time delay between the former employee and candidate phases of the experiment. Considerable space has been devoted to outlining why both goals are important. The continuing debate concerning the automaticity of social categorization and judgment provides the major theoretical impetus for the present study. From a practical standpoint, it is necessary to understand more fully the nature of leadership recognition in order to anticipate and ameliorate potential negative consequences.

Brief Study Overview

Jacoby's PDP was used to assess the cognitive processes mediating leadership recognition. Individual behavioral descriptions were presented as excerpts from recommendation letters written by former employers. The set of descriptions included two types of behavioral descriptions: half
were pretested as being consistent with undergraduates' notions of leaders and leadership (leadership consistent) and half were pretested as bearing no relationship to leadership (leadership irrelevant). Subjects reviewed descriptions of several former employees (former employee phase) and one job candidate (candidate phase) in order to fill a vacancy in a work team. Three potential moderators were investigated in separate experiments. The potential impact of information load was investigated in the first experiment by varying the time allotted for presentation of each behavioral description in both the former employee and candidate phases of the experiment. In the second, the description of the work team was varied in order to manipulate need for leadership. In one description, the team was depicted as having difficulty in areas that indicated a need for leadership (high need) whereas the other description depicted a team that was doing well in these same areas (low need). Finally, a time delay was introduced between the former employee and candidate phases in the third experiment as a potential moderator of the balance of automatic and controlled processes in leadership recognition.

Hypotheses

**Experiment 1: Information Load**

- Contrary to the theory of Lord and his colleagues, it was predicted that both automatic and controlled processes would mediate leadership recognition. This prediction is consistent with the argument that most social categorization and judgment is the product of some combination of automatic and controlled processes (e.g., Bargh, 1989; Feldman, 1981).
• A second prediction was that information overload would reduce estimates of control due to a reduction in attentional resources.

Experiment 2: Need for Leadership

• Again, it was predicted that both automatic and controlled processes would mediate leadership recognition.

• A second prediction was that high (versus low) need for leadership would reduce estimates of control and boost estimates of automaticity for leadership consistent (but not irrelevant) behavioral descriptions due to increased accessibility of the leadership category.

Experiment 3: Time Delay Between Former Employee and Candidate Phase

• As with Experiments 1 and 2, it was predicted that both automatic and controlled processes would mediate leadership recognition.

• A second prediction was that a time delay would provide a clear demarcation between the former employee and candidate phases of the experiment resulting in an increase in the estimates of control and, possibly, a decrease estimates of automaticity in the PDP.

Method

Procedure

All phases of the experiment were presented on Macintosh IIcx computers with the exception of the pencil and paper budget task in
Experiment 3 (see Appendix C). Subjects were 118 Rice undergraduates who participated voluntarily in return for partial course credit. Subjects were randomly assigned to one of four experimental conditions: information overload (n = 32), high need for leadership (n = 29), time delay (n = 28), or "control" (n = 29). The control group provided the basis for comparison in Experiments 1, 2, and 3. In other words, this group was the nonoverload group in Experiment 1, the low need for leadership group in Experiment 2, and the no time delay group in Experiment 3.

Subjects began by reading a vignette describing a small computer company and a work team (see Appendix A). They were then asked to assume the role of a teams coordinator for this company. Their first task was to choose a candidate from among a pool of job candidates who would be best suited to fill an opening in the work team. During the former employee phase, subjects first read a series of 32 behavioral descriptions (16 leadership consistent and 16 leadership irrelevant) that were presented as excerpts from recommendation letters (see Appendix B). The pool of behavioral descriptions was pretested to ensure that subjects viewed the descriptions in the intended fashion -- that is, either consistent with or irrelevant to leadership. The former employee phase was presented as an opportunity for subjects to become acquainted with the type of information they would need to consider in choosing a new team member for the work team. After reading the last description in this phase, subjects were reminded that they had just finished reading descriptions written about former employees and that in the next phase, the candidate phase, they
would read 32 behavioral descriptions that were written about the first job candidate, Mark Thompson (see Appendix D).

A test phase followed in which the primary task was Jacoby's PDP. As in the former employee and candidate phases, behavioral descriptions were presented in a serial fashion. Subjects responded "yes" or "no" to each description according to the specific test instructions: inclusion versus exclusion. In the inclusion test, subjects were instructed to respond "yes" to a statement if they remembered having read it in either the former employee or the candidate phase of the experiment. If the statement was new, they were to respond "no." In the exclusion test, subjects were told to respond "yes" to a statement only if they remembered having read it in the candidate phase of the experiment. They were told that if they remembered reading the statement in the former employee phase, they could be certain that it had not appeared in the candidate phase and should, therefore, respond "no." As in the inclusion test, subjects were instructed to respond "no" to new or distractor behaviors (see Appendix E). In all three experiments, every subject participated in both the inclusion and exclusion tests of the PDP. That is, the inclusion and exclusion tests were within subject. In both the inclusion and exclusion tests, 64 behavioral descriptions were presented: 16 former employee, 16 candidate, and 32 distractors. Within each item type (former employee, candidate, or distractor), leadership consistent and irrelevant behaviors were represented equally. This configuration yielded a total of 128 descriptions in the test phase.
The order of the inclusion and exclusion tests was not counterbalanced. That is, all subjects completed the inclusion test and then the exclusion test of the PDP. Jacoby and his colleagues have implemented the PDP in a number of ways: inclusion test followed by exclusion test as both between and within subject, exclusion test and then inclusion test as both between and within subject, inclusion and exclusion tests interleaved into one test session, and so forth. In short, the ordering of the two tests does not appear to affect the resulting PDP estimates (see Jennings & Jacoby, under review, for a more in-depth treatment of this point). A set order of inclusion test followed by the exclusion test was chosen to provide a more intuitively appealing and reasonable task for subjects.

Subjects' responses in the inclusion and exclusion tests were used to compute estimates of automatic and controlled processes following Jacoby's method (e.g., Jacoby, 1991; Jennings & Jacoby, under review). These formulae are presented and discussed at length in the next paragraph. Immediately after completing the two tests of the PDP, subjects wrote a brief open-ended description of the job candidate. The goal here was to gain additional insight into the process of leadership recognition. Subjects' descriptions were examined for labels or phrases that included or implied leadership (see Appendix F). Subjects then completed a modified version of the General Leadership Impression (GLI) scale, a five-item evaluative questionnaire developed by Cronshaw and Lord (1987). The GLI tapped subjects' evaluations of the job candidate's potential to be an effective leader as well as the extent to which the job candidate fit their image of both the typical and ideal leader. This instrument was used in all three
experiments to establish that the job candidate was, in fact, evaluated favorably in terms of his leadership skills and abilities (see Appendix G). Finally, appropriate manipulation checks were administered in Experiments 1 and 2 to ensure that the manipulations were perceived as intended. For Experiment 1, this involved establishing that there were perceived differences between subjects in the two information load conditions. This item asked subjects to rate the speed at which the behavioral statements were presented in the former employee and candidate phases of the experiment. For Experiment 2, the manipulation check included three items that tapped into subjects' perceptions regarding the extent to which leadership ability was an important and necessary qualification for the new team member (Appendix H).

**Dependent Variables**

*PDP Estimates of Automatic and Controlled Processes.* The strength of Jacoby's PDP is its unique ability to provide quantitative estimates of automatic and controlled processes used at retrieval. As mentioned earlier, the operating assumption is that what individuals remember reflects the manner in which they interpreted and encoded information (Fiske & Taylor, 1991; Phillips & Lord, 1982; Woll & Graesser, 1982). In generating the estimates of automatic and controlled processes, only former employee phase items were used as subjects' responses should have varied only for these descriptions. That is, subjects should have responded "yes" to candidate phase descriptions and "no" to distractors in both the inclusion and exclusion tests of the PDP. The process of computing the PDP estimates began by computing probability estimates of "yes" responses to
former employee phase descriptions in both tests. If the distinction between the former employee and candidate phase items was blurred due to schematic processing, then there should have been little difference in the probability of a subject responding "yes" in the inclusion versus exclusion test. This would result in little or no contribution of controlled processes. Subtracting the probability of responding "yes" to former employee phase items on the exclusion test from the probability of a "yes" response on the inclusion test provided an estimate of controlled processes:

Controlled Processes = p(Inclusion) - p(Exclusion)

Given this estimate, it was possible to estimate the contribution of automatic processes. Contrary to controlled processes, automatic processes do not support selective responding. The following formula was used to calculate the contribution of automatic processes:

Automatic Processes = p(Exclusion)/(1 - Controlled Processes)

At this point, it might be instructive to discuss at some length what it means to say that there has been "a failure in control or selective responding" (i.e., [1 - Controlled Processes]). At the most simple level, this means that individuals did one of two things when responding to a former employee phase item in the inclusion and exclusion tests:

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<th>Inclusion</th>
<th>Exclusion</th>
<th>Control</th>
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<td>&quot;no&quot; or &quot;0&quot;</td>
<td>&quot;no&quot; or &quot;0&quot;</td>
<td>0</td>
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<td>&quot;yes&quot; or &quot;1&quot;</td>
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</table>

The first instance reflects a situation where a former employee item evokes no sense of prior exposure or "familiarity"--a sort of "in one ear and out the other" experience. (Familiarity can be thought of as a vague or
nonspecific sense of having encountered some piece of information in the past.) If this pattern of responding was repeated throughout the two tests of the PDP, one would obtain zero probabilities for both automatic and controlled influences of memory as there would be, in essence, zero memory for all behavioral descriptions whether former employee or candidate phase. The more frequent occurrence is depicted in the second situation where a former employee phase item evokes a feeling of prior exposure or familiarity that is sufficient to secure a "yes" response in the inclusion test. During the exclusion test, this sense of familiarity prevails and there is insufficient recollection or specificity of memory to recognize the item as having been presented in the former employee rather than candidate phase of the experiment. The result of this interplay between familiarity and recollection is that the individual will incorrectly attribute a former employee phase description to the job candidate (i.e., respond "yes" when he/she should have responded "no"). Recall that this is exactly the sort of evidence that researchers have relied on in previous investigations of schematic information processing (e.g., Bransford & Franks, 1971; Foti, 1983; Kosslyn & Bower, 1974; Phillips, 1984; Phillips & Lord, 1982, Woll & Graesser, 1982). The advantage of the PDP rests on the fact that one can actually generate quantitative estimates of controlled and automatic influences in a recognition memory task. Also, the PDP pits not only "old" versus "new" items against one another (i.e., inclusion test), but forces subjects to pinpoint precisely the source of "old" items (i.e., former employee versus candidate in the exclusion test).
Hopefully, it is now clear exactly what is meant by the phrase "failure in control or selective responding." This is, quite literally, half of the equation -- the denominator. The numerator reflects the probability that an individual has endorsed former employee items in the exclusion test. Dividing this probability by the probability that there has been a failure in control or selective responding provides the estimate of automatic processes in the PDP.

The estimates of automatic and controlled processes were computed separately for each subject, maintaining separate estimates for leadership consistent and irrelevant items. The individual estimates were then averaged to yield group means. PDP estimates are, essentially, probability estimates. This means that the estimates of both automatic and controlled processes range from 0 to +1.0 and can be interpreted as one would interpret any probability estimate.

At this point, it might be instructive to provide PDP data for three actual subjects who exhibited different balances of automatic versus controlled processes to illustrate the computations and logic of the PDP as applied to the study of leadership recognition. These individuals read behavioral descriptions in both the former employee and candidate phases and then completed both the inclusion and exclusion tests of the PDP. The data presented below are for former employee phase items as individuals' responses should have changed from the inclusion to the exclusion test only for these items. That is, the individuals should have responded "yes" to candidate phase behaviors and "no" to new or distractor behaviors in both the inclusion (Incl) and exclusion (Excl) tests.
<table>
<thead>
<tr>
<th>Subj</th>
<th>p(yes)-Incl</th>
<th>p(yes)-Excl</th>
<th>Control</th>
<th>Automatic</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>.88</td>
<td>.25</td>
<td>.63</td>
<td>.67</td>
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<td>2</td>
<td>.88</td>
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The individual estimates of control were computed by subtracting the probability of a "yes" response in the exclusion test from the probability of this same type of response in the inclusion test. The estimates of automatic processes were computed by dividing the probability of a "yes" response in the exclusion test by the probability of a failure in control (i.e., [1 - Controlled Processes]). An examination of these data reveals a very different balance of automatic and controlled processes among the three subjects. Subject 1 evidenced a fairly balanced pattern of responding in the PDP with both processes contributing to a moderate degree. Subjects 2 and 3 evidenced patterns that clearly favored one process over the other, with automatic processes dominating Subject 2's responses. In contrast, controlled processes precluded any contribution of automatic processes in Subject 3's responses.

Individual data were presented to provide a more concrete introduction to the PDP computations. This same computational process was carried out in generating the PDP data for all three experiments. That is, probabilities of "yes" responses to former employee phase items in both the inclusion and exclusion tests were calculated for each individual. These individual-level probabilities were used to compute estimates of automaticity and control according to the method outlined by Jacoby and his colleagues.
Open-Ended Responses. Unequivocal evidence of the application of categories or other types of knowledge structures is difficult to obtain (Gilbert & Hixon, 1991). Subjects' open-ended responses represent a potentially useful source of information about their informal leadership perceptions (Lord, Foti, & DeVader, 1984). Immediately after completing the inclusion and exclusion tests of the PDP, subjects provided brief unstructured descriptions of the job candidate. These descriptions were examined for labels or phrases that included or implied leadership.

Leadership Evaluations. After subjects provided their open-ended descriptions of the job candidate, they evaluated his leadership skills and ability by completing a modified version of the General Leadership Impression scale (GLI), a five-item scale originally developed by Cronshaw and Lord (1987). The scale assessed subjects' evaluations of the job candidate's leadership potential and leadership prototypicality as well as their willingness to place the candidate in a position of leadership. A composite rating was computed separately for each subject to form a global leadership evaluation.

Information Load Manipulation Check. One item was presented to make certain that there was a significant difference between the two information load conditions with respect to the rate at which the behavioral descriptions were presented. This item ranged along a five-point scale with end points of "much too quickly" and "much too slowly," and was presented to subjects in Experiment 1.
Need for Leadership Manipulation Check. This manipulation check was administered to subjects in Experiment 2 to ensure that they perceived a greater need for leadership in the high versus low need condition.

Basic Design Feature

As discussed in previous paragraphs, the PDP consists of two separate tests: inclusion and exclusion. The test instructions were repeated and augmented to ensure that subjects clearly understood the difference between the two tests of the PDP. As discussed previously, subjects' responses to former employee phase items in the inclusion and exclusion tests were used to generate estimates of automatic and controlled processes. These estimates of automaticity and control constituted a repeated-measure variable (cognitive process) in subsequent analyses of variance.

Independent Variables

Behavior Type: Leadership Consistent and Irrelevant. Both leadership consistent and irrelevant behavioral descriptions were presented in equal proportions across all phases of the three experiments. Extensive pilot testing was conducted to ensure that the items were judged to be either consistent with or irrelevant to leadership.

Experiment 1: Information Load (Overload versus Nonoverload). During the test phase, each subject completed the inclusion and exclusion tests of the PDP, an open-ended description of the job candidate, an evaluative measure of the job candidate's leadership skills and abilities (GLI), and an information load manipulation check -- in this order. It should be noted that words like "leader," "manager," "subordinate," and so forth did not appear in any of the experimental materials with the
exception of the GLI. At the point they filled out this scale, subjects essentially had completed their participation in the experiment. This aspect of the procedure was true for all three experiments. Information load was manipulated by varying the rate at which behavioral descriptions were presented. This manipulation was between subjects so that each subject participated in either the nonoverload or overload condition, not both. In the overload condition, each behavioral description appeared for only 3 seconds. Pretesting determined that 3 seconds would be enough time for subjects to read quickly most descriptions. For longer descriptions, it was difficult, if not impossible, for subjects to read the entire description. In contrast, subjects in the nonoverload were given ample time (8 seconds) to read and consider each behavioral description. A time of eight seconds was chosen to allow subjects to elaborately process the behavioral information.

Experiment 2: Need for Leadership (High versus Low). Subjects in this experiment completed the inclusion and exclusion tests of the PDP, an open-ended description of the job candidate, leadership evaluations, and the need for leadership manipulation check—in this order. Need for leadership was manipulated in the description of the work team. In one, the team was depicted as experiencing difficulty in areas that indicated a need for leadership (high need) whereas the other team was described as doing well in these same areas (low need). Subjects were randomly assigned to one of the two need for leadership conditions.
Experiment 3: Time Delay Between Former Employee and Candidate Phase

Subjects in Experiment 3 completed the inclusion and exclusion tests of the PDP, an open-ended description of the job candidate, and leadership evaluations—in this order. In the time delay condition, subjects completed a 10-minute budget task immediately after reading the behavioral descriptions in the former employee phase. The actual delay amounted to approximately 14 minutes including time to distribute, explain, and collect the budget task. In the "no delay" condition, subjects moved from the former employee phase immediately into the candidate phase of the experiment. Subjects were randomly assigned to one of the two conditions.

Results and Discussion - General

Open-Ended Responses

Immediately after completing both the inclusion and exclusion tests of the PDP, subjects were asked to briefly describe the job candidate. They were told that their descriptions could be a word, a phrase, or a few sentences. In other words, the length was unimportant. They were urged simply to describe the job candidate in their own words. These responses were collected in an attempt to discover whether subjects spontaneously generated a leadership label for the job candidate. Given this purpose, a liberal coding scheme was applied that considered words like "leader," "leadership," "direct," "manage," "manager," and so forth to be a spontaneous leadership attribution. Despite this liberal coding scheme, only 14 out of a possible 118 subjects applied some type of leadership label to the job candidate. The overwhelming majority of responses were quite
positive, but were, for the most part, restricted to reiterating specific behaviors (e.g., "Helped coworkers achieve what they never expected," "...often comes up with innovative ideas to problems," etc.) or more general, trait-like attributions (e.g., "...is a very well-rounded person," "...is very helpful and conscientious," etc.). A sampling of responses appears in Appendix I.

Leadership Evaluations

Subjects (n = 118) completed a five-item leadership scale at the end of their participation in the experiment. The scale was a modified version of the General Leadership Impression Scale (Cronshaw & Lord, 1987) and was designed to tap subjects' evaluations of the job candidate's leadership potential and prototypicality as well as subjects' willingness to place the job candidate in a leadership position. A composite rating was computed separately for each subject to produce a global leadership evaluation. Possible response values ranged from 1 to 5 with lower values indicating more positive or favorable ratings. In order to provide a fair test of Lord's leadership recognition theory, it was important that subjects evaluated favorably the job candidate's leadership skills and abilities. Subjects' evaluations revealed that the job candidate was rated quite favorably in this area with mean composite values ranging from 2.09 to 2.19 across experimental conditions. This range of mean values corresponds to statements like "fit very well my image of what a leader should be" and "I would expect the job candidate to be very effective in a leadership position." There were no reliable differences between conditions in the three experiments (p values ranging from .59 to .99).
Results - Experiment 1

Information Load

In Experiment 1, information load was investigated as a potential moderator of the processes underlying leadership recognition. In this experiment, subjects were instructed to assume the role of work team coordinator for a small computer company. They were told that their primary goal was to identify a new team member for a team that had recently lost a team member to a competing computer company. After reading a description of the work team, subjects read a series of 32 behavioral statements in both the former employee and candidate phases of the experiment. These were presented as recommendation excerpts written by former employers. Information load was manipulated by randomly assigning subjects to a control or nonoverload condition (n = 29) in which they were given plenty of time (8 seconds) to read and to consider each piece of behavioral information in the former employee and candidate phases, or an overload condition (n = 32) in which they had barely enough time (3 seconds) to read each behavioral description through one time. It was predicted that information overload would preclude in-depth attentional processing of information (Bargh & Thein, 1985), thereby reducing the PDP estimate of controlled processes without affecting automatic processing.

Manipulation Check

One item was administered to make certain that subjects perceived a difference between the two information load conditions with respect to the rate at which the behavioral descriptions were presented. This item ranged
along a five-point scale with end points of (1) "much too quickly" to (5)
"much too slowly." Subjects in the overload condition reported that the
items were presented "somewhat too quickly" (mean = 2.03) whereas
subjects in the nonoverload condition reported that the items were
presented "just right to somewhat too slowly" (mean = 3.24). This
difference was reliable, $F(1,59)$ of 107.05, $MS_e = .21$, $p < .0001$.
Subjects' responses during oral debriefings were more qualitatively
polarized than their scaled responses indicated. A number of information
overload subjects stated that they were quite surprised and moderately
piqued to have been allowed so little time to read each behavioral
statement. The majority of overload subjects were more restrained in their
comments, but without exception advised the experimenter to significantly
slow the rate of presentation. In contrast, subjects in the nonoverload
condition suggested that the rate of presentation could be stepped up just a
bit as they were able to read most behavioral descriptions through several
times while awaiting the next description. Evidently, nonoverload subjects
did not consider this to be an advantage.

Probability of Responding "Yes" to Former Employee Behavioral
Descriptions

Observed probabilities of responding "yes" to the former employee
behavioral descriptions were examined to obtain a preliminary indication
of the pattern of subjects' responding in the inclusion and exclusion tests of
the PDP. Again, the analyses of PDP data were conducted using only
former employee phase data as subjects' responses in the inclusion and
exclusion tests should have varied only for these descriptions. The
instructions for candidate phase and new or distractor descriptions did not change across the two tests. That is, subjects were instructed to respond "yes" to candidate phase descriptions and "no" to new or distractor descriptions in both the inclusion and exclusion tests. Observed probabilities of "yes" responses for candidate phase and distractor behaviors in the inclusion and exclusion tests are listed in Appendix J.

The observed probabilities for responding "yes" to former employee phase descriptions were analyzed in a 2 X 2 X 2 mixed design with information load as the between-subjects factor, and test instruction and behavior type as within-subjects factors. There were no significant main effects or interactions associated with information load with p values ranging from .56 to .99.

There was a significant interaction of behavior type and test instruction, F(1,59) = 19.14, p < .0001, with the difference between the inclusion and exclusion tests being larger for irrelevant (.89 versus .42, or .47) than for consistent behavioral descriptions (.74 versus .45, or .29). In the inclusion test, irrelevant descriptions evoked more "yes" responses than did consistent descriptions (.89 versus .74), F(1,59) = 33.44, p < .0001, whereas in the exclusion test, irrelevant and consistent descriptions were equally likely to evoke a "yes" response (.42 versus .45), F(1,59) = .52, p < .48. This interaction suggests that subjects were more successful in selecting for irrelevant (as opposed to consistent) behaviors in the inclusion test and equally successful in then selecting against these irrelevant behaviors in the exclusion test. This pattern of responding resulted in a higher estimate of control or responding for irrelevant as opposed to
consistent behaviors (see Table 1). Again, the ability to selectively respond is the essence of controlled or intentional processes according to Jacoby and his colleagues. Further elaboration of this point is included in the discussion of the PDP estimates of automatic and controlled processes.

**Table 1**

**Mean Observed Probabilities of Responding "Yes" to Former Employee Phase Behavioral Descriptions**

**Experiment 1 - Information Load**

<table>
<thead>
<tr>
<th>Test Instruction</th>
<th>Information Load</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overload (n = 32)</td>
</tr>
<tr>
<td>Inclusion</td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.74</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.88</td>
</tr>
<tr>
<td>Exclusion</td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.45</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.41</td>
</tr>
</tbody>
</table>

Additionally, the analysis of the observed probabilities revealed two significant main effects. The main effect for test instruction indicated that subjects were fairly successful in their efforts to comply with the PDP test instructions, \( F(1,59) = 170.02, \text{MSE} = .11, p < .0001 \). That is, they were more likely to respond "yes" to former employee phase items in the
more likely to respond "yes" to former employee phase items in the inclusion (.82) than in the exclusion (.43) test. The second significant main effect was associated with the behavior type factor, with subjects responding "yes" to irrelevant descriptions (.65) more often than consistent descriptions (.59) across the two tests, \( F(1,59) = 5.15, \text{MSe} = .05, p < .03 \). Of course, the main effects for both test instruction and behavior type should be interpreted in light of the significant two-way interaction of these factors outlined in the previous paragraph. There were no additional significant effects from the analysis of observed probabilities.

**PDP Estimates of Automatic and Controlled Processes**

Subjects' responses to former employee phase items in the inclusion and exclusion test of the PDP were used to compute estimates of automatic and controlled processes according to the method outlined by Jacoby and his colleagues (e.g., Jacoby, 1991). These estimates were computed separately for each subject, maintaining separate estimates for leadership consistent and irrelevant behaviors.

Information load (overload versus nonoverload), behavior type (leadership consistent and irrelevant), and cognitive process (automatic and controlled) were investigated in a \( 2 \times 2 \times 2 \) mixed design with information load representing the between-subjects factor.

**Hypothesis 1.** It was predicted that there would be a significant contribution of both automatic and controlled processes to subjects' responses in the PDP. Mean probability estimates ranged from .29 to .77 and were all significantly greater than zero with associated \( p \) values less than .01 (see Table 2).
Table 2

Estimates of Automatic and Controlled Processes in the Process-Dissociation Procedure (PDP)

Experiment 1 - Information Load

<table>
<thead>
<tr>
<th>Information Load</th>
<th>Overload (n = 32)</th>
<th>Nonoverload (n = 29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled Estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.29</td>
<td>.30</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.47</td>
<td>.48</td>
</tr>
<tr>
<td>Automatic Estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.64</td>
<td>.63</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.73</td>
<td>.77</td>
</tr>
</tbody>
</table>

The finding that both automatic and controlled processes played a significant role in the PDP judgment task is consistent with current views of social judgment and categorization (e.g., Bargh, 1989; Feldman, 1981). The balance of cognitive processes clearly favored the automatic estimates (.69) over the estimates of control (.38), $F (1,59) = 56.90, p < .0001$. This suggests that subjects were engaged in a fairly effortless mode of information processing that resulted in a moderately high probability of responding "yes" to a former employee phase description in the exclusion test given a failure in control or selective responding. In summary, it
appears that subjects were engaged in an "impression formation" strategy that involved a high degree of unintentional, inescapable, and effortless processing of information. This processing strategy resulted in a low to moderate contribution of control and a high contribution of automaticity in subjects' responses in the PDP (see Table 2).

**Hypothesis 2.** The second experimental hypothesis was that information overload would reduce estimates of control due to an overall reduction in attentional resources. As was discussed earlier, the consequences of information overload are theorized to vary as a function of the degree to which individuals possess knowledge structures that are adequate to process incoming information given limited attentional resources (Bargh & Thein, 1985). The critical issue here, then, is the degree to which the leadership category is an efficient knowledge structure as opposed to a structure that is accessed so infrequently as to provide inadequate support when attentional resources are limited.

Analyses were conducted to specifically investigate the impact of information load on the balance between automatic and controlled processes in leadership recognition. There were no significant main effects or interactions associated with the information load manipulation in a 2 (information load) X 2 (cognitive process) X 2 (behavior type) analysis of variance (p values ranging from .64 to .98). Null findings are generally troublesome. In this particular case, the predicament involves determining whether the information load manipulation failed, or individuals have sufficiently well-defined and accessible leadership categories to support impression formation given limited attentional resources. Lord (1985) has
argued that the automatic nature of leadership recognition allows individuals to easily and accurately recognize leaders in the typical fast-paced and frenetic work environment. The results reported in connection with the first hypothesis suggest that subjects were operating in a more automatic than controlled fashion in considering the behavioral information. Subjects' responses to the manipulation check and, especially, their comments during oral debriefings, suggest that there were significant, if not profound, differences in the extent to which they felt at liberty to carefully read and consider the behavioral descriptions.

It should be noted that Jacoby and his colleagues have reduced attentional capacity at time of study by employing a divided attention manipulation (e.g., Jacoby, Toth, & Yonelinas, under review; Jennings & Jacoby, under review; Jacoby, Toth, Lindsay, & Debner, 1992). Without exception, reducing attentional resources led to decreased estimates of controlled processes. The problem with a direct comparison of the present and previous PDP experiments is the tremendous difference between the stimuli employed and the manner in which the availability of attentional resources were manipulated. In previous PDP research, the stimuli have been limited to words or proper names. Aside from the obvious difference in length, one must take into account the ease with which the various stimuli can be organized to form a coherent and meaningful impression or judgment. That is, do individuals possess knowledge structures that allow them to process and integrate words and proper names as efficiently and effortlessly as categorical, behavioral information? Probably not, and this may provide a good explanation for the fact that reducing attentional
resources failed to alter subjects' information processing strategies in this experiment. In addition, Jacoby and his colleagues manipulated attentional resources by dividing attention rather than by altering rate of presentation. The differences in stimuli and manipulation of attentional resources may have contributed to the contrast between the results of past research using the PDP and the present experiment.

The only other significant effect associated with the analysis of PDP estimates was a significant main effect for behavior type, F(1, 59) = 26.04, \( p < .0001 \). This effect indicates that the estimates of both automaticity and control were higher for irrelevant than consistent behavioral descriptions (.61 versus .46, respectively). This finding may provoke some level of confusion. At an intuitive level, one might expect that a greater ability to selectively respond to former employee phase descriptions in the inclusion and exclusion tests (higher control) would result in a decrease in the probability of responding "yes" to these descriptions given a failure in control (lower automaticity). In theory, however, the PDP estimates of automaticity and control are independent so that an increase in control does not guarantee a decrease in automaticity (or vice versa). What appears to have happened is that the irrelevant descriptions were, at some level, more "memorable." This is evidenced by the fact that they evoked a significantly higher level of "yes" responses (.89) than did the consistent descriptions (.74) in the inclusion test, and an equal probability of this same type of response in the exclusion test (.42 versus .45, respectively). The fact that the estimates of automaticity were higher for irrelevant than for consistent behavioral descriptions reflects the fact that, given a failure in control,
subjects were more likely to endorse than reject the descriptions (.61 as opposed to a midpoint of .50). The lower estimate for consistent behaviors reflects the fact that, given a failure in control, subjects were only slightly more likely to reject the descriptions (.46 as opposed to .50). It is important to recognize that when subjects endorsed a former employee description in the exclusion test, they were doing so in opposition to the test instructions and, arguably, their intentions to comply with the test instructions. That is, it seems clear that subjects were aware of the difference between the inclusion and exclusion test instructions, and were attempting to comply with these instructions as demonstrated by the significant main effect for test instruction reported earlier, $F(1,59) = 170.02$, $p < .0001$. When subjects endorsed former employee phase descriptions in the exclusion test, it was because the descriptions seemed sufficiently familiar to warrant "yes" responses (Jacoby, 1991; Jennings & Jacoby, under review). The probability that subjects rejected these descriptions in both the inclusion and exclusion tests reflected instances in which former employee phase descriptions simply "fell through the cracks." That is, they were not familiar or memorable enough to evoke a "yes" response in either test. This happened less often with irrelevant behaviors than it did with consistent behaviors (see Appendix J). As a result, both the automatic and controlled estimates were higher for irrelevant than for consistent behavioral descriptions.
Results - Experiment 2

Need for Leadership

Given the results from Experiment 1, the investigation of "need for leadership" as a potential moderator took on added significance. For all the reasons outlined in the introduction, need for leadership is an important construct in its own right. The added significance of Experiment 2 was the need to determine whether the PDP was appropriate for investigating the impact of subtle contextual variables on the processes underlying social judgment and categorization given the fact that information load did not moderate the estimates of automaticity and control in Experiment 1.

In Experiment 2, need for leadership was investigated as a potential moderator of the processes underlying leadership recognition. In this experiment, subjects were instructed to assume the role of work team coordinator for a small computer company. They were told that their primary goal was to identify a new team member for a team that had recently lost a team member to a competing computer company. Subjects then read one of two work team descriptions. In the high need for leadership condition (n = 29), the team was depicted as experiencing difficulty in areas that indicated a need for leadership: for example, handling conflict, setting reasonable and challenging goals, motivating others, and so forth. In the control or low need for leadership condition (n = 29), the team was depicted as doing well in these same areas. As discussed earlier, this group was the same group of subjects who constituted the control or nonoverload condition in Experiment 1. After subjects read one of the two work team descriptions, they then read a series
of behavioral descriptions in the former employee and candidate phases of the experiment. These were presented as recommendation excerpts written by former employers. It was predicted that increasing need for leadership would increase estimates of automaticity and reduce estimates of control for consistent, but not for irrelevant, behavioral descriptions as subjects would be more likely to process the consistent descriptions according to a leadership category than another plausible category (Bruner, 1957; Bruner & Goodman, 1947, Higgins, Rholes, & Jones, 1977).

Manipulation Check

Examination of the need for leadership manipulation check confirmed that high need subjects (n = 29) did, in fact, perceive a greater need for leadership than did their low-need counterparts (n = 29), $F(1,56) = 36.43, p < .0001$. Mean values indicated that low need subjects perceived a moderate need for leadership (mean = 2.68) whereas high need subjects perceived high need (mean = 1.66). The moderate need perceived by subjects in the low need for leadership condition seems reasonable given that all subjects were told that the User-Interface team faced a difficult and challenging task.

Probability of Responding "Yes" to Former Employee Behavioral Descriptions

As in Experiment 1, the observed probabilities of responding "yes" to the former employee behavioral descriptions were examined to gain a preliminary indication of the pattern of subjects' responding in the inclusion and exclusion tests of the PDP. Again, the analyses of PDP data were conducted using only former employee phase data as subjects'
responses in the inclusion and exclusion tests should have varied only for these descriptions. That is, the instructions for candidate phase and new or distractor descriptions did not change across the two tests: subjects were instructed to respond "yes" to candidate phase descriptions and "no" to new or distractor descriptions in both the inclusion and exclusion tests. Probabilities for candidate phase and distractor behaviors are listed in Appendix K.

The observed probabilities for responding "yes" to former employee phase descriptions were analyzed in a 2 X 2 X 2 mixed design with need for leadership as the between-subjects factor, and test instruction and behavior type as within-subjects factors. In contrast to Experiment 1, there were significant effects associated with the moderator, need for leadership. Most important was the marginal three-way interaction, $F(1,56) = 2.79$, $MS_e = .10$, $p < .10$. A more detailed examination of the mean observed probabilities revealed that high-need-for-leadership subjects endorsed more consistent behavioral descriptions than their low-need counterparts in both the inclusion (.84 versus .74), $F = 6.56$, $p < .01$, and exclusion tests (.56 versus .44), $F = 3.67$, $p < .06$. This resulted in no difference in the level of selective responding or control for consistent behavioral descriptions as a function of need for leadership. In contrast, there was no difference between high and low-need-for-leadership subjects for irrelevant behaviors in the inclusion test (.93 versus .91), $F = .34$, $p < .56$. In the exclusion test, there was a reversal in the general trend of higher observed probabilities for high-need-for-leadership subjects. Instead, these subjects endorsed
fewer irrelevant behaviors than their low-need counterparts (.31 versus .43), $F = 3.35$, $p < .07$ (see Table 3).

Table 3
Mean Observed Probabilities of Responding "Yes" to Former Employee Phase Behavioral Descriptions

Experiment 2 - Need for Leadership

<table>
<thead>
<tr>
<th>Test Instruction</th>
<th>Need for Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High $(n = 29)$</td>
</tr>
<tr>
<td>Inclusion</td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.84</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.93</td>
</tr>
<tr>
<td>Exclusion</td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.56</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.31</td>
</tr>
</tbody>
</table>

This pattern of responding indicates that high-need-for-leadership subjects exhibited a higher level of selective responding or control for irrelevant, but not consistent, behavioral descriptions. The fact that the rate of selective responding or control varies as a function of both need for leadership and behavior type is responsible for the marginal three-way interaction. This point will be elaborated further in the section on controlled processes in the PDP.
A second significant effect associated with the need for leadership factor was its two-way interaction with behavior type. Here, high-need-for-leadership subjects were more likely to endorse consistent descriptions (.70) than were their low need for leadership counterparts (.59), F(1,56) = 7.44, MS_e .04, = p < .01. In contrast, high-need-for-leadership subjects were somewhat less likely to endorse irrelevant descriptions (.62) than were low-need-for-leadership subjects (.67), F(1,56) = 2.19, p < .14.

As in Experiment 1, there were two significant effects associated with the test instruction factor: an interaction with behavior type and a main effect for test instruction. The significant interaction of behavior type and test instruction, F(1,56) = 34.78, MS_e = .03, p < .0001 was a disordinal one and reflects the fact that subjects were more likely to endorse irrelevant (.92) than consistent (.79) descriptions in the inclusion test, F(1,56) = 8.73, p < .005, whereas the reverse was true in the exclusion test. In this test, subjects were more likely to endorse consistent (.50) than irrelevant (.37) behavioral descriptions, F(1,56) = 23.27, p < .0001. Thus, collapsing over need for leadership revealed that subjects were better able to selectively respond to irrelevant (versus consistent) behavioral descriptions in the PDP. That is, they were more successful in using the former employee phase information in the inclusion and then not using this same information in the exclusion test when it was irrelevant to as opposed to consistent with leadership. This interaction of behavior type and test instruction should, of course, be interpreted in light of the marginally significant three-way interaction reported earlier, F(1,56) = 2.79, p < .10. The final significant effect was a main effect for test
instruction indicating that subjects were moderately successful in following
the PDP test instructions, $F(1,56) = 236.84, p < .0001$. They were more
likely to respond "yes" to former employee phase items in the inclusion
(.85) than in the exclusion (.43) test.

PDP Estimates of Automatic and Controlled Processes

Subjects' responses to former employee phase items were used to
compute estimates of automatic and controlled processes according to the
method outlined by Jacoby and his colleagues (e.g., Jacoby, 1991). These
estimates were computed separately for each subject, maintaining separate
estimates for leadership consistent and irrelevant behaviors.

Need for leadership (high versus low), behavior type (leadership
consistent and irrelevant), and cognitive process (automatic and controlled)
were investigated in a
2 X 2 X 2 mixed design with need for leadership representing the only
between-subjects factor.

Hypothesis 1. It was predicted that there would be a significant
contribution of both automatic and controlled processes to subjects'
responses in the PDP. Mean probability estimates of automaticity and
control for both consistent and irrelevant behaviors ranged from .28 to .77
and were all significantly greater than zero with $p$ values less than .01.

Again, this finding is consistent with current views of social
judgment and categorization as resulting from some combination of
automatic and controlled processes (e.g., Bargh, 1989; Feldman, 1981).
The balance of cognitive processes clearly favored automatic processes,
however, with a mean estimated probability of .72 as compared with a
mean of .42 for controlled processes, \( F (1,56) = 53.20, p < .0001 \) (see Table 4).

Table 4

Estimates of Automatic and Controlled Processes in the Process-Dissociation Procedure (PDP)

Experiment 2 - Need for Leadership

<table>
<thead>
<tr>
<th>Need for Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>High (n = 29)</td>
</tr>
<tr>
<td>Low (n = 29)</td>
</tr>
<tr>
<td>Controlled Estimate</td>
</tr>
<tr>
<td>Consistent Behaviors</td>
</tr>
<tr>
<td>.28</td>
</tr>
<tr>
<td>.30</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
</tr>
<tr>
<td>.62</td>
</tr>
<tr>
<td>.48</td>
</tr>
<tr>
<td>Automatic Estimate</td>
</tr>
<tr>
<td>Consistent Behaviors</td>
</tr>
<tr>
<td>.76</td>
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<tr>
<td>.63</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
</tr>
<tr>
<td>.72</td>
</tr>
<tr>
<td>.77</td>
</tr>
</tbody>
</table>

This suggests that subjects were engaged in a fairly effortless mode of information processing that resulted in a moderately high probability of responding "yes" to a former employee phase description in the exclusion test given a failure in control or selective responding. As was the case in Experiment 1, this pattern of results suggests that subjects were engaged in an "impression formation" mode that involved a high degree of unintentional, inescapable, and effortless processing of information. This
processing strategy resulted in a low to moderate contribution of control and a high contribution of automaticity in subjects' responses in the PDP.

**Hypothesis 2.** In Experiment 2, need for leadership was manipulated by altering the description of the work team. The intention here was to predispose high need subjects to process leadership behaviors according to a leadership category as opposed to some other relevant category. Given this rationale, the second hypothesis was that need for leadership would reduce estimates of control and boost estimates of automaticity by increasing the accessibility of subjects' leadership categories.

Analyses were conducted specifically to investigate the impact of need for leadership on the balance between automatic and controlled processes in leadership recognition. The prediction concerning the need for leadership factors was partially supported by the results of a 2 (need for leadership) X 2 (cognitive process) X 2 (behavior type) analysis of variance. The three-way interaction was significant, $F(1,56) = 3.91$, MS$_e$ = .10, $p < .053$, but revealed a somewhat different pattern of results than was expected. Specifically, as need for leadership increased, there was the predicted increase in the automatic estimate for consistent (.63 versus .76), $F(1,56) = 4.50$, $p < .04$, but not irrelevant behaviors (.77 versus .72), $F(1,56) = .33$, $p < .57$. The unexpected twist was the failure to find a decrease in control for consistent behaviors (.30 versus .28), $F(1,56) = .04$, $p < .85$, combined with the discovery that need for leadership increased the estimate of control for irrelevant behaviors (.48 versus .62), $F(1,56) = 3.35$, $p < .07$. 
What happened here? In retrospect, it seems unwarranted to have predicted that increasing need for leadership or leadership accessibility would both increase automaticity and decrease control for consistent behaviors. As discussed earlier, the PDP estimates of automaticity and control are independent such that an increase in one is not necessarily accompanied by a decrease in the other. Either effect is probably sufficient to provide evidence for an increase in accessibility, although this point is open for debate given that this set of experiments is the first to apply the PDP to the investigation of social categorization and judgment.

Having made this point, there remains the question of why subjects in the high need for leadership condition exhibited a higher level of selective responding or control for irrelevant behaviors. It seems reasonable to surmise that high-need-for-leadership subjects employed a more focused strategy of information processing than did their low-need counterparts. That is, it appears that high need subjects had some notion of the type of individual who might be effective in the work team, and this notion seemed to guide their processing of information in the former employee and candidate phases of the experiment. High-need-for-leadership subjects seemed to expect and give less scrutiny to leadership behaviors, almost as if their leadership categories were "ready and waiting" to interpret and integrate these behaviors (Bruner, 1957; Bruner & Goodman, 1947). In contrast, these same subjects appear to have carefully scrutinized the irrelevant behaviors, processing them in a more piecemeal fashion than their low-need counterparts.
It is possible that irrelevant behaviors received additional processing in the high need for leadership condition because the criteria imposed for deciding whether a given behavior was irrelevant (versus consistent or inconsistent) shifted so that irrelevant behaviors were actually regarded as being inconsistent with leadership. Inconsistent behaviors generally have been found to receive greater attentional resources than either consistent or irrelevant behaviors. (See Stangor & McMillan, 1992, for a recent review of the literature dealing with this topic.) Although this provides a reasonable explanation for the pattern of results in Experiment 2, it seems an unlikely one given that subjects' open-ended responses indicated positive or favorable judgments of the various irrelevant behaviors with regard to the job candidate's potential to be an effective member of the work team. For a behavior to be inconsistent with leadership, this would require that subjects judged the presence of an irrelevant behavior as an impediment or detractor to effective performance in a leadership position. There was no indication of this in subjects' open-ended responses.

A more plausible explanation is that high-need-for-leadership subjects were more focused in their tasks of identifying a new team member and, therefore, approached the irrelevant behaviors with greater perplexity and determination. Perhaps, invoking a need for leadership served to highlight the fact that the irrelevant behaviors were just that -- irrelevant. This heightened awareness of the irrelevant nature of these behaviors combined with the perceived need to identify a leader may have led high-need-for-leadership subjects to ask, "Gee, what does backpacking through Europe immediately after graduating from college have to do with
being effective in a team that is plagued by unresolved conflict and low motivation and morale?...Well, I'm not really sure, but perhaps if I give it some thought I will discover some common thread." This human penchant for making sense of the nonsensical has, in fact, been well documented in previous research (see Park, 1989, for a more in-depth treatment of this point). Taking an opportunity to elaborately process and consider an irrelevant behavior in this manner would allow a subject to more effectively adapt his or her response to satisfy the test instructions in the PDP, and this is the essence of controlled processes as envisioned by Jacoby and his colleagues.

There were two additional effects associated with the analysis of PDP estimates. First, there was a significant interaction of behavior type and cognitive process such that subjects demonstrated significantly higher levels of selective responding or control for irrelevant (.55) than for consistent (.29) behavioral descriptions, $F(1,56) = 33.72$, $MS_e = .10$, $p < .0001$. In contrast, there were no significant differences in estimates of automaticity between irrelevant (.74) and consistent (.70) behaviors, $F(1,56) = .56$, $p < .46$. Finally, there was a main effect for behavior type that indicated higher estimates of both automaticity and control for irrelevant (.65) than for consistent descriptions (.49), $F(1,56) = 23.78$, $p < .0001$. As pointed out in the results of Experiment 1, this suggests that irrelevant descriptions were, perhaps, more memorable than were consistent descriptions.

In summary, the results from this experiment suggest that leadership recognition is the product of both automatic and controlled cognitive processes, but that the balance of the two depends on the needs and/or
motivation of the observer. Invoking a need for leadership influenced subjects to engage in a more focused strategy of information processing. It is likely that subjects were reallocating some of their cognitive resources away from behaviors that were expected and consistent with their perceived need for leadership to make sense of behaviors that were unexpected by virtue of their being irrelevant to this same need (Bruner, 1957; Bruner & Goodman, 1947).

Results - Experiment 3

Time Delay Between Former Employee and Candidate Phase

The results from the investigation of need for leadership in Experiment 2 were encouraging in that they confirmed the utility and promise of the PDP for investigating the impact of subtle contextual variables on the processes underlying social categorization and judgment. In Experiment 3, a primarily methodological issue was explored to discover how robust or impervious the PDP might be to alterations in experimental procedure.

It seemed plausible that one could boost the controlled estimate and, perhaps, decrease the automatic estimate by providing a clear demarcation between the former employee and candidate phases of the experiment. This prediction was a purely intuitive one, and was based on the assumption that introducing a delay between the two phases would provide a powerful cue in the inclusion and exclusion tests of the PDP. In the exclusion test, one could imagine a situation in which a subject was fairly certain that he or she had, in fact, read a given behavioral description. That is, the individual was certain that the description was not a new or distractor item.
It seems reasonable to assume that the delay between the former employee and candidate phase would serve as a "point of reference" so that the individual could, then, pinpoint more precisely whether the description was presented either "pre-delay" (i.e., former employee) or "post-delay" (candidate). This individual's counterpart in the "no delay" condition would not have this advantage, but would be forced to rely on other, arguably, less salient cues to make the judgment.

In Experiment 3, subjects were given the task of identifying a new team member for a work team. After reading a description of the work team, subjects read a series of behavioral descriptions in the former employee phase. At this point, approximately half of the subjects (n = 28) completed a 10-minute budget task while the remaining subjects, the control group from Experiments 1 and 2, (n = 29) moved immediately into the candidate phase of the experiment. For the subjects in the delay condition, there was a 14-minute break between the two phases that included time to distribute, explain, and collect the budget task. It was predicted that providing a delay between the two phases would increase subjects' ability to selectively respond to the behavioral descriptions in the PDP (an increase in control) and, possibly, reduce the probability of subjects endorsing a behavioral description given a failure in control (a decrease in automaticity). Additionally, it was anticipated that there would be a significant contribution of both automatic and controlled processes in the PDP.
Probability of Responding "Yes" to Former Employee Behavioral Descriptions

As in Experiments 1 and 2, the observed probabilities of responding "yes" to the former employee behavioral descriptions were examined to provide a preliminary indication of the pattern of subjects' responding in the inclusion and exclusion tests of the PDP. Again, the analyses of PDP data were conducted using only former employee phase data as subjects' responses in the inclusion and exclusion tests should have varied only for these descriptions. That is, the instructions for candidate phase and new or distractor descriptions did not change across the two tests. Subjects were instructed to respond "yes" to candidate phase descriptions and "no" to new or distractor descriptions in both the inclusion and exclusion tests. Probabilities for candidate phase and distractor behaviors are listed in Appendix L.

The observed probabilities for responding "yes" to former employee phase descriptions were analyzed in a 2 X 2 X 2 mixed design with time delay as the between-subjects factor, and test instruction and behavior type as within-subjects factors.

There were no significant main effects or interactions associated with the time delay manipulation with p values ranging from .18 to .39. There was a significant interaction of behavior type and test instruction, $F(1,55) = 30.12$, $MS_e = .03$, $p < .0001$, with the difference between the inclusion and exclusion tests being larger for irrelevant (.91 versus .37) than for consistent behavioral descriptions (.74 versus .44). In the inclusion test, irrelevant descriptions evoked more "yes" responses than did consistent
descriptions (.91 versus .74), $F(1,55) = 39.04$, $p < .0001$ whereas in the exclusion test irrelevant descriptions were slightly less likely to evoke a "yes" response (.37 versus .44), $F(1,55) = 2.83$, $p < .09$ (see Table 5).

Table 5
Mean Observed Probabilities of Responding "Yes" to Former Employee Phase Behavioral Descriptions

Experiment 3 - Time Delay Between Former Employee and Candidate Phases

<table>
<thead>
<tr>
<th>Test Instruction</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 28)</td>
<td>(n = 29)</td>
</tr>
<tr>
<td>Inclusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.75</td>
<td>.74</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.92</td>
<td>.91</td>
</tr>
<tr>
<td>Exclusion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.43</td>
<td>.44</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.31</td>
<td>.43</td>
</tr>
</tbody>
</table>

This interaction of behavior type and test instruction suggests that subjects were more successful in selecting for irrelevant (as opposed to consistent) behaviors in the inclusion test and then selecting against these irrelevant behaviors in the exclusion test. This same general pattern of results was found in Experiment 2.
There were two additional significant effects revealed in the analysis of observed probabilities: main effects for test instruction and behavior type. Just as in Experiments 1 and 2, it appears that subjects understood the instructions in the inclusion and exclusion tests of the PDP. As one would expect, subjects were more likely to endorse a former employee description in the inclusion (.83) than in the exclusion test (.40). Finally, irrelevant behavioral descriptions elicited, on average, more "yes" responses than did consistent descriptions (.64 versus .59, respectively), $F(1,55) = 3.61, p < .06$. Both main effects should be cautiously interpreted in light of the significant interaction of behavior type and test instructed that was discussed earlier in this section, $F(1,55) = 30.12, MSE = .03, p < .0001$.

**PDP Estimates of Automatic and Controlled Processes**

Subjects' responses to former employee phase items were used to compute estimates of automatic and controlled processes according to the method outlined by Jacoby and his colleagues (e.g., Jacoby, 1991). These estimates were computed separately for each subject, maintaining separate estimates for leadership consistent and irrelevant behaviors.

Time delay (yes versus no), behavior type (leadership consistent and irrelevant), and cognitive process (automatic and controlled) were investigated in a $2 \times 2 \times 2$ mixed design with time delay representing the between-subjects factor.

**Hypothesis 1.** It was predicted that there would be a significant contribution of both automatic and controlled processes to subjects' responses in the PDP. Mean probability estimates ranged from .33 to .79
and were all significantly greater than zero with p values less than .01 (see Table 6).

**Table 6**

**Estimates of Automatic and Controlled Processes in the Process-Dissociation Procedure (PDP)**

**Experiment 3 - Time Delay Between Former Employee and Candidate Phases**

<table>
<thead>
<tr>
<th>Time Delay</th>
<th>Yes (n = 28)</th>
<th>No (n = 29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled Estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.33</td>
<td>.30</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.61</td>
<td>.48</td>
</tr>
<tr>
<td>Automatic Estimate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.65</td>
<td>.63</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.79</td>
<td>.77</td>
</tr>
</tbody>
</table>

Again, the fact that both the automatic and controlled estimates were significantly greater than zero is consistent with current views of social judgment and categorization as resulting from some combination of automatic and controlled processes (e.g., Bargh, 1989; Feldman, 1981). However, the balance between the contributions of the two processes were not equivalent with a significantly greater contribution of automatic (.71)
versus controlled (.43) processes, F (1,55) = 46.91, p < .0001. As in Experiments 1 and 2, this finding suggests that subjects were engaged in a fairly effortless mode of information processing that resulted in a moderately high probability of responding "yes" to former employee phase descriptions in the exclusion test given a failure in control or selective responding. This pattern of results suggests that subjects were engaged in an "impression formation" mode that involved a high degree of unintentional, inescapable, and effortless processing of information. This processing strategy resulted in a low to moderate contribution of control and a high contribution of automaticity in subjects' responses in the PDP.

**Hypothesis 2.** In this experiment, a 14-minute budget task was introduced between the former employee and candidate phases of the experiment to discover how robust the PDP might be to alterations in experimental procedure. It seemed reasonable to expect that this time delay would provide subjects with a clear demarcation between the two phases thereby allowing them to more easily distinguish between descriptions used to describe the candidate versus former employees when participating in the inclusion and exclusion tests of the PDP. This would represent an increase in control or selective responding. Additionally, it was predicted that subjects would be less likely to endorse former employee descriptions given a failure in control -- a decrease in automaticity.

Analyses were conducted to specifically investigate the degree to which the balance of automatic and controlled processes might be affected by a time delay between the former employee and candidate phases of the
experiment. There was only one significant effect in addition to the main
effect of cognitive process reported earlier, and that was a main effect of
behavior type, $F(1, 55) = 37.37, p < .0001$. Here, irrelevant behaviors
produced higher contributions of both automatic and controlled processes
(.66) than did consistent behaviors (.47) in the PDP. This main effect was
found in all three experiments and, possibly, reflects the fact that irrelevant
behaviors were more memorable than were consistent behaviors. This
point was discussed at length in the results section of Experiment 1.

In contrast to what was predicted, there were no significant main
effects or interactions associated with the time delay manipulation in a 2
(time delay) X 2 (cognitive process) X 2 (behavior type) analysis of
variance ($p$ values ranging from .23 to .53). Again, it is always difficult to
pinpoint the source of null findings. However, this experiment was
conducted expressly to determine whether an alteration in experimental
procedure would significantly alter the estimates and conclusions to be
drawn from research using the PDP. The results from this experiment and
from Experiment 1 suggest that the procedure is fairly robust to fairly
significant alterations in implementation. Additionally, Jacoby and his
colleagues have used several variations of the PDP with no significant
difference in results (see Jennings & Jacoby, under review, for a more in-
depth treatment of this point).

This issue of whether the PDP estimates of control and automaticity
are sensitive to variations in experimental procedure is, primarily, a
methodological one. From the perspective of one whose aim was to
investigate the balance of automatic and controlled processes in leadership
recognition, it is encouraging to discover a high measure of stability across a series of experiments in which important contextual variables were manipulated. This stability makes it possible to talk about some of the practical implications of this research with some degree of confidence.

General Discussion

The Issue of Automaticity in Leadership Recognition

Lord and his colleagues offered the first information-processing theory of leadership recognition (Lord, Foti, & DeVader, 1984). The experiments reported here represent an attempt to discover whether Lord is correct in asserting that leadership recognition is mediated by automatic processing of behavioral information. Jacoby's process-dissociation procedure (PDP) was used to investigate the way in which individuals considered behavioral information about a potential leader. This methodology was chosen based on the assumption that what individuals remember reflects the way in which they attended to, interpreted, and encoded information. This assumption is not unique to this set of experiments, but is, in fact, one that has been made by a number of researchers in social cognition (Phillips & Lord, 1982; Woll & Graesser, 1982) and cognitive psychology (Bransford & Franks, 1971; Kihlstrom, Barnhardt, & Tataryn, 1992; Kosslyn & Bower, 1974).

The results from the experiments reported here suggest that subjects considered and integrated behavioral information about a potential leader using a combination of automatic and controlled cognitive processes, with the balance clearly favoring automatic processes. In other words, individuals operated in a primarily unintentional, inescapable, and
effortless mode of information processing when considering information in
the former employee and candidate phases of the experiment. Regardless
of the moderator under investigation, this balance held constant and the
pattern of PDP estimates clearly favored automatic as opposed to
controlled cognitive processes. One could argue that these findings suggest
that leadership is a moderately important and commonplace construct in the
minds of individuals. This argument could and has been made (Lord,
1985; Lord, Foti, & DeVader, 1984) on the basis that some knowledge
structures are efficient in promoting social categorization even in the event
of attentional scarcity. This efficiency results in a primarily automatic
social categorization that is sufficient to facilitate the processing and
integration of the vast array and quantity of information that individuals
encounter in everyday life (Bruner, 1957; Bruner & Goodman, 1947;
Bargh & Thein, 1985). If leadership recognition was an unpracticed or
infrequent social categorization for subjects, two findings should have
emerged in this set of experiments. One, there should have been a more
equitable balance between the PDP estimates of automatic and controlled
processes with, perhaps, a smaller contribution of automatic processes.
Two, information load should have impaired subjects' ability to effectively
process and integrate information in the former employee and candidate
phases of the experiment. There was no evidence of this, with no
difference between information overload and nonoverload subjects in their
responses in either the PDP or the GLI (the formal leadership measure).
This suggests that the leadership category does, in fact, represent a type of
knowledge structure that allows individuals to operate efficiently in an
situation of attentional scarcity (Bargh & Thein, 1985). That is, the leadership category is sufficiently accessible and well-defined to promote leadership recognition in a variety of processing environments.

An argument has been advanced regarding the degree to which leadership is an important aspect of everyday life as a segue for shifting the level of discussion on the topic of leadership recognition. The issue of whether leadership recognition is automatic versus controlled is interesting both at a theoretical and practical level. The consequences of automatic versus controlled leadership categorization were outlined in the introductory portions of this manuscript. It is time, however, to focus the discussion on what can be gleaned by pinpointing the processes mediating leadership recognition. As touched on in the previous paragraph, the degree to which a particular social categorization or judgment is automatic likely reflects the extent to which it is an important aspect of everyday life. For example, one would expect to find that observers more easily and readily identify an individual along a "friendly" as opposed to a "terrorist" dimension in a typical social environment. This would be expected given that, for most individuals, it is more practical and advantageous to discover whether an individual is friendly as opposed to terrorist material.

Although "leadership" is probably not as chronically or universally accessible as the category "friendly," the results from this study suggest that it is probably a fairly mainstream and important social category. An amusing, but valid, caveat to this statement was pointed out to this author during a trip overseas. After listening to a presentation of Experiment 2, an audience member pointed out that the results and conclusions were all
well and good in the United States, but that Americans were a "nation of individuals obsessed with the notion of leadership." The implication intended was that this was a uniquely American "obsession." It may be that there are, in fact, cross-cultural differences in the emphasis placed on leaders and leadership recognition. This is a question that could be answered by future research.

**Moderators of Leadership Recognition**

A second goal of the three experiments reported here was to investigate the degree to which such contextual variables as information load, need for leadership, and time delay moderated the balance of cognitive processes underlying leadership recognition. In the final analysis, it appears that the key to altering the underlying nature of leadership recognition is to provide some reason or motivation for individuals to abandon their usual strategy for considering behavioral information about a potential leader. Need for leadership did just this by inducing individuals to adopt a more focused information processing strategy. Subjects in the high need for leadership condition seemed to expect and give less scrutiny to leadership consistent behaviors and work more diligently to make sense of and integrate irrelevant behaviors. It is possible that this shift in information processing strategy reflects subjects' attempt to conserve and effectively utilize valuable cognitive resources. That is, priming the leadership category may have provided individuals with a convenient framework for interpreting leadership consistent descriptions, thereby allowing them to shift their cognitive resources toward making sense of and integrating irrelevant behavioral descriptions.
It is interesting to speculate how useful this type of conservation strategy might be in a highly-charged, crisis situation. In such a situation, it might, in fact, be wise to direct one's cognitive resources toward processing, interpreting, and integrating ambiguous, irrelevant, and, even, inconsistent information rather than adopting a more diffuse information processing strategy.

In contrast to need for leadership, information load and time delay between the former employee and candidate phases did not alter the way subjects processed behavioral information. Given nonsignificant findings, it is commonplace to focus one's attentions on possible weaknesses in experimental design with "failed manipulation" at the top of the list. This charge seems less plausible in this case. Specifically, the need for leadership manipulation was clearly the most subtle and risky of the three manipulations in that it was entirely possible that subjects "just wouldn't get it." The manipulation of information load and time delay, on the other hand, were clearly more straightforward and did not rely on subjects' keen intellect to discern a subtle twist in the experimental plot. At a more conceptual level, the characteristic that seems to distinguish the need for leadership manipulation is that it was motivational or goal-oriented in nature, whereas information load and time delay focused solely on altering the degree to which the environment supported intentional or controlled processing of behavioral information. It seems reasonable to conclude that the latter two manipulations "failed" simply because individuals are adroit at recognizing leaders and, therefore, operated in a primarily automatic fashion. Reducing attentional resources by increasing information load
would not hinder individuals from doing something that is largely effortless in the first place (Bargh & Thein, 1985). Furthermore, introducing a manipulation designed to facilitate selective responding or control (i.e., time delay) is probably pointless without providing the motivation for individuals to be more effortful in their information processing strategies (Tetlock, 1983; Tetlock & Kim 1987).

**Practical and Theoretical Implications of the Present Research**

What does the present research tell us about leadership recognition? One, the results suggest that individuals are adept at forming impressions of potential leaders. This predilection to recognize leaders has several implications. For example, the average layperson believes that "leaders are born, not made." Past research (Jacoby, Toth, Lindsay, & Debner, 1992; Lewicki, Hill, & Sasaki, 1989; McArthur & Baron, 1983) and the experiments reported here suggest that this belief is, perhaps, perpetuated by the fact that individuals identify leaders in a largely unintentional and effortless fashion. As noted in an earlier portion of this manuscript, automatic perceptions tend to be regarded as reality or "truth." The practical consequence of this belief or experience is that observers will argue that their leadership perceptions reflect reality rather than some consciously-mediated interpretation of reality. In addition, observers will be less likely to take into account situational or contextual factors that facilitated leader emergence and recognition. This, in turn, may lead followers to place more confidence in their leaders' skills and abilities than is either warranted or prudent.
A second practical consequence of the research reported here involves the issue of women and leadership. Many explanations have been offered for the "glass ceiling" in which women fail to reach the highest levels of organizations. The majority of researchers who investigate sex discrimination in the workplace (Fiske, 1989; Heilman, Block, Martell, & Simon, 1989) believe that individuals must expend more cognitive resources if they are going to perceive women as capable of assuming and being effective in a leadership position. The good news from this research is that the balance between automatic and controlled processes suggests that people are adept at recognizing leaders, and that they have the cognitive resources available to be more effortful in considering information about a potential leader.

Finally, the notion of leadership would appear to be a fairly central and important one for individuals--at least in this country. Bargh and Thein's notion of efficient processing structures is similar to Wundt's notion of habit (1903) and Shiffrin and Schneider's (1977) conception of automatic human information processing. What these three viewpoints have in common is the idea that, over time and with practice, humans develop the cognitive ability to deal quickly and easily with the complex array of information that is so commonplace in everyday life. It seems reasonable to argue that individuals have developed this same type of capacity to identify and recognize those who are capable of being effective leaders. For most individuals, everyday life involves a series of social interactions and events. Very often, these situations dictate that a small portion of individuals lead while the rest follow. Given this aspect of
everyday life and theory regarding the development of automaticity, it seems reasonable to suggest that individuals are probably fairly capable of making prudent judgments of leadership potential even when operating in cognitively-demanding situations. This capacity for leadership recognition is critical in that many researchers argue that everyday life is characterized by "...the mundane and commonplace conditions of attentional scarcity" (Bargh & Thein, 1985, p. 1132).

Caveats and Future Directions

As is often the case, the present research leaves many important questions unanswered. The first falls logically out of the discussion of women and leadership and has to do with the possibility that identical leadership behaviors are processed and/or perceived quite differently when performed by a female as opposed to a male leader. In terms of information processing, individuals might exhibit a higher level of control and a lower level of automaticity when considering a potential female leader. This could be problematic if individuals simply do not have the additional cognitive resources to expend in the typical, fast-paced work environment. The second possibility is that there is no difference in terms of the balance of cognitive processes, but that the difference lies in the perception or evaluation of an identical "leadership-consistent" behavior. In other words, "encouraging coworkers to consider and understand the points of view of fellow coworkers" might be viewed as "enlightened and sensitive" when performed by Mark Thompson, but "controlling and intrusive" when performed by Susan Thompson. Future research needs to determine which of the these two explanations, if not both, underlie the
seemingly intransigent glass ceiling in corporate America. The success of any efforts to ameliorate this discrimination will, most likely, depend on the extent to which researchers accurately and fully understand the nature of the problem.

A second caveat for the research reported here has to do with the nature of the stimulus materials. Because this was a first attempt to test Lord and his colleagues' assumption of automatic leadership recognition, a decision was made to present only positive or favorable behavioral information. In fact, even the irrelevant descriptions were judged to be favorable in nature. The intention was to provide a fair, but somewhat liberal test of Lord's theory. This intention resulted in a job candidate who was, according to many of the subjects, quite "stellar." It is doubtful that many real world leaders could measure up to Mark Thompson, the fictitious job candidate of these experiments! Given the realities of the real world, it is important to extend the type of work reported here to include more realistic target individuals. An additional related point is whether reading a behavioral description is, in any way, equivalent to observing actual behaviors. An obvious difference has to do with the level of ambiguity that is inherent in interpreting the behavior of others. In addition, behavioral descriptions lack the rich and subtle nuances of facial expressions, gestures, and voice tones that are so integral to human behavior. Given the mystique and aura that surrounds the layperson's notions of leadership, these types of behavioral nuances may be more critical for a complete understanding of leadership than for most other social categories.
A final word of caution. An observant reader noticed that, contrary to what was expected and assumed, subjects' response rates for candidate phase and new behavioral descriptions tended to vary across the inclusion and exclusion test. In general, subjects endorsed fewer candidate phase and new descriptions in the exclusion test than in the inclusion test (.49 versus .40, respectively), and this discrepancy was twice as large for consistent behavioral descriptions (.52 versus .40, or .12) than it was for irrelevant descriptions (.46 versus .40, or .06). This discrepancy between response rates for candidate phase and new descriptions across the inclusion and exclusion tests indicates a shift in subjects' criteria for responding "yes" to these items. To adjust for this bias in the PDP estimation procedure, two different corrections were carried out. The specifics of these correction techniques are outlined in the "Notes for Appendices M, N, and O."

Conceptually, these corrections adjust for the discovery that a portion of what was attributed to controlled processes likely reflects the fact that subjects were generally less willing or likely to endorse behavioral descriptions in the exclusion than in the inclusion test. This general tendency would serve to inflate or compound the difference between subjects' performance on former employee phase descriptions in the inclusion versus the exclusion test of the PDP.

The two corrections yielded fairly similar patterns of results. Specific discrepancies are noted in Appendices M, N, and O. The general conclusions regarding the primacy of automatic processes were maintained with the main effects of cognitive process resulting in p values ranging from .0008 to .0001. The most interesting result from these new analyses
was that the controlled estimate for leadership consistent behaviors did not reach significance in either the "control" condition (mean = .09, \( p < .20 \)) or the overload condition (.04, \( p < .42 \)). This is in contrast to the previous analyses in which all estimates, regardless of condition, were significantly greater than zero. This finding would require some revision in the general conclusions to be drawn from the experiments reported here. Specifically, it appears that leadership recognition is largely mediated by automatic processing of behavioral information, and that this mediation was complete in the "control" and information overload conditions. In contrast, evoking a need for leadership or providing a time delay between the former employee and candidate phases of the experiment caused subjects to employ a more effortful processing strategy. Only in these conditions was the controlled estimate for leadership consistent behaviors significant (.13, \( p < .05 \) and .23, \( p < .0001 \), respectively).

At this point, something should be said regarding the difference between the two corrections. The first correction, "Correction 1," adjusts for the incidence of "yes" responses or false alarms for new behavioral descriptions in both the inclusion and exclusion test in calculating the automatic estimate in addition to correcting for differences in response bias across the two tests. The idea here is that the obtained probability for "yes" responses to new items constitutes a "base rate" that inflates the automatic estimate in the PDP. This base rate problem has been discussed in previous PDP research (e.g., Jacoby, Toth, Lindsay, and Debner, 1992). The question one must ask here is whether base rates in a word-stem completion task, for example, reflect the same construct as do false
recognitions in an impression formation study. In the former case, it makes perfect sense to adjust the PDP estimates for the fact that some proportion of individuals will, "fresh off the street," complete a word stem with a word from the study list despite having no prior exposure to this list. Given this fact, it seems reasonable to decide that whatever this proportion might be, it should not be allowed to inflate the automatic estimate. In contrast, it is not at all clear that false recognition in an impression formation task reflects a mere base rate phenomenon that should be eradicated at all cost. In fact, this author would argue that this is tantamount to instructing all those who have used false recognition data in research on schema-driven processing (e.g., Bransford & Franks, 1971; Foti, 1983; Kosslyn & Bower, 1974; Phillips, 1984; Phillips & Lord, 1982, Woll & Graesser, 1982) to return to their labs and expose any and all false recognition as nothing more than a base rate phenomenon! The probabilities for new behavioral descriptions from Experiments 1, 2, and 3 are entirely consistent with this type of past research. Specifically, subjects falsely recognized or endorsed new descriptions that were consistent with, but not irrelevant to, the leadership category (.17 versus .03). To remove this information would underestimate the contribution of automatic processes for leadership consistent behaviors in the same way that subtracting out false recognition in past schema research would remove any trace of schema-driven processing.

Conclusion

Leadership is an extremely rich and complex area of study. Despite decades of research, so much of the true essence of leadership remains a
mystery. Rather than create yet another descriptive theory or taxonomy of leadership strategies, attributes, and behaviors, some researchers have chosen to take a different tack. This brand of research is best represented by the work of Lord and his colleagues who have worked to develop a theory of how individuals come to identify and recognize leaders. Perhaps, researchers must first answer this question in order to understand fully what it means to be a leader, and why individuals choose to follow them.
References


Appendix A

Introduction to Subjects

In this experiment, it will be necessary for you to assume the role of "Teams Coordinator" for a small computer company. Our company's philosophy is based on the concept of "self-directed creative teams" with each seven-member team assuming responsibility for an assigned phase or portion of any given project. The teams are self-directed in that they are given an assignment and then allowed almost total freedom in determining how to complete the assignment. Our company is currently working on a very ambitious project that will culminate in the introduction of a new computer called "The ULtimate" computer. As Teams Coordinator, your primary goal is to facilitate team productivity. Today, the first item on your agenda is to identify an individual from among a pool of job candidates to fill an opening in one of your teams. This team, the User-Interface Team, has lost one of its team members to a competing computer company. Your goal is to identify a new team member.

While working on this task, it is critical that you keep in mind the special needs of the User-Interface Team. Your goal is to identify a candidate whose skills and abilities will contribute positively to team performance. On the next page, you will find a brief description of the User-Interface Team. You will be given several minutes to read this description before continuing with your task.
Appendix A (cont.)

Description of the User-Interface Team
(Low Need for Leadership)

The User-Interface Team has one of the toughest assignments in the project. Other computer companies have been so successful in creating user-friendly computers that the team is faced with a monumental task if it is going to achieve its goal of designing "The ULtimate" in user-friendly computers. As it stands now, the User-Interface Team is performing quite well. The six remaining team members are among the most creative minds in the computer industry today. Furthermore, they have been successful in developing a coherent strategy and setting realistic and challenging goals. The team enjoys a healthy level of conflict. This conflict is handled appropriately and actually contributes positively to team performance. Because of the team's strong sense of direction and healthy approach to dealing with conflict, team member motivation and morale are at an all-time high. It appears that the User-Interface Team will be successful in its task if team members continue to work together in the future as they have in the past.
Appendix A (cont.)

Description of the User-Interface Team
(High Need for Leadership)

The User-Interface Team has one of the toughest assignments in the project. Other computer companies have been so successful in creating user-friendly computers that the team is faced with a monumental task if it is going to achieve its goal of designing "The ULtimate" in user-friendly computers. As it stands now, the User-Interface Team is floundering. The six remaining team members are among the most creative minds in the computer industry today, but they have failed to develop a coherent strategy and are unable to set realistic and challenging goals. The team is also plagued with an unhealthy level of conflict. This conflict is handled inappropriately and, as such, negatively impacts team performance. Because of the team's lack of direction and unhealthy approach to dealing with conflict, team member motivation and morale are at an all-time low. In order for the User-Interface Team to be successful in its task, there will have to be major changes in the team's day-to-day operations.
Appendix B
Former Employee Phase Instructions

Before you begin your task of identifying a new team member for the User-Interface Team, we thought that it would be helpful for you to become acquainted with the type of information that you will need to consider in making your decision. We will refer to this phase as the former employee phase of the experiment. We feel that recommendations from past employers are one of the most valuable sources of information about the qualifications of a job candidate. During the former employee phase of your participation, you will read statements that have been taken from recommendation letters written about former employees of our company. It is our hope that reading through these statements will assist you during the candidate phase in which you will be asked to consider information about a job candidate. While reading through the statements in the former employee and candidate phases of the experiment, you may notice that most of the statements are positive or favorable in nature. We receive so few negative recommendations that we have decided to present only the positive ones in an effort to provide you with information that is as realistic as possible.

Presentation of these recommendation statements will be automated. You will have ample opportunity to read and consider each statement before the next statement appears. Remember that the statements you are about to read were written about former employees.
Appendix B (cont.)

Former Employee Phase

Sample Behavioral Descriptions

1. was sympathetic and supportive when coworkers were worried or upset about something.
2. worked for our organization for seven years.
3. backpacked through Europe immediately after graduating from college.
4. acknowledged when a decision or plan was not working and tried to discover what went wrong and how it could be corrected, rather than making excuses or blaming others.
5. influenced the opinions, decisions, and policies of those at higher levels within the organization.
6. has a degree in business.
7. offered helpful advice and suggestions to junior coworkers on how to advance their careers.
8. enrolled in an evening course in Sicilian cuisine.
9. talked in a persuasive manner about the importance of working together to create an innovative high-quality product.
10. encouraged cooperation and teamwork among people who depended on each other to get the work done.
11. volunteered to work in the Meals on Wheels program on weekends.
12. loved to watch reruns of "I Love Lucy" and had taped every episode over the course of several years.
Appendix B (cont.)

Former Employee Phase

Sample Behavioral Descriptions

13. maintained contacts with people in other parts of the organization who could be a useful source of information, resources, and political support.

14. was a great fan of James Michener and was always seen reading one of his epic novels during breaks from work.

15. had ideas that forced coworkers to rethink ideas of their own that they had never questioned before.

16. encouraged coworkers to suggest improvements and innovations.

17. actually worked best when the workspace was cluttered and chaotic.

18. often 'brown bagged' it for lunch when the weather was nice and then went for a leisurely stroll through the park a couple of blocks down.

19. complimented coworkers for demonstrating unusual creativity, initiative, persistence, or skill in performing a task.

20. motivated coworkers with a vision of what they could accomplish if they worked together.

21. participated in intramural sports in college.

22. usually went to the Caribbean for one week in the summer to unwind.

23. backed up coworkers and supported them when they were in a difficult situation.

24. attended numerous activities sponsored by the university alumni association and tried to keep in touch with fellow classmates.
25. encouraged coworkers to consider and understand the points of view of fellow coworkers.

26. met with important clients or customers to discover how to better meet their needs.

27. made a quick but systematic analysis to find the cause of work-related problems before taking corrective action.

28. got ideas and views accepted by upper management.

29. spent a semester studying in Paris during college.

30. provided junior coworkers with opportunities to develop their skills and demonstrate what they could do.

31. sponsored a child in a third world country and always sent more than was requested by the sponsor organization.

32. developed enthusiasm for a task or project by appealing to coworkers' pride in accomplishing a challenging task, beating competitors, or doing something never done before.
Appendix C

Time Delay Budget Task - The ULtimate Computer Project

Experiment 3 - Time Delay Subjects Only

As Work-Team Coordinator, you are responsible for making difficult budgetary decisions. The current November, 1992 budget overspends the allowed expenditures by $22,000.00. Your task is to review the budget and decide which items can be reasonably cut in order to trim $22,000.00 from the November budget.

You are to cut items. Don't reduce allotted spending for an individual budget item. Cut the item or leave it as is.

To help you with your task. Brief descriptions are provided on the next page to give you an idea of what each item contributes or accomplishes toward the successful completion of The ULtimate Computer Project. Use these descriptions to help you make your decision regarding which items to cut from the budget.

Remember, you must cut an item altogether or leave it as is. You must reduce the November, 1992 budget by $22,000.00. You will have 10 minutes to complete this task. Do not rush, just do as much as you can given time constraints.
Appendix C (cont.)

Time Delay Budget Task - The ULtimate Computer Project

Experiment 3 - Time Delay Subjects Only

Item descriptions:

**Chairs** - This item consists of (12) chairs that are specially designed to either alleviate or prevent the incidence of "carpal tunnel syndrome." Research trials have shown that these chairs do, in fact, make a positive contribution toward reducing or preventing the painful flare-ups associated with this condition.

**Memory packs** - The current phase of this project is taxing available memory capacity for many of the company's computers. The (5) memory packs would increase memory capacity by 67% for five of the company’s computers thereby facilitating work on this phase of The ULtimate Computer Project.

**Aesthetics research** - Research that will be conducted to gauge potential users' reactions to several proposed prototypes of The ULtimate Computer.

**Public relations** - This allotment represents increased funding to hire (1) assistant whose sole responsibility will be to assist in the development a number of public relations ads. These ads will then be screened by the Public Relations Department of our company, and then presented to a focus group in order to reach a final decision.

**Art design** - This money will be allotted in anticipation of the need to develop an appropriate logo for the computer and computer manual.

**Overtime** - Several of the individuals working on The ULtimate Computer Project are hourly employees. The project director anticipates a significant increase in the need for overtime hours for the month of November.

**Security** - As the project moves into the final phase this month, the staff is increasingly anxious regarding possible security breaches. Money allotted for this item will be used to hire (4) additional security guards and (1) private investigator in an attempt to prevent such incidents.
Appendix C (cont.)

Time Delay Budget Task - The ULtimate Computer Project

Experiment 3 - Time Delay Subjects Only

The following budget excerpt includes only the "discretionary" items listed on the previous page. The term "discretionary" refers to the fact that these items are ones that can be cut to bring the November, 1992 budget in line with allotted expenditures.

• Chairs 12 @ $500.00/each $6000.00
• Memory packs 5 @ $1200.00/each $6000.00
• Aesthetics research $8500.00
• Public relations (1) assistant $2700.00
• Art design $9600.00
• Overtime (250) hours @ $13.50/hour $3375.00
• Security (4) guards @ $1200.00/guard (1) P.I. @ $3600.00 $8400.00
Appendix C (cont.)

Time Delay Budget Task - The ULtimate Computer Project

Experiment 3 - Time Delay Subjects Only

Please indicate on the lines below which items you will cut and their dollar amount. To help you, a line is included for each item so that you may keep a running subtotal of cuts. When you have finished, please record the total dollar amount of your proposed cuts. Remember that you may cut an item entirely or leave it as is. You may not lower the dollar amount of a particular item. You must trim the budget by $22,000.00. You may cut a bit more than $22,000.00, but try to aim for $22,000.00. Feel free to make notes on this sheet.

<table>
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<th>Amount</th>
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<th>Total</th>
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Notes:
Appendix D
Candidate Phase Instructions

You have just completed the former employee phase of this experiment in which you read statements that were written about former employees of our company.

You are now ready to begin the candidate phase of this experiment in which you will read about the first job candidate, Mark Thompson. The descriptions you are about to read were taken from recommendation letters that were written on behalf of Mark Thompson by former employers. Again, be sure to keep in mind the special needs of the User-Interface Team as you read statements that were written about the first job candidate, Mark Thompson.
Appendix D (cont.)
Candidate Phase
Sample Behavioral Descriptions

1. encouraged frank and open discussion of disagreements.
2. would talk about retiring some day and going to work for the Peace Corps or some other equally noble organization.
3. enjoyed exceptionally good health.
4. kept in touch with people outside the organization who could provide information about important developments and events.
5. belonged to Greenpeace and The Sierra Club and was very environmentally conscious in personal habits and behavior.
6. emphasized the use of intelligence to overcome obstacles.
7. consulted with coworkers to get their reactions and suggestions before advocating major changes that would affect them.
8. was an avid amateur photographer.
9. was usually fairly conservative in political and social views.
10. gave coworkers credit for helpful ideas and suggestions.
11. communicated a sense of mission to coworkers.
12. made coworkers enthusiastic about assignments.
13. helped plan the office Christmas party last year.
14. gave coworkers encouragement and support when they had a difficult and stressful task or responsibility
15. showed pedigreed Cocker Spaniels in spare time.
Appendix D (cont.)
Candidate Phase
Sample Behavioral Descriptions

16. handled work-related problems and crises in a confident and decisive manner.

17. worked to insure that coworkers' accomplishments were appropriately recognized and rewarded by the organization.

18. belonged to the local garden club.

19. encouraged junior coworkers to attend relevant training programs, workshops, or night courses to develop greater skill and expertise.

20. was a lifeguard at a camp for disabled children for two summers.

21. described a clear and appealing vision of what could be accomplished with coworkers' cooperation and support.

22. could always be depended on to keep a conversation going.

23. volunteered in a local literacy education program.

24. attempted to resolve disagreements in a constructive manner (e.g., by mutual problem solving or without unnecessary arguing or conflict).

25. was one of the best joke tellers in the entire organization, really kept things lively.

26. participated in a 'Fun Run' that was sponsored by our organization to support a local homeless shelter.

27. did favors (e.g., provided information, assistance, political support, or resources) to maintain a good working relationship with people whose cooperation and support were important.

28. enjoyed talking with coworkers about current events.
29. encouraged coworkers to look at problems as learning opportunities.

30. preferred using a pen and pencil to a computer.

31. encouraged coworkers to express any concerns or doubts they might have about a proposal that was under consideration.

32. expressed personal appreciation when coworkers did something that required a special effort.
Appendix E
PDP Inclusion Test Instructions

In the first part of this judgment task, statements will be presented one at a time. Your task will be the following:

Upon presentation of a statement, you must decide whether it appeared in either the former employee or candidate phase of this experiment. If it did, click on the "yes" button with your mouse. If it did not, then click on the "no" button.

Some of the statements will be new. That is, they did not appear in either the former employee or candidate phase of the experiment. You should click on the "no" button when these statements appear.
Appendix E (cont.)

PDP Inclusion Test

Sample Distractor Behavioral Descriptions

Note: 16 Former Employee and 16 Candidate Phase Descriptions were included in the Inclusion Test resulting in a total of 64 Descriptions.

1. had season tickets for the symphony and occasionally invited clients as a way of thanking them for their business.

2. drove a '65 Mustang that was in absolute mint condition.

3. increased coworkers' optimism for the future.

4. always ordered the most healthy entree on the menu when out for lunch with coworkers.

5. projected a powerful, confident, and dynamic presence in the organization.

6. offered to provide advice or assistance when coworkers needed help with a difficult task or problem.

7. ran in the company-sponsored marathon and posted a good time.

8. identified constraints preventing the solution of a problem and found ways to eliminate or circumvent them.

9. advocated both own and coworkers' issues and concerns to upper management.

10. was more likely to subscribe to the "Utne Reader" than "Business Week."

11. worked with an old friend of mine before coming to work here.
Appendix E (cont.)

PDP Inclusion Test

Sample Distractor Behavioral Descriptions

12. always jogged three miles each morning before coming to work.

13. provided extra instruction or coaching to help coworkers improve their job skills or learn new ones.

14. had several old movie posters hanging around the office.

15. played racquetball once a week at lunch time with a group of coworkers.

16. made persuasive arguments to gain coworkers' support for a proposed project.

17. worked to clarify each coworkers' point of view when there was a disagreement.

18. had a very philosophical outlook on life.

19. enjoyed camping and would often get a group of coworkers together to go to a nearby state park for the weekend.

20. formed alliances with people in different organizational units to work toward mutual objectives.

21. encouraged coworkers to back up their opinions with good reasoning.

22. just earned a black belt in Karate.

23. proposed ideas or plans and then listened carefully to any concerns coworkers expressed without getting defensive.

24. wrote short stories in spare time.
Appendix E (cont.)

PDP Inclusion Test

Sample Distractor Behavioral Descriptions

25. worked to insure that coworkers received public recognition for special contributions and important achievements.

26. inspired loyalty from coworkers.

27. showed enthusiasm for the work that needed to be accomplished.

28. would often write letters to the editor of our local newspaper.

29. faithfully attended a weekly fellowship breakfast that was sponsored by the Association for Christians in Business.

30. displayed at least three dozen photographs of various family members and friends on office credenza.

31. was patient and helpful when giving complicated explanations or instructions.

32. would rather listen to Beethoven than "The Boss."
Appendix E (cont.)

PDP Exclusion Test Instructions

In the next part of this judgment task, statements will again be presented one at a time. Your task will be the following:

Upon presentation of a statement, you must decide whether it appeared in the candidate phase of this experiment. If it did, click on the "yes" button with your mouse.

If you remember seeing this statement in the former employee phase then you should respond "no." If an item appeared in the former employee phase then you can be certain that it did not appear in the candidate phase.

Just as in the last judgment phase, some of the statements will be new. You should click on the "no" button when these statements as well as statements from the former employee phase appear.
Appendix E (cont.)

PDP Exclusion Test

Sample Distractor Behavioral Descriptions

Note: 16 Former Employee and 16 Candidate Phase Descriptions were included in the Exclusion Test resulting in a total of 64 Descriptions.

1. came from a good family and received an excellent education.

2. proposed new and innovative approaches for dealing with serious or persistent problems.

3. secured commitment and resources from upper management when necessary.

4. was an avid sports fan and could always tell you the latest team standings.

5. would often browse through the bookstore down the street from our office at lunchtime.

6. talked in a persuasive manner about the importance of improving productivity, efficiency, or quality.

7. followed a very healthy lifestyle: no junk food, no smoking, and alcohol only on special occasions.

8. proposed a reasonable compromise to resolve disagreements.

9. never missed an opportunity to go to the gym in order to maintain a good level of fitness.

10. volunteered to help with the office recycling program.

11. was an avid reader and could always be counted on to recommend a good book.
Appendix E (cont.)

PDP Exclusion Test

Sample Distractor Behavioral Descriptions

12. was a real movie trivia buff, especially old movie trivia.

13. helped coworkers to identify key aspects of complex problems.

14. was very patriotic and, on numerous occasions, defended the ideals and values of this country to those who criticized it.

15. liked to travel to New England to see the Fall foliage.

16. took the initiative in identifying work-related problems that needed to be solved.

17. modified proposals or plans to deal with coworkers' concerns and incorporated their suggestions.

18. was very generous in donating time and money to worthy charities.

19. got coworkers to use reasoning and evidence to solve problems.

20. was an excellent Tex-Mex chef and would often invite friends from work to come for dinner on the weekends.

21. adopted an orphaned child from Romania.

22. praised improvements in coworkers' performance.

23. placed a strong emphasis on problem solving before taking action.

24. maintained a challenging workout regimen.

25. played on the company softball team for the past five seasons.
Appendix E (cont.)

PDP Exclusion Test

Sample Distractor Behavioral Descriptions

26. exhibited confidence in coworkers' ability to meet high performance expectations.

27. took evening courses in French at the local community college near our offices.

28. motivated coworkers to accomplish more than what they thought they could do.

29. would ride a bike to work in good weather for health and environmental reasons.

30. encouraged coworkers to look at old problems in new ways.

31. inspired coworkers to greater effort by setting an example of dedication, courage, or self-sacrifice in own behavior.

32. enjoyed chatting with coworkers on breaks from work.
Appendix F
Open-Ended Response Question

On the lines that follow, please type a brief description of Mark Thompson, the job candidate. Your description of him may be only a word or phrase, or even a few sentences. The length is not important, just use your own words to describe Mark Thompson.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix G
Evaluative Ratings Instrument

1. How would you describe Mark Thompson's potential to be an effective leader of the User-Interface Team?
   excellent    good    moderate    fair    poor

2. How willing would you be to designate Mark Thompson as the leader of the User-Interface Team?
   extremely willing    somewhat willing    indifferent    somewhat unwilling    extremely unwilling

3. To what extent is Mark Thompson typical of a leader?
   great    substantial    moderate    some    not at all
   extent    extent    extent    extent    all

4. How well does Mark Thompson fit your image of what a leader should be?
   extremely    very    moderately    somewhat    not at all
   well    well    well    effective    all effective

5. How effective do you feel Mark Thompson would be in a leadership position?
   extremely    very    moderately    somewhat    not at all effective
   effective    effective    effective    effective    all effective

(Note: This scale is based on the General Leadership Impression scale used by Cronshaw and Lord, 1987. It has been modified for use in the present study.)
Appendix H

Experiment 1: Information Load

Manipulation Check

1. How would you rate the speed at which the recommendation excerpts were presented?

  much too  somewhat  just right  somewhat  much too
  quickly  too quickly  too slowly  slowly
Appendix H (cont.)

Experiment 2: Need for Leadership

Manipulation Check

1. How important did you feel it was for the individual to possess strong leadership abilities?

   extremely  very  moderately  slightly  not at all
   important    important    important    important

2. Circle the number on the scale below that most closely characterizes the type of individual you were looking for to fill the vacancy in the User-Interface team.

   "follower"  1  2  3  4  5  6  7  "leader"

3. To some degree, it is always beneficial to have people in a work team who are capable of being effective leaders. This benefit probably varies in response to changing work environments (for example, fluctuations in the performance and motivation of the work team, changes in the demands placed on the work team, et cetera). In other words, there is likely a greater need for a leader in some situations than in others. Please circle the response on the scale below that best describes your assessment of the User-Interface Team's need for an effective leader.

   tremendous  high  moderate  slight  no
   need        need    need    need    need
Appendix I
Sample of Subjects' Open-Ended Responses

"Mark Thompson works well in chaotic and cluttered surroundings. He makes sure that he keeps in contact with people in other departments or businesses who could offer him support. He encourages others to advance their knowledge through special programs, etc., and he does not hesitate to tackle tough problems while taking into consideration the concerns of his co-workers."

"Very assertive. Very active and health conscious. Expects above average work from coworkers."

"Mark seems dedicated to his job and it seems that he is very confident. He will be able to provide leadership and encourage his people. At the same time, it appears that he is healthy and can handle stress and his job.

"Gives favors, has connections, healthy, good outlook, probably not extremely cooperative, but well liked. No evidence of creativity, but does want to better the company, unfortunately starting with other people then moving onto himself."

"A very helpful and determined worker who seems to get along with his fellow employees."

"Mark Thompson is an energetic, ambitious individual who is very conscientious and supportive of others. Although tinged with a proclivity toward charismatic clutter in the office (posters, workspace, etc.), his involvement in environmental programs, sports, and movies provides him with an individualistic spirit that motivates all around him."

"Mark Thompson seems to be more of a leader than a team player. It felt as if he was good at compromising but lacked in coming up with innovative ideas of his own."

"Mark Thompson seems to be a positive force for the team, and would make useful contributions. Seems both to be able to work with people, yet maintain own independence of thought. Has a seriously cool car, too."
Appendix I (cont.)

Sample of Subjects' Open-Ended Responses

"Mark Thompson is a perfect candidate given not only impeccable character, but also leadership qualities -- something this group badly needs. He will be able to reduce the intra-group conflict and is also a great motivator."

"Mark seemed quite capable and seemed to get along very well with coworkers, providing support and encouragement. He was very concerned about staying physically fit. He made sure everyone's morale was high and had an open mind to new suggestions or opinions while also keeping the group from having too many internal conflicts by successfully handling any problems."

"Decisive, inspiring, friendly."

"Mark is conservative, religious, and healthy. He encourages group unity, vision, and dedication. He supports many worthy causes and takes good care of his health, running and working out regularly."

"He is intelligent, healthy, physically fit, and socially aware. He is a leader."

"Mark Thompson was a healthy, privileged person who was somewhat philosophical and supportive of junior colleagues. He liked to cook exotic foods, and worked toward compromise in his job. He also tried to motivate coworkers to work together and use logic over emotion."

"Mark Thompson is a team player. He also seems to be creative and is health and environmentally conscious. Mark enjoys reading and seems to be affluent and well-educated."

"He is a good and concerned person. Seems to care about the opinions of others and they are expressed to their fullest. To me, the he would probably be a good candidate for a position that calls for leadership."

"Mark Thompson has many of the qualities needed. He is enthusiastic, inspiring, and helpful. He also seems to lead an active life."
Notes for Appendices J, K, and L

This set of appendices contains the observed probability estimates for "yes" responses in both the inclusion and exclusion tests of the PDP for candidate phase (C), former employee phase (FE), and new or distractor (N) descriptions.

These estimates can be thought of as representing Hit Rates (correct endorsements) and False Alarm Rates (incorrect endorsements). The appropriate classification depends on Item Type (FE, C, or N) and Test Instruction (Inclusion versus Exclusion). The following breakdown can serve as a guide:

**C - Candidate Phase Descriptions**
- "yes" in inclusion = "Hit"
- "yes" in exclusion = "Hit"

**FE - Former Employee Phase Descriptions**
- "yes" in inclusion = "Hit"
- "yes" in exclusion = "False Alarm"

**N - New or Distractor Descriptions**
- "yes" in inclusion = "False Alarm"
- "yes" in exclusion = "False Alarm"
Appendix J

Experiment 1 - Information Load

**Mean Observed Probabilities of Responding "Yes" to Descriptions in the Inclusion and Exclusion Tests of the PDP**

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<th>Information Load</th>
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<td>FE</td>
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<td>C</td>
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<td>.73</td>
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<td>.02</td>
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<td>Consistent Behaviors</td>
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Appendix K

Experiment 2 - Need for Leadership

Mean Observed Probabilities of Responding "Yes" to Descriptions in the Inclusion and Exclusion Tests of the PDP

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<td>N</td>
<td>C</td>
<td>FE</td>
<td>N</td>
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<tr>
<td>High (n = 29)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.83</td>
<td>.84</td>
<td>.25</td>
<td>.66</td>
<td>.56</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.92</td>
<td>.93</td>
<td>.01</td>
<td>.77</td>
<td>.31</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (n = 29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.81</td>
<td>.74</td>
<td>.25</td>
<td>.60</td>
<td>.44</td>
<td>.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.91</td>
<td>.91</td>
<td>.02</td>
<td>.75</td>
<td>.43</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix L

Experiment 3 - Time Delay

Mean Observed Probabilities of Responding "Yes" to Descriptions in the Inclusion and Exclusion Tests of the PDP

| Time Delay | Inclusion | | | | Exclusion | | | |
|------------|-----------|---|---|---|---|---|---|---|---|
|            | C | FE | N | C | FE | N | | | |
| Yes (n = 28) | Consistent Behaviors | .83 | .75 | .20 | .73 | .43 | .13 | | | |
|            | Irrelevant Behaviors | .92 | .92 | .01 | .82 | .31 | .02 | | | |
| No (n = 29)  | Consistent Behaviors | .81 | .74 | .25 | .60 | .44 | .17 | | | |
|            | Irrelevant Behaviors | .91 | .91 | .02 | .75 | .43 | .04 | | | |
Notes for Appendices M, N, and O

This set of appendices contains adjusted PDP estimates for Experiments 1, 2, and 3. The adjusted estimates of automatic and controlled processes were computed according to one of two methods:

**Correction 1**

\[
\begin{align*}
\text{Step 1} \quad &\quad p(C)_{\text{incl}} = p(C)_{\text{incl}} - p(N)_{\text{incl}} \\
&\quad p(C)_{\text{excl}} = p(C)_{\text{excl}} - p(N)_{\text{excl}} \\
&\quad p(\text{FE})_{\text{incl}} = p(\text{FE})_{\text{incl}} - p(N)_{\text{incl}} \\
&\quad p(\text{FE})_{\text{excl}} = p(\text{FE})_{\text{excl}} - p(N)_{\text{excl}}
\end{align*}
\]

Note: The probabilities generated in Step 1 are adjusted probabilities (i.e., adjusted for new item base rates) rather than the observed probabilities reported in Appendices J, K, and L.

\[
\begin{align*}
\text{Step 2} \quad &\quad p(\text{FE}) = p(\text{FE})_{\text{incl}} - p(\text{FE})_{\text{excl}} \\
&\quad p(C) = p(C)_{\text{incl}} - p(C)_{\text{excl}}
\end{align*}
\]

\[
\begin{align*}
\text{Step 3} \quad &\quad \text{Corrected Controlled Estimate (CCE)} = p(\text{FE}) - p(C) \\
&\quad \text{Corrected Automatic Estimate} = p(\text{FE})_{\text{excl}} / (1 - \text{CCE})
\end{align*}
\]

Note: The calculations in Steps 1, 2, and 3 were carried out separately for consistent and irrelevant descriptions.
Notes for Appendices M, N, and O (cont.)

Correction 2

**Step 1** -> Uncorrected Controlled Estimate (UCE) = p(FE)incl - p(FE)excl

Bias = p(C)incl - p(C)excl

Corrected Controlled Estimate (CCE) = (UCE) - Bias

Note: The method outlined in Step 1 yields estimates of control that are identical to that of Correction 1.

**Step 2** -> Corrected Automatic Estimate = Observed p(FE)excl/(1 - CCE)

Note: The corrected estimate of automatic processes generated by this technique is identical to that of Correction 1 with the exception that observed rather than adjusted exclusion test probabilities appear in the numerator. Reasons for this are discussed in the "Caveats and Future Directions" section of this manuscript.

Also, all computations were carried out separately for leadership consistent and irrelevant items.
Appendix M
Experiment 1 - Information Load

Mean Corrected Estimates of Automatic and Controlled Processes in the PDP

<table>
<thead>
<tr>
<th>Information Load</th>
<th>Correction 1</th>
<th></th>
<th>Correction 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Overload (n = 32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.05</td>
<td>.29</td>
<td>.05</td>
<td>.49</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.30</td>
<td>.55</td>
<td>.30</td>
<td>.58</td>
</tr>
<tr>
<td>Nonoverload (n = 29)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.09</td>
<td>.29</td>
<td>.09</td>
<td>.52</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.32</td>
<td>.55</td>
<td>.32</td>
<td>.63</td>
</tr>
</tbody>
</table>

Note: C = Controlled Estimate
      A = Automatic Estimate
Appendix M (cont.)

Experiment 1 - Information Load

The following lists all possible effects for both Corrections 1 and 2:

<table>
<thead>
<tr>
<th>Univariate</th>
<th>Correction 1</th>
<th>Correction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Consistent</td>
<td>$F(1,59) = 0.20$, $p &lt; 0.65$</td>
<td>$0.20$, $p &lt; 0.65$</td>
</tr>
<tr>
<td>Automatic/Consistent</td>
<td>$F(1,59) = 0.00$, $p &lt; 0.99$</td>
<td>$0.19$, $p &lt; 0.67$</td>
</tr>
<tr>
<td>Control/Irrelevant</td>
<td>$F(1,59) = 0.04$, $p &lt; 0.85$</td>
<td>$0.04$, $p &lt; 0.85$</td>
</tr>
<tr>
<td>Automatic/Irrelevant</td>
<td>$F(1,59) = 0.00$, $p &lt; 0.75$</td>
<td>$0.54$, $p &lt; 0.46$</td>
</tr>
</tbody>
</table>

**Between Subjects Effect**

Information Load $F(1,59) = 0.11$, $p < 0.75$ $0.54$, $p < 0.46$

**Within Subject Effects**

Behavior $F(1,59) = 43.70$, $p < 0.0001$ $17.91$, $p < 0.0001$

Behavior*Condition $F(1,59) = 0.02$, $p < 0.88$ $0.00$, $p < 0.98$

MS$e$(Behavior) $0.09$ $0.10$

Process $F(1,59) = 24.74$, $p < 0.0001$ $79.73$, $p < 0.0001$

Process*Condition $F(1,59) = 0.10$, $p < 0.75$ $0.02$, $p < 0.88$

MS$e$(Process) $0.14$ $0.10$

**Behavior*Process** $F(1,59) = 0.04$, $p < 0.85$ $4.04$, $p < 0.05$

Behav*Process*Cond $F(1,59) = 0.02$, $p < 0.90$ $0.10$, $p < 0.75$

MS$e$(Behavior*Process) $0.09$ $0.08$

Note: Effects in **Bold** denote discrepancies between the results generated from the two corrections.
Appendix N

Experiment 2 - Need for Leadership

Mean Corrected Estimates of Automatic and Controlled Processes in the PDP

<table>
<thead>
<tr>
<th>Need for Leadership</th>
<th>Correction 1</th>
<th>Correction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>High (n = 29)</td>
<td>.13</td>
<td>.38</td>
</tr>
<tr>
<td>Consistent Behaviors</td>
<td>.45</td>
<td>.51</td>
</tr>
<tr>
<td>Irrelevant Behaviors</td>
<td>.09</td>
<td>.29</td>
</tr>
<tr>
<td>Low (n = 29)</td>
<td>.32</td>
<td>.55</td>
</tr>
</tbody>
</table>

Note: C = Controlled Estimate
     A = Automatic Estimate
Appendix N (cont.)

Experiment 2 - Need for Leadership

The following lists all possible effects for both Corrections 1 and 2:

<table>
<thead>
<tr>
<th>Univariate</th>
<th>Correction 1</th>
<th>Correction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Consistent</td>
<td>$F(1,56) = .19, \ p &lt; .67$</td>
<td>$.19, \ p &lt; .67$</td>
</tr>
<tr>
<td>Automatic/Consistent</td>
<td>$F(1,56) = 1.09, \ p &lt; .30$</td>
<td>$4.43, \ p &lt; .04$</td>
</tr>
<tr>
<td>Control/Irrelevant</td>
<td>$F(1,56) = 1.79, \ p &lt; .19$</td>
<td>$1.79, \ p &lt; .19$</td>
</tr>
<tr>
<td>Automatic/Irrelevant</td>
<td>$F(1,56) = .25, \ p &lt; .62$</td>
<td>$1.39, \ p &lt; .24$</td>
</tr>
</tbody>
</table>

**Between Subjects Effect**

| Need for Leadership         | $F(1,56) = 1.03, \ p < .32$ | $1.08, \ p < .30$ |

**Within Subject Effects**

| Behavior                    | $F(1,56) = 38.48, \ p < .0001$ | $10.53, \ p < .002$ |
|-----------------------------| $F(1,56) = .07, \ p < .88$     | $.90, \ p < .35$   |
| MS(behavior)                | .08                            | .10               |
| Process                     | $F(1,56) = 14.29, \ p < .0004$ | $63.99, \ p < .0001$ |
| Process*Condition            | $F(1,56) = .42, \ p < .52$     | $.62, \ p < .43$   |
| MS(behavior)                | .14                            | .10               |

| Behavior*Process             | $F(1,56) = 1.04, \ p < .31$    | $13.18, \ p < .001$ |
| Behav*Process*Cond           | $F(1,56) = 1.74, \ p < .19$    | $4.46, \ p < .04$   |

Note: Effects in **Bold** denote discrepancies between the results generated from the two corrections.
Appendix O
Experiment 3 - Time Delay

Mean Corrected Estimates of Automatic and Controlled Processes in the PDP

<table>
<thead>
<tr>
<th>Time Delay</th>
<th>Correction Technique</th>
<th>Correction 1</th>
<th>Correction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Yes (n = 28)</td>
<td>Consistent Behaviors</td>
<td>.23</td>
<td>.38</td>
</tr>
<tr>
<td></td>
<td>Irrelevant Behaviors</td>
<td>.52</td>
<td>.59</td>
</tr>
<tr>
<td>No (n = 29)</td>
<td>Consistent Behaviors</td>
<td>.09</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>Irrelevant Behaviors</td>
<td>.32</td>
<td>.55</td>
</tr>
</tbody>
</table>

Note: C = Controlled Estimate
A = Automatic Estimate
Appendix O (cont.)

Experiment 3 - Time Delay

The following lists all possible effects for both Corrections 1 and 2:

<table>
<thead>
<tr>
<th>Univariate</th>
<th>Correction 1</th>
<th>Correction 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control/Consistent</td>
<td>$F(1, 55) = 2.91, \ p &lt; .09$</td>
<td>$2.91, \ p &lt; .09$</td>
</tr>
<tr>
<td>Automatic/Consistent</td>
<td>$F(1, 55) = 1.39, \ p &lt; .24$</td>
<td>$.28, \ p &lt; .60$</td>
</tr>
<tr>
<td>Control/Irrelevant</td>
<td>$F(1, 55) = 5.36, \ p &lt; .02$</td>
<td>$5.36, \ p &lt; .02$</td>
</tr>
<tr>
<td>Automatic/Irrelevant</td>
<td>$F(1, 55) = .15, \ p &lt; .70$</td>
<td>$.39, \ p &lt; .75$</td>
</tr>
</tbody>
</table>

Between Subjects Effect

Time Delay

<table>
<thead>
<tr>
<th>Effect</th>
<th>Corrected 1</th>
<th>Corrected 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F(1, 55) = 7.38, \ p &lt; .01$</td>
<td>$3.23, \ p &lt; .08$</td>
<td></td>
</tr>
</tbody>
</table>

Within Subject Effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Corrected 1</th>
<th>Corrected 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior</td>
<td>$F(1, 55) = 37.89, \ p &lt; .0001$</td>
<td>$17.06, \ p &lt; .0001$</td>
</tr>
<tr>
<td>Behavior*Condition</td>
<td>$F(1, 55) = .00, \ p &lt; .88$</td>
<td>$.01, \ p &lt; .93$</td>
</tr>
<tr>
<td>MSe(Behavior)</td>
<td>.08</td>
<td>.10</td>
</tr>
<tr>
<td>Process</td>
<td>$F(1, 55) = 12.49, \ p &lt; .0008$</td>
<td>$46.35, \ p &lt; .0001$</td>
</tr>
<tr>
<td>Process*Condition</td>
<td>$F(1, 55) = 1.33, \ p &lt; .26$</td>
<td>$3.96, \ p &lt; .05$</td>
</tr>
<tr>
<td>MSe(Process)</td>
<td>.13</td>
<td>.10</td>
</tr>
<tr>
<td>Behavior*Process</td>
<td>$F(1, 55) = 1.10, \ p &lt; .76$</td>
<td>$5.01, \ p &lt; .03$</td>
</tr>
<tr>
<td>Behav<em>Process</em>Cond</td>
<td>$F(1, 55) = .40, \ p &lt; .53$</td>
<td>$.60, \ p &lt; .44$</td>
</tr>
<tr>
<td>MSe(Behavior*Process)</td>
<td>.09</td>
<td>.10</td>
</tr>
</tbody>
</table>

Note: Effects in **Bold** denote discrepancies between the results generated from the two corrections.