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Effects of prior impressions, time pressure, cognitive complexity, and cognitive ability on information gathering and decision making strategies

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EFFECTS OF PRIOR IMPRESSIONS, TIME PRESSURE, COGNITIVE COMPLEXITY, AND COGNITIVE ABILITY ON INFORMATION GATHERING AND DECISION MAKING STRATEGIES

by

JAMES A. DAY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF ARTS

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ABSTRACT

EFFECTS OF PRIOR IMPRESSIONS, TIME PRESSURE, COGNITIVE COMPLEXITY, AND COGNITIVE ABILITY ON INFORMATION GATHERING AND DECISION MAKING STRATEGIES

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James A. Day

Using a computerized information display board, subjects gathered information regarding applicants and subsequently evaluated the applicants. Results showed that subjects with prior impressions operated under a confirmatory bias during the information search and during the subsequent decision making process. This effect was greater for subjects under time pressure and with lesser cognitive complexity. Subjects having no prior impressions preferred to gather diagnostic information. Subjects under time pressure demonstrated a noncompensatory processing strategy by increasing the rate of processing, gathering less information, and showing greater variance in dimensional accesses. Subjects under severe time pressure demonstrated greater variance in applicant accesses, focused on the information dimensions most important to them, and had significantly more Type 4 (nonsystematic) transitions. Subjects with lesser cognitive complexity eliminated applicants from consideration sooner than did subjects with greater cognitive complexity. Subjects with lesser cognitive ability were more likely to immediately reaccess information and gathered less information.
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This thesis is dedicated to the memory of Gramps Ivie and Grandma Midgley.
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Effects of Prior Impressions, Time Pressure, Cognitive Complexity, and Cognitive Ability on Information Gathering and Decision Making Strategies

The topic of human information processing and decision making has received increasing attention in recent years (Abelson & Levi, 1985; Einhorn & Hogarth, 1981; Ford, Schmitt, Schechtman, Hults, & Doherty, 1989; Payne, 1982; Pitz & Sachs, 1984). Researchers have recognized the theoretical and practical significance of this area and are thus seeking to understand the bounds and conditions that govern human information processing.

A major finding of recent research on information processing is that people employ a variety of information processing strategies (Abelson & Levi, 1985; Payne, Bettman, & Johnson, 1988; Russo & Dosher, 1983). One such strategy is a compensatory strategy, in which items of information are linked, such that a high value on one dimension compensates for a low value on another dimension for any given alternative. Another possible strategy is a noncompensatory strategy, in which a high score on one dimension does not compensate for a low score on another dimension for any given alternative. Instead, the decision maker uses simplifying rules to reduce the complexity of the decision problem. For example, the decision maker might focus on the evaluative dimensions that are believed to be most diagnostic, and largely ignore other information about the alternatives.

Given that the decision maker has a variety of decision strategies available in evaluating alternatives, a number of variables might influence
the decision maker's choice of strategy. The present research is designed to investigate the possible influence of prior impressions, time pressure, cognitive complexity, and cognitive ability on a decision maker's processing strategy.

**Prior Impressions**

A large amount of research on information processing strategies has been generated by the seminal research of Snyder and Swann. About a decade ago, Snyder and Swann investigated how people gather information to test a hypothesis about another's personality (Snyder, 1981, Snyder & Campbell, 1980, Snyder & Swann, 1978). Subjects were asked to test either the hypothesis that an individual was an extrovert or the hypothesis that an individual was an introvert. Those subjects testing the extrovert hypothesis asked more questions about behaviors typical of extroverts, whereas subjects testing the introvert hypothesis asked questions about behaviors typical of introverts. For example, a subject testing the *extrovert* hypothesis might ask, "What would you do if you wanted to liven things up at a party?" (Snyder, 1981, p. 279). A subject testing the *introvert* hypothesis might ask, "What factors make it hard for you to really open up to people?" (p. 280). These questions, then, were biased to confirm the original hypotheses of the subjects, i.e., they sought information that would corroborate the original hypothesis. Snyder and Swann concluded that people incorporate a hypothesis-confirming strategy that leads them to "test these hypotheses by preferentially searching for behavioral evidence that would confirm these hypotheses." (Snyder & Swann, 1978, p. 1202).
Studies in social cognition have reached conclusions similar to those of Snyder and Swann. Researchers investigating the systematic biases that influence human judgment and decision making have concluded that people may indeed employ strategies that confirm their pre-existing stereotypes and hypotheses (Darley & Gross, 1983; Kahneman, Slovic, & Tversky, 1982). For example, Bodenhausen (1988) asked subjects to play the role of a juror and determine the guilt or innocence of a defendant accused of criminal assault. Subjects were provided with an ethnically nondescript name, a Hispanic name, or no prior information about the defendant. They were then given either unfavorable evidence, neutral evidence, or favorable evidence about the defendant. Consistent with Snyder & Swann's predictions, subjects given a Hispanic name rated the evidence as having the most negative implications for the defendant, recalled the most incriminating evidence for the defendant, and were most likely to judge the defendant to be guilty. Subjects given an ethnically nondescript name and subjects not provided with an original hypothesis were less likely to demonstrate these confirmatory biases. Thus, it appears that Snyder & Swann's conclusions may extend beyond personality assessment to other situations involving the testing of hypotheses about people.

The Snyder and Swann position represents one view of the strategies people use to gather information. Other researchers have claimed that Snyder & Swann's findings are an artifact of their methodology and do not represent typical human information processing. For example, Sackett (1982) claimed that Snyder & Swann's research was artificial by requiring subjects to choose from a limited pool of biased questions. Sackett (1982)
had subjects test in a social context the hypothesis that an individual was either introverted or extroverted. Although subjects did seek information consistent with their original hypotheses, their final judgments of the individual were based upon information obtained from the questions, even when that information was inconsistent. Thus, their final ratings were not correlated with their initial hypotheses. Similarly, McDonald & Hakel (1985) investigated the generalizability of the confirmatory strategy to the employment interview and failed to replicate Snyder & Swann's findings. Subjects received initial hypotheses by reading resumes of hypothetical applicants. They then selected ten questions to ask each applicant, received written responses to each question after it was selected, and evaluated the applicant's suitability for the position. Although initial hypotheses did influence the final ratings, the information obtained in the interview was the primary source of the ratings. Thus, there was little evidence for the strong confirmatory strategies found by Snyder & Swann. Rather than giving the preinterview information disproportional weight in making the final ratings of the applicants and demonstrating a confirmatory bias, the interviewers gave greater weight to the objective information gathered during the interview.

This research on human information processing has significant practical implications in a variety of areas. For example, in an organizational setting, consider the information processing that is performed during the employment interview. Because the job application or resume is often the first information reviewed by the interviewer, it is possible that this initial impression of the applicant can influence both the
interviewer's information gathering strategy and the interviewer's interpretation of applicant responses. To the extent that the employment interview is intended to provide unique information about the applicant, a confirmatory strategy could limit the predictive validity of the interview. Consider also the implications of potentially biased information processing in such areas as medicine or the judicial system. If prior information can potentially bias the subsequent search for information in order to diagnose an illness, or if such information can bias the litigation process in which the guilt or innocence of a defendant is determined, the effects of such information could be far reaching and seriously detrimental. Thus, there is an important practical motivation to better understand the potential biases that can influence human information processing.

Researchers have begun to examine the potential influence of prior information on subsequent information processing in applied areas. For example, researches have investigated the use of confirmatory strategies in the employment interview and have found partial support for Snyder and Swann's predictions. Macan & Dipboye (1988, see also Binning, Goldstein, Garcia, & Scattaregia, 1988; Dipboye, 1982) found that interviewers asked more negative questions of poorly qualified applicants than of moderately and highly qualified applicants. Furthermore, Dipboye, Fontenelle, & Garner (1984) found that interviewers who did not preview applications made more reliable judgments about the applicant's qualifications than interviewers who had access to preinterview information. Dipboye, Stramler, & Fontenelle (1984) found that interviewers previewing the applications of poorly qualified applicants recalled fewer favorable
behaviors and rated the interviewee's performance in the interview as poorer than did interviewers who previewed applications of highly qualified applicants (see also Phillips & Dipboye, 1989). These findings suggest that confirmatory behavior can occur in such applied areas as the employment interview, but there is still a great deal to learn about information processing behavior.

**Time Pressure**

One variable that might moderate the effects of prior information on human information processing is the presence of time pressure. Several studies have investigated time pressure and conclude that people under time pressure tend to process information differently than people not under time pressure. For example, Ben Zur and Breznitz (1981, see also Miller, 1960; Zakay, 1985) found at least three strategies that people under time pressure can employ. One strategy is to accelerate information processing by reviewing the same information, but at a faster rate. A second strategy is to give greater weight to the most important information, a process referred to as "filtration". Finally, people under time pressure can employ a noncompensatory strategy that simplifies and focuses the information gathering process (see Christensen-Szalanski, 1980). For example, Payne, Bettman, and Johnson (1988) found that people demonstrated a greater variance in the proportion of time spent evaluating different attributes when under time pressure. Thus, people under time pressure were more likely to use a noncompensatory strategy by selectively attending to particular attributes, while people not under time pressure were more
likely to use a compensatory strategy by paying equal attention to all attributes.

Svenson and Edland (1987) investigated the influence of time pressure on information processing by having students choose among several different apartments. The apartments varied according to size, travelling time to the university, and housing standard (old vs. modern). The students indicated that travelling time was the most important attribute to them. They were then presented with 24 different pairs of alternatives, and were asked to choose for each pair of apartments, the apartment in which they would prefer to live. Some subjects experienced time pressure by having only 5 seconds for each choice, while other subjects experienced no time pressure by having 15 seconds per choice.

When subjects experienced no time pressure, they chose the larger apartment with longer travelling time. However, subjects under time pressure chose just the opposite, preferring smaller apartments with shorter travelling time. The study concluded that decisions and choices can be affected by time pressure to the extent that choice reversals can take place. The presence of time pressure caused subjects to select one alternative under time pressure, and another alternative when no time pressure was present. This change of preference seemed to be due to subjects under time pressure becoming more influenced by aspects of the attribute that they perceived to be most important (traveling time) than were subjects not under time pressure. Wright (1974) also found in a decision making study that subjects under time pressure gave more weight
to the information that they felt was most important than did subjects not under time pressure.

Another study that investigates the influence of time pressure on information processing was performed by Freund, Kruglanski, and Shpitzajzen (1985, see also Kruglanski & Freund, 1983). The subjects of this study were soldiers in the Israel Defense forces. The soldiers were asked to predict a soldier’s future success at advanced training based upon information they received from the commanding officer’s report regarding the soldier’s basic training. One part of the report discussed positive qualifications of the target person by discussing behavioral events where he showed an understanding of the technical material, had leadership abilities, was friendly, and was able to endure stress. A second part of the report put the target person in a negative light by discussing behavioral events where the target person displayed poor understanding of the technical material, lacked leadership abilities and friendliness, and had a low tolerance for stress. The informational sequence of the report was manipulated, such that half of the subjects received the positive information first, and half of the subjects received the negative information first.

Subjects under time pressure were given 1 minute to reach a decision after receiving the material, and subjects not under time pressure were given 15 minutes. The results indicated an interaction between initial information and time pressure, such that primacy effects were stronger when subjects experienced time pressure.

These findings have important implications for human information processing. They suggest that information received prior to subsequent
information gathering might exert a greater influence on the decision maker’s ultimate decision regarding various alternatives when the individual experiences time pressure, whereas individuals not experiencing time pressure might give more weight to the subsequent information gathered. Therefore, not only are the individual effects of prior impressions and time pressure of interest, but it is possible that these variables have an interactive effect on the decision maker’s information processing strategy.

**Measuring Process Strategies: The Information Display Board**

In recent years, there has been increased recognition that people are not usually passive recipients of information, but that they take an active role in evaluating the information that is available to them, and selectively extract the information that they desire (Jacoby, Jaccard, Kuss, Troutman, & Mazursky, 1987; Klayman, 1983, 1985). Furthermore, the sequence in which information is received can have an impact on information processing. As shown above, prior information can significantly influence subsequent processing of information. Therefore, there has been increased attention to developing methodologies that will allow the researcher to trace the process of information acquisition. One promising methodology that has been developed is the information display board (Billings & Marcus, 1983; Grunert, 1986; Jacoby, 1977; Payne, 1976).

An information display board often refers to a physical form board constructed as a matrix where each cell contains information about a particular property for a particular option. The options are typically listed as rows of the matrix, while properties are listed as columns. The
information is concealed by being printed on the back of the card within each cell. To get information, the subject removes the card containing the desired item of information, turns the card over, and reads the information. The subject then turns the card back over and returns it to the appropriate slot.

As Jacoby, et al. (1987) discuss, the information display board is a rich source of information, as it allows researchers to evaluate three aspects of the information gathering process: the depth, content, and sequence of information gathering. Depth measures refer to the amount of information accessed from the information display board. A number of search depth measures are available, including the total number of items chosen, the proportion of information accessed relative to the total amount of information available, the number of options considered, the number of properties considered, the variance of properties for each option, and the variance of options for each property. A compensatory processing strategy would typically involve a greater depth of search, and would be more consistent across options and properties. A noncompensatory processing strategy would typically simplify the information search by selectively focusing on a smaller amount of information. Thus, a noncompensatory processing strategy would be marked by fewer accesses of the information display, and by greater variance in the options and properties considered.

Content measures refer to the kind of information, in terms of options and properties, that is sought from the information display board. Examples of content measures would be the proportion of times a given option is accessed, the proportion of times a given property is accessed, and
the proportion of subjects considering a given option or property. A compensatory processing strategy would typically give an equal proportion of accesses to the options and properties in the information display board. However, a noncompensatory processing strategy would be more likely to have a higher proportion of accesses to particular options or properties in the information display board.

*Sequence* measures refer to the order in which information is accessed. One of the most frequently used procedures is the transition analysis approach that was developed by Jacoby, Chestnut, Weigl, & Fisher (1976). The transition analysis approach focuses on the change in options and properties while moving from one item of information to the next. Table 1 describes four kinds of transitions that can take place.

For each subject, the proportion of Type 1, 2, 3, and 4 transitions that occurred is calculated. These proportions can then be aggregated to permit comparisons of sequential information strategies across groups. Recall that a compensatory processing strategy implies a connection between items of information, such that one item of information compensates for another item of information as the information is gathered and evaluated. Therefore, a compensatory strategy would be more likely to have fewer Type 4 transitions than a noncompensatory strategy, since Type 4 transitions represent a non-systematic shift to a different option and to a different property in the information display board.

To assist in the gathering and analysis of this information, researchers have recently begun to use computers to store the information in the information display board, supply information on the request of subjects,
Table 1

Transition Types in the Information Display Board

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Same option-same property (i.e., immediate reaccessing of same item)</td>
</tr>
<tr>
<td>2</td>
<td>Same option-different property (i.e., within-option search)</td>
</tr>
<tr>
<td>3</td>
<td>Different option-same property (i.e., within-property search)</td>
</tr>
<tr>
<td>4</td>
<td>Different option-different property</td>
</tr>
</tbody>
</table>

and trace the process of information acquisition for each subject (Chestnut & Jacoby, 1980; Hoyer & Jacoby, 1983; Jacoby, et al., 1987). Typically, the information is displayed in one of two ways. In the first approach, the subjects have access to a set of menus which list the options and properties that are available. Alternatively, when the matrix is relatively small, the computer can display an actual matrix with options listed as rows and properties listed as columns. The information is displayed when the subject indicates a particular cell in the matrix. Using a computerized information display board has the advantage of collecting data in an accurate and unobtrusive fashion. In addition, it is possible to get precise time measurements of various elements in the information gathering process. The present research utilized a computerized information display board to assess the potential effects of prior impressions and time pressure on the information processing strategy of individuals.

Pilot Study

Unlike previous studies, many of which employed tasks with which the subjects were unfamiliar, e.g., playing the role of a juror, the pilot study was designed to draw upon an experience with which the subjects were familiar. The subjects in this study were undergraduate students at a university which typically requires an admissions interview prior to acceptance to the university. Thus, most subjects had participated in the admissions interview and were familiar with the interview process. The subjects in the pilot study were asked to evaluate several applicants to their university, and thus participated in a process with which most were familiar.
A second contribution of the pilot study, as discussed above, is that it was designed to assess not only the individual effects of prior impressions and time pressure, but also the potential interactive effect of these variables on an individual's information processing strategy. Previous research suggests that prior impressions might exert a greater influence on the individual's processing strategy when the individual is under time pressure. The pilot study was designed to assess this possibility.

Third, the pilot study incorporated the information display board methodology, thus providing a rich array of information about the depth, content, and sequence of information acquisition under the various experimental conditions. This information is useful in identifying the potential effects of prior information and time pressure, not only on the final ratings of applicants, but on the information gathering process. In addition, this information is useful in distinguishing between compensatory and noncompensatory information processing strategies.

Based upon the research discussed above, the pilot study was designed to test the following hypotheses:

**Hypothesis 1:** Subjects under time pressure will use a noncompensatory processing strategy, while subjects not under time pressure will use a compensatory processing strategy, as measured by the proportion of Type 1, 2, 3, and 4 transitions that occur during the information search, and by the average amount of time spent within each cell. It is predicted that subjects under time pressure will engage in more Type 4 transitions, and will spend less time per cell than will subjects not under time pressure.
Hypothesis 2: Subjects under time pressure will demonstrate a noncompensatory processing strategy by focusing their information search on the evaluative dimensions that they consider to be most important. Subjects not under time pressure will demonstrate a compensatory processing strategy by asking a more even proportion of questions for all evaluative dimensions, regardless of how important they feel those dimensions to be in reaching a decision regarding the applicants.

Hypothesis 3: Subjects under time pressure will be more likely to demonstrate a noncompensatory processing strategy by accessing fewer items of information on the applicants, and by displaying a greater variance in the number of dimensions and applicants considered than will subjects not under time pressure.

Hypothesis 4: The introduction of prior impressions will create a greater primacy effect for subjects under time pressure than for subjects not under time pressure. Thus, although prior impressions are expected to influence final ratings for all subjects, this influence is expected to be greater for subjects under time pressure than for subjects not under time pressure.

Hypothesis 5: Subjects under time pressure will exhibit a confirmatory bias by asking a greater proportion of questions of highly qualified applicants, and by spending a greater proportion of time with highly qualified applicants. In addition, subjects under time pressure will eliminate more applicants from consideration, and will remove applicants from consideration sooner than will subjects not under time pressure.
Method

Subjects and Experimental Design

A total of 29 subjects participated in the pilot study. All subjects were undergraduate students participating for course credit. Fifteen of the subjects were under time pressure during the information search. These subjects were given six minutes to gather information from the information display board. The remaining 14 subjects were not under time pressure. These subjects were given as much time as they desired to gather information from the information display board. The design was a 3 x 2 mixed factorial design with the following variables: (1) Prior Impression (High, Medium, Low—within subjects variable), and (2) Time Pressure (High, Low—between subjects variable). Subjects received prior impressions about 15 applicants to the subjects’ university, and were instructed to evaluate the applicants using a computerized information display board. After completing the information search, subjects were asked to complete a brief computerized questionnaire, after which they were dismissed.

Development of Stimulus Material

An information display system similar to the Mouselab information system (Johnson, Payne, Schkade, & Bettman, 1986) was developed for the Macintosh using Hypercard 2.1 software. Subjects used a Macintosh IIci computer with a 14-inch monitor for the experiment.

Procedure

The subjects were seated at a computer terminal and were given a consent form. All subjects were asked to read the consent form, which
stated that the study was designed to assess how people go about evaluating applicants to the subjects' university. After signing the consent form, the subjects were asked to begin the experiment by clicking a button on the computer screen. They were shown a series of computer screens that instructed them to assume the role of a student member of the Admissions Committee and to gather information that would allow them to determine the qualifications of the 15 student applicants. They were told that after gathering their information, they would be asked to rate the 15 student applicants on their qualification to be accepted and to perform well at the subjects' university. They were given a form that depicted the information display matrix and were encouraged to take notes on this form as they gathered the information. In addition to these instructions, subjects under time pressure were told that they would have six minutes to search the information display. Subjects not under time pressure were told that they could take as long as they wished to gather their information about the applicants. The subjects were then given the opportunity to practice searching a sample information display for as long as they wished. When the subjects were finished practicing, they were shown a screen that depicted the 15 student applicants, as well as a rating that represented the combined SAT and High School rank of each student applicant. This rating depicted the applicants as having either a High, Medium, or Low score, based upon the SAT and High School rank information for the applicant. The SAT/High School rank ratings were randomly assigned among the 15 applicants, but in all cases five of the applicants were depicted as having a High rating, five were depicted as having a Medium rating, and five were
depicted as having a Low rating. All subjects were given as long as they wished to review this information. When the subjects were ready, they were given access to the information display board.

The computerized information display board consisted of an 8 x 16 matrix, in which the 15 applicants were listed vertically, and six evaluative dimensions were listed horizontally in the matrix. The column furthest to the right in the matrix was an elimination column. By clicking in this column for any applicant, the subjects were able to eliminate applicants from consideration, and were no longer given access to information about that applicant. To avoid any gender or racial effects, the 15 applicants were referred to as Applicant 1, Applicant 2, etc. The six evaluative dimensions are taken from an actual application to the subjects' university, and include the applicants' Scholastic Awards, Number of AP Courses, Extracurricular Activities, Academic Motivation, Emotional Maturity, and Leadership Positions. The SAT/High School rank rating (High, Medium, or Low) appeared next to each applicant.

The cells in the matrix were blank until the subject clicked on the desired cell. Then, the information appeared and remained on the screen until the subject released the mouse button. When the mouse button was released, the information disappeared. Subjects were free to return to any cells previously viewed, if they desired. However, as noted above, if an applicant was eliminated from consideration, the subjects were no longer able to access information about that applicant.

For each dimension within the matrix, there were two possible answers: a High answer, which depicted the applicant as being highly
qualified on that dimension, or a Low answer which depicted the applicant as being poorly qualified on that dimension. The computer randomly selected one of these two answers for each applicant and displayed it when the appropriate cell was clicked by the subject. For example, clicking on the Extracurricular Activities dimension for Applicant 1 would yield one of the following answers:

High: “This applicant has participated in a large number of extracurricular activities”

Low: “This applicant has participated in very few extracurricular activities”

Once the subject had accessed a particular cell, any reaccesses of that cell yielded the same information, i.e., the randomization of dimensional answers occurred only once. Clicking on the same dimension for a different applicant caused the computer to randomly generate either a High or a Low answer for that applicant. The two potential answers (High or Low) generated for each dimension were the same across all 15 applicants. This methodology ensured that information provided during the information search was completely random and thus was independent of prior impressions. This was done in order to determine the degree to which the final ratings of the applicants were uniquely influenced by the prior information.

Subjects under time pressure were shown a small clock at the top of the information display board that informed them of the time they had remaining. When the six minutes had passed, these subjects were told that
they could no longer gather information from the display board, and were then taken to the next computer screen.

After completing the information search, all subjects were shown a computer screen that asked them to rate each applicant on a 7-point scale regarding the applicant’s qualification to be accepted to the university and to perform well once accepted. The scale ranged from poorly qualified (1) to highly qualified (7). The subjects were also asked to rank the 15 applicants according to their qualification to be accepted and to perform well at the university. Next, the subjects were asked to recall the SAT/High School rank information (High, Medium, or Low) for each applicant, in order to provide a manipulation check for the prior impressions. They were given access to their notes to assist them in doing this. The subjects were then asked to rate the six evaluative dimensions and the SAT/High School rank information on a 7-point scale for their importance in determining the applicants’ qualifications. This scale ranged from not at all important (1) to extremely important (7). Finally, subjects were asked to rate on a 7-point scale the degree to which they felt pressured by time during the information search. The time pressure scale ranged from very pressured (1) to not at all pressured (7). Then subjects were then dismissed and were told that a full explanation of the study would be available to them after the completion of data collection.

Independent Variables

The study contains two primary independent variables: Prior Impression (High, Medium, or Low conditions) and Time Pressure (High or Low conditions). Prior Impression in the pilot study is a within subjects
variable, and Time Pressure is a between subjects variable. As discussed above, Prior Impressions were manipulated by randomly assigning a rating of High, Medium, or Low to each applicant, based upon the applicant’s High School rank and SAT information. Five applicants were depicted as being High on this rating, five were depicted as being Medium on this rating, and five were depicted as being Low on this rating. This information was given to the subjects prior to their engaging in the information search. Time Pressure was manipulated by giving subjects under time pressure six minutes to complete their information search. Subjects not under time pressure were given as long as they wished to complete the information search.

Dependent Variables

To best understand the subjects’ processing strategies, the study contained variables measuring the depth, content, and sequence of the information search. The depth measures include the total number of cells accessed during the information search and the variance in the number of dimensions and applicants considered. These measures assess whether the subjects sought a different amount of information about the applicants or about particular dimensions as a result of prior impressions or time pressure.

The content measures include the proportion of times that High applicants were assessed, the proportion of times that Medium applicants were assessed, and the proportion of times that Low applicants were assessed. The content measures also include the proportion of times that each dimension was accessed. These measures provide one
operationalization of confirmatory bias by assessing whether some applicants were given greater attention than others for the different experimental conditions. In addition, content measures include the proportion of times that each of the six dimensions were accessed. This measure, in combination with the importance ratings given to the six dimensions, provides one measure of diagnosticity, as it measures whether subjects asked more questions about those dimensions that they felt were more important.

The sequence measures include the proportion of Type 1, 2, 3, and 4 transitions (see Table 1) that occurred for each of the experimental groups. This measures assess group differences in the process of information acquisition.

The depth, content, and sequence measures were supplemented by measurements of time. One time measurement is the average amount of time spent within each cell. This variable provides a measure of group differences in processing strategy. A second time measurement is the proportion of time spent with High, Medium, and Low applicants. This variable provides a second measure of confirmatory bias by measuring the attention given to the three different groups of applicants.

The elimination measures include the number of applicants that were eliminated from consideration for each of the treatment groups, and the proportion of time that passed before the first applicant was eliminated, relative to the total amount of time spent in the information search. These measures help to identify different information processing strategies for the experimental groups.
Finally, a third measure of confirmatory bias is obtained by predicting the final qualification ratings of the applicants from the prior impressions (High, Medium, or Low). Because the information gathered during from the information display was randomly generated, this measure assesses the unique influence of prior impressions on the final ratings of the applicants.

As discussed above, several of these measures are also useful in distinguishing between compensatory and noncompensatory processing strategies.

**Results**

**Manipulation Check**

To evaluate the effectiveness of the Prior Impressions manipulation, an independent t-test was performed on the subjects’ recall of the Prior Impressions. The mean recall scores for subjects under time pressure and for subjects not under time pressure were identical and near perfect ($M = 14.93/15$ correctly recalled). The effectiveness of the Time Pressure manipulation was also evaluated, using the subjects’ ratings of perceived time pressure as the dependent variable. Subjects under time pressure reported significantly greater perceived time pressure ($M = 6.33$) than did subjects not under time pressure ($M = 2.29$), $t(27) = 10.30$, $p<.001$.

**Tests of the Hypotheses**

**Hypothesis 1**: The first hypothesis predicted that subjects under time pressure would use a noncompensatory processing strategy and subjects not under time pressure would use a compensatory strategy, as measured by the proportion of Type 1, 2, 3, and 4 transitions that occurred during the
information search. The means and standard deviations for the four transition types are presented in Table 2.

The results supported this hypothesis, showing a difference in Type 4 transitions between the experimental groups. Subjects under time pressure engaged in a significantly higher proportion of Type 4 transitions \((M = .23)\) than did subjects not under time pressure \((M = .12)\), \(t(27) = -2.13, p = .04\). There was not a significant difference in the proportion of Type 1, 2, and 3 transitions that occurred.\(^1\) It will be recalled that Type 4 transitions indicate a movement to a different person and to a different dimension within the information display (see Table 1). This suggests that one of the effects of time pressure was to cause subjects to be less systematic in their information search than subjects not under time pressure. The increased frequency of Type 4 transitions provides evidence that subjects under time pressure were more likely to use a noncompensatory processing strategy than subjects not under time pressure.

Hypothesis 1 also predicted that subjects under time pressure would alter their processing strategy by spending less time evaluating each item of information than subjects not under time pressure. The results indicated that subjects under time pressure spent less time per cell \((M = 3.37\) seconds) than did subjects not under time pressure \((M = 4.85\) seconds), \(t(27) = 2.05, p = .05\). Thus, a second noncompensatory strategy employed by subjects under time pressure was to accelerate the rate of information processing.

**Hypothesis 2:** The second hypothesis predicted that subjects under time pressure would demonstrate a noncompensatory strategy by focusing
### Table 2

**Pilot Study**

**Means and Standard Deviations of Transition Type Proportions by Group Membership**

<table>
<thead>
<tr>
<th>Group</th>
<th>Type 1 Mean</th>
<th>Type 1 SD</th>
<th>Type 2 Mean</th>
<th>Type 2 SD</th>
<th>Type 3 Mean</th>
<th>Type 3 SD</th>
<th>Type 4 Mean</th>
<th>Type 4 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Pressure</td>
<td>.01</td>
<td>.02</td>
<td>.42</td>
<td>.33</td>
<td>.43</td>
<td>.38</td>
<td>.23</td>
<td>.17</td>
</tr>
<tr>
<td>No Time Pressure</td>
<td>.01</td>
<td>.01</td>
<td>.31</td>
<td>.31</td>
<td>.67</td>
<td>.41</td>
<td>.12</td>
<td>.07</td>
</tr>
</tbody>
</table>
the information search on the information that they considered to be most important, and by asking a lower proportion questions on the dimensions that they considered to be less important. Subjects not under time pressure were expected to demonstrate a compensatory strategy by asking a more even proportion of questions for all evaluative dimensions, regardless of how important they felt those dimensions to be in rating the applicants. The results confirmed this hypothesis, showing an overall effect of Time Pressure on the mean correlation between dimension importance and dimension accesses, \( t(25.6) = 6.32, p < .001 \). For subjects under Time Pressure, the mean correlation between dimension importance and dimension accesses was .609, while for subjects not under Time Pressure, the mean correlation was -.241. Thus, subjects under Time Pressure tended to ask more questions of the dimensions that they felt were most important. Subsequent analyses revealed significant correlations between dimension importance and dimension accesses for the following information dimensions: the Academic Motivation dimension, \( F(3, 25) = 29.93, p < .001 \), the AP Courses dimension, \( F(3, 25) = 5.76, p = .02 \), and the Extracurricular Activities dimension, \( F(3, 25) = 5.55, p = .03 \). The correlations between dimension importance and the proportion of times each dimension was accessed for the two groups are presented in Table 3.

A subsequent analysis of simple effects revealed that for subjects under time pressure, there was a significant positive correlation between the importance of the Academic Motivation dimension and the proportion of questions asked about that dimension, \( F(1,13) = 29.39, p < .001 \). However,
Table 3
Pilot Study
Correlations Between Dimension Importance and Proportion of Accesses per Dimension by Group Membership

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Time Pressure</td>
<td>.83</td>
<td>.53</td>
<td>.53</td>
<td>.41</td>
<td>-.07</td>
<td>.30</td>
</tr>
<tr>
<td>Non-Time Pressure</td>
<td>-.53</td>
<td>-.28</td>
<td>.01</td>
<td>.36</td>
<td>-.06</td>
<td>-.01</td>
</tr>
</tbody>
</table>
for subjects not under time pressure, just the opposite was true; there was a significant negative correlation between the importance of the Academic Motivation dimension and the proportion of questions asked about that dimension, $F(1,12) = 4.67, p = .05$. This interaction is depicted in Figure 1.

Therefore, subjects under time pressure asked more questions about Academic Motivation when they felt that this was an important criterion for admission to the University. Subjects under time pressure who did not feel that Academic Motivation was important asked fewer questions about this dimension. However, subjects who were not under time pressure asked fewer questions about Academic Motivation when they felt it was important, and asked more questions about Academic Motivation when they felt it was less important, thus indicating a less diagnostic processing strategy.

Similarly, an analysis of simple effects revealed that subjects under time pressure were more likely than subjects not under time pressure to ask questions regarding the AP Courses dimension and the Extracurricular Activities dimension when they felt that these dimensions were important. For these subjects, there was a significant positive correlation between the importance of the dimension and the proportion of questions asked about the dimension for AP Courses, $F(1,13) = 5.04, p = .04$ and for Extracurricular Activities, $F(1,13) = 5.17, p = .04$. However, for subjects not under time pressure, there was not a significant relationship between the importance of the AP courses dimension and the Extracurricular Activities dimension and the proportion of questions asked about these
Figure 1. Time Pressure x Importance of Academic Motivation interaction, with Proportion of Questions Regarding Academic Motivation as the dependent measure.
dimensions. Thus, subjects under time pressure were more likely to "filter out" less important information and to focus the information search on the dimensions that they judged to be most important than were subjects not under time pressure.

Subjects under time pressure did not differ from subjects not under time pressure in the correlations between the importance and proportion of accesses for the remaining three dimensions, i.e., for Leadership, Emotional Maturity, and Scholastic Awards. However, the evidence discussed above suggests that subjects under time pressure tended to choose a noncompensatory strategy by selectively focusing on the information that they considered to be most important, while subjects not under time pressure preferred a compensatory strategy, asking an equal proportion of questions for all dimensions, regardless of how diagnostic they judged those dimensions to be.

**Hypothesis 3:** This hypothesis predicted that subjects under time pressure would gather less information regarding the applicants than would subjects not under time pressure. This hypothesis was confirmed; subjects under time pressure accessed fewer cells ($M = 50.33$) than did subjects not under time pressure ($M = 96.50$), $t(27) = 11.26$, $p < .001$.

This hypothesis also predicted that subjects under time pressure would demonstrate greater variance in the proportion of times the dimensions and applicants were considered, thus indicating a noncompensatory processing strategy, than would subjects not under time pressure. Thus, a standard deviation score was computed for each subject that measured that subject's variance in the proportion of accesses across
the information dimensions. Likewise, a standard deviation score was computed for each subject that measured that subject's variance in the proportion of accesses across applicants having High, Medium, or Low prior impressions. As predicted, subjects under time pressure demonstrated greater variance in the proportion of accesses across information dimensions (Mean S.D. = .11) than did subjects not under time pressure (Mean S.D. = .02), \( t(27) = -6.13, p < .001 \). Similarly, subjects under time pressure demonstrated greater variance in the proportion of accesses for applicants having High, Medium, or Low prior impressions (Mean S.D. = .14) than did subjects not under time pressure (Mean S.D. = .03), \( t(27) = -6.52, p < .001 \).

These results suggest that subjects under time pressure used a noncompensatory processing strategy by accessing less information and by demonstrating greater selectivity in the dimensions and the applicants that they considered. However, subjects not under time pressure used a more compensatory processing strategy by reviewing the information more thoroughly and by demonstrating greater consistency in the dimensions and applicants that they considered.

**Hypothesis 4:** This hypothesis predicted that in reaching a final decision about the qualifications of the applicants, subjects under time pressure would demonstrate a primacy effect. Although all subjects were expected to be influenced by prior information in rating the applicants, the influence was expected to be greater for subjects under time pressure. The results did not show a significant interaction between Prior Impressions and Time Pressure regarding the Final Ratings of the applicants. However,
a main effect of Prior Impressions on Final Ratings was found, $F(2,56) = 35.06$, $p<.001$ (High mean rating = 4.84, Medium mean rating = 4.07, and Low mean rating = 3.03). Similarly, a main effect of Prior Impressions on Final Rankings was found, $F(2,56) = 80.04$, $p<.001$ (High mean ranking = 5.29, Medium mean ranking = 7.70, and Low mean ranking = 11.01).

Thus, subjects under time pressure were not influenced more by prior information in their final ratings of the applicants than were subjects not under time pressure. Rather, a main effect of prior impressions on final ratings was found. In addition, subjects under time pressure did not differ from subjects not under time pressure in their subjective ratings of the importance of the prior information to them in reaching a decision regarding the applicants.

It is interesting to note that the correlation between Prior Impressions and Final Ratings of the applicants was .75. Thus, about 56% of the variance in Final Ratings was accounted for by Prior Impressions, both for subjects under time pressure and for subjects not under time pressure. It will be recalled that the information generated in the information display board was completely random, and thus independent of the prior information. Therefore, the majority (56%) of the variance in the final ratings was uniquely attributable to the effect of the prior information both for subjects under time pressure and for subjects not under time pressure.

It will be recalled that after gathering their information and rating the student applicants, the subjects were asked to rate each dimension of the information display (Scholastic Awards, Emotional Maturity, Leadership Experience, Academic Motivation, AP Courses, and Extracurricular
Activities), as well as to rate the Prior Information, on the importance of that information to them in reaching a final decision about the applicants. To better understand the above finding, a Dunnett test was performed, comparing the mean rating of the importance for Prior Information with the mean ratings of importance for the six dimensions of the information display. The means and standard deviations for the Prior Information and the six dimensions are presented in Table 4.

The analysis revealed that the Prior Information was rated as being more important ($M = 5.07$) than Scholastic Awards ($M = 3.67$), $t(27) = 4.78$, $p<.001$. However, there was not a statistically significant difference between Prior Information and the remaining five dimensions. Thus, the subjects did not consider the prior information to be any more important than the information provided by five of the six dimensions in reaching a decision regarding the qualifications of the applicants, although the prior information accounted for 56% of the variance in the final ratings.

**Hypothesis 5:** This hypothesis predicted that subjects under time pressure would be more likely than subjects not under time pressure to demonstrate a confirmatory bias during the information search. It was predicted that subjects under time pressure would ask a greater proportion of questions of highly qualified applicants, and would spend a greater proportion of time with highly qualified applicants, than would subjects not under time pressure. However, the predicted interaction for these variables was not significant. A subsequent analysis of a main effect for Prior Impressions revealed that there was not a significant difference in the
### Table 4

**Pilot Study**

Means and Standard Deviations for
Prior Information and Dimensional Ratings of Importance

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Information</td>
<td>5.07</td>
<td>1.22</td>
</tr>
<tr>
<td>Scholastic Awards</td>
<td>3.67</td>
<td>1.23</td>
</tr>
<tr>
<td>Emotional Maturity</td>
<td>4.72</td>
<td>1.58</td>
</tr>
<tr>
<td>Leadership Experience</td>
<td>4.62</td>
<td>1.24</td>
</tr>
<tr>
<td>Academic Motivation</td>
<td>5.03</td>
<td>1.61</td>
</tr>
<tr>
<td>AP Courses</td>
<td>4.14</td>
<td>1.51</td>
</tr>
<tr>
<td>Extracurricular Activities</td>
<td>4.62</td>
<td>1.55</td>
</tr>
</tbody>
</table>
proportion of questions asked of applicants with High, Medium, or Low prior impressions. Similarly, there was not a significant difference in the proportion of time spent on applicants with High, Medium, or Low prior impressions. The means and standard deviations for these variables are presented in Table 5.

Therefore, the results suggest that subjects in both experimental groups asked about the same proportion of questions and spent an approximately equal amount of time with the 15 applicants, regardless of their initial impression.

It was also predicted that subjects under time pressure would eliminate more applicants from consideration, and would remove applicants from consideration sooner than would subjects not under time pressure. However, there was not a statistically significant difference between the experimental groups on these variables. The means and standard deviations for these variables are presented in Table 6.

The results reported above in combination with the conclusions of Hypothesis 4 suggest little evidence of bias in the gathering of information for both experimental groups, but provide evidence that both groups demonstrated a bias in the final evaluation of the applicants. Although the subjects were judicious in gathering an equal proportion of information from applicants having High, Medium, or Low prior impressions, they tended to discount this information and to give greater weight to the information gained prior to the information search. Furthermore, this occurred despite subjects rating five of the six dimensions to be as
Table 5
Pilot Study
Means and Standard Deviations for Proportion of Questions Asked and Proportion of Time Spent on Applicants with High, Medium, or Low Prior Impressions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>.32</td>
<td>.12</td>
<td>.33</td>
<td>.13</td>
</tr>
<tr>
<td>Medium</td>
<td>.34</td>
<td>.10</td>
<td>.32</td>
<td>.12</td>
</tr>
<tr>
<td>Low</td>
<td>.33</td>
<td>.11</td>
<td>.31</td>
<td>.12</td>
</tr>
</tbody>
</table>
Table 6
Pilot Study
Means and Standard Deviations for
Applicants Removed and Proportion of Time Before Removing First Applicant

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Pressure</td>
<td>2.73</td>
<td>1.44</td>
<td>.58</td>
<td>.25</td>
</tr>
<tr>
<td>No Time Pressure</td>
<td>2.36</td>
<td>3.20</td>
<td>.68</td>
<td>.47</td>
</tr>
</tbody>
</table>
important as the prior information in making their final ratings of the applicants.

**Discussion**

**Effects of Time Pressure**

The results support the hypothesis that subjects under time pressure would use noncompensatory processing strategies while subjects not under time pressure would use compensatory processing strategies in gathering information about the 15 applicants. Consistent with predictions, subjects under time pressure increased the rate of information processing and gathered less information than did subjects not under time pressure. This is consistent with previous research on information processing under time pressure (Ben Zur & Breznitz, 1981; Payne, Bettman, & Johnson, 1988).

Perhaps the most commonly used variable to distinguish between compensatory and noncompensatory information processing is the variability of the information search. Payne (1976) points out that an individual using a compensatory processing strategy gives each alternative or dimension an equal amount of attention, while an individual using a noncompensatory processing strategy pays different attention to the various alternatives or dimensions. Consistent with the predictions, subjects under time pressure showed greater variability in the dimensions and applicants considered, thus demonstrating a noncompensatory processing strategy. Subjects not under time pressure were more likely to give equal consideration to all of the dimensions and applicants in the information display, thus demonstrating a compensatory processing strategy.
A third strategy commonly associated with noncompensatory information processing is an idea referred to as "filtration" (Miller, 1960). This strategy focuses on a subset of the most important information, thus "filtering" out less important information. The results show evidence of filtration by the subjects under time pressure, as these subjects tended to focus their information search on the dimensions that they considered to be most important.

Finally, the results showed that subjects under time pressure engaged in a significantly higher proportion of Type 4 (different applicant-different dimension) transitions than did subjects not under time pressure. This finding is an important addition to previous research in this area, as it shows that one noncompensatory strategy available to information processors under time pressure is to engage in a higher proportion of Type 4 transitions during the information search.

Effects of Prior Impressions

As Ford, et. al (1989, p. 106) point out in their review of process tracing methods, there has been very little research regarding the effects of prior impressions on the information gathering process. This study investigated the influence of prior impressions on the gathering of information about 15 student applicants, and was designed to investigate time pressure as a possible moderating variable. Contrary to predictions, the results showed that subjects under time pressure did not ask more questions or spend a greater proportion of time with highly qualified applicants than did subjects not under time pressure. For both
experimental groups, there appeared to be an equal amount of attention
payed to all applicants, regardless of their prior impressions.

Also contrary to predictions, subjects under time pressure were not
influenced to a greater extent by prior impressions in rating the applicants
than were subjects not under time pressure. Rather surprisingly, both
experimental groups demonstrated a strong influence of prior impressions.
For both groups, the majority of the variance in the final ratings (56%)
was uniquely attributable to the prior impressions. Equally interesting is
the finding that subjects did not rate the prior impression dimension to be
any more important to them than five of the six information dimensions in
providing useful information with which to evaluate the 15 applicants.

These results suggest some conclusions regarding the ability of people
to adapt to various information processing demands. When under time
pressure, people seem to be able to adjust their information processing
strategies in order to focus on the information most important to them and
minimize the effort required for the task. In the pilot study, subjects under
time pressure adapted their processing strategies by accelerating the
gathering process, by focusing on the most diagnostic information, and by
engaging in more Type 4 transitions than did subjects not under time
pressure.

However, when people have prior impressions about an information
domain, it is less clear about how they adjust their information processing
strategies based upon personal beliefs regarding the target. While the pilot
study did find evidence for an effect of prior impressions on the decision
making process, the results did not suggest an effect of prior impressions
on the *information gathering* process. It is possible that this is because the experimental design did not include a control group that did not receive impression information until *after* the information gathering process. By comparing the information gathering and decision making process of subjects having prior impressions with the process of subjects who have no prior impressions, it would be possible to arrive at more substantive conclusions regarding the possible effects of prior impressions. As discussed below, this change among several others was made in the main experiment in order to allow a more detailed examination of the bounds and conditions of human information processing.

**Main Experiment**

The results of the pilot study suggest several interesting hypotheses regarding the effects of time pressure and prior impressions on information processing. The main experiment was designed to investigate these hypotheses and to contribute to the findings of the pilot study in several important ways. The changes in methodology and the additional research questions to be addressed in the main experiment are discussed below.

In the conclusion of their review of process tracing research, Ford, et. al (1989, p. 113) stated that very little research has looked at the possible interactive effects of task, environmental, and personal characteristics on information processing. The pilot study addressed part of this question by investigating the possible interactive influence of an environmental characteristic (time pressure) and a task characteristic (prior impressions) on information processing in an interview setting. The main experiment
expanded upon this methodology by including two personal characteristics: Cognitive Complexity and Cognitive Ability. These variables and their predicted effects on information processing are discussed in detail below.

**Cognitive Complexity**

There has been a growing body of research which suggests that the cognitive complexity of the information processor can have an important influence on the individual's processing strategy. Cognitive complexity has been defined as the ability to *differentiate* among the dimensions that are relevant to an information processing task, and to *integrate* these dimensions into a meaningful, multidimensional cognitive structure (Streufert & Swezey, 1986). People who are low in cognitive complexity tend to simplify the processing task by processing information on the basis of few dimensions or only one dimension. Particularly when the information processing task places additional cognitive demands on the individual, one might expect to see differences in the strategies employed by individuals with differing levels of cognitive complexity.

The early work of Asch (1946) on impression formation has generated considerable research regarding primacy effects in information processing. Complexity theorists have related this work to cognitive complexity, and suggest that cognitively complex people are more likely to integrate discrepant or contradictory information than are less cognitively complex people, who tend to be more unidimensional in their information processing (Crockett, 1965; Streufert & Driver, 1967, Streufert & Swezey, 1986). Therefore, theory would predict that more cognitively
complex people would be less subject to primacy effects than would less cognitively complex people.

As Streufert and Swezey (1986) point out, early research on cognitive complexity considered only the cognitive orientation of the individual, without taking into account environmental and task demands (Bieri, 1961; Kelly, 1955; Zajonc, 1960). However, recent research has begun to investigate the interaction of cognitive complexity with environmental and task characteristics (Rotton, Olszewski, Charleton, and Soler, 1978; Streufert, 1978; Streufert, Streufert, & Denson, 1985). This research suggests that cognitively complex information processors tend to take more information into account and to form more integrated impressions of people than do less complex information processors. However, Streufert and Swezey (1986, p. 88) hypothesize that self-initiated information search is dependent on task demands, such that it should decrease as the task demand increases. Furthermore, the cognitive complexity of the information processor is predicted to interact with task demands, such that at low levels of information load, less cognitively complex people will search for more information than will cognitively complex people. Thus, at high levels of information load, it is predicted that cognitively complex people will search for more information than will less cognitively complex people. The rationale for these predictions is that less cognitively complex people are more dependent upon the information environment than are cognitively complex people. Thus, less complex people tend to gather more information when they have little information to begin with, but tend to gather less information when they are already overloaded. Cognitively
complex people, on the other hand, are more likely to rely on their own integrative abilities, and are less bound to the external information environment. In addition, cognitively complex people are more likely to gather unique or discrepant information, and to consider a greater number of information dimensions (Streufert and Swezey, 1986, p. 28).

Given the hypotheses discussed above regarding the interactive effects of cognitive complexity, primacy effects, and environmental demands, it is surprising that virtually no studies have used process tracing methods to evaluate the potential influence of these variables on an individual's information processing strategy (Ford, Schmitt, Schechtman, Hults, & Doherty, 1989). The main experiment is designed to test these variables directly, using the information board methodology. The pilot study showed that individuals under time pressure were more likely to employ noncompensatory strategies that eased the cognitive burden of the information processing task. Individuals under time pressure increased the rate of information processing, gathered less information, and demonstrated greater variability in the dimensions and applicants considered than did subjects not under time pressure. In addition, subjects under time pressure engaged in a significantly higher proportion of Type 4 (different applicant-different dimension) transitions and were more likely to "filter" out less important information than were subjects not under time pressure. The hypotheses discussed above suggest that people with greater cognitive complexity may gather more information while under time pressure than people with lesser cognitive complexity. However, cognitively complex individuals will gather less information when not
under time pressure than will less cognitively complex individuals. Furthermore, cognitively complex people should be more likely to consider contradictory information in the information display than should less cognitively complex people, and should be less influenced by prior impressions.

The main experiment operationalized cognitive complexity by having subjects complete the Impression Formation task. This task was originally developed by Asch (1946), and has been adapted by Schroder, Driver, and Streufert (1967). In this task, subjects are given a list of three adjectives (e.g., intelligent, industrious, and impulsive), and are asked to write a description of a person with these traits. Subjects are then given a second list of three adjectives (e.g., critical, stubborn, and envious), which are somewhat inconsistent with the first set, and are asked to write a description of a person with these traits. Finally, subjects are told to write a description of a person having all six of these traits (e.g., intelligent, industrious, impulsive, critical, stubborn, and envious). The responses are scored on a 7-point scale for the degree to which they differentiate and integrate the six adjectives. People who are cognitively complex tend to differentiate among the six adjectives and to integrate them into an overall impression of the individual that makes sense of the apparently contradictory adjectives. People who are less cognitively complex tend to overgeneralize their perception and to reduce conflict by creating an impression that is either all favorable or all unfavorable. The Impression Formation task is especially relevant to the main experiment, as it measures directly the ability to distinguish among different trait adjective
dimensions, and to integrate these dimensions into a meaningful impression of an individual.

**Cognitive Ability**

In addition to cognitive complexity, one would predict that the cognitive ability of the information processor could have an important influence on the processing strategy of the individual. Particularly when the information processing task places additional cognitive demands on the individual, one might expect to see differences in the strategies employed by individuals with differing cognitive abilities. It is surprising, therefore, that relatively few studies have investigated the potential influence of cognitive ability on an individual's information processing strategy (Ford, Schmitt, Schechtman, Hults, & Doherty, 1989).

One of the few studies to investigate cognitive ability and its influence on information processing strategies was performed by Klayman (1985). In this study, Klayman tested the memory capacity of sixth-grade children by reading them strings of letters and having them report how many of each letter they heard. The children were then asked to search four different information display boards in order to make a number of decisions. The results indicated that high capacity children engaged in more extensive searches when the task was relatively simple. In addition, when doing more complex tasks, high capacity children increased the depth of their search on dimensions that were important to them more than did children with a lower memory capacity. Therefore, the processing strategies of high capacity children were different from those strategies used by children with a lower memory capacity.
A second study to investigate the influence of cognitive ability on the selection of information processing strategies was performed by Capon & Davis (1984). This study also found that performance on cognitive tasks was related to the complexity of the information processing strategy chosen by subjects. Therefore, although there are relatively few studies in this area, there is some evidence that the cognitive ability of individuals can influence their selection of an information processing strategy.

The main experiment investigated the influence of cognitive ability on information processing, and more importantly the potential interaction of cognitive ability with time pressure, prior impressions, and cognitive complexity. Although limited, previous research on the effects of cognitive abilities on information processing suggests that people with greater cognitive ability may be better able to adapt optimally to the demands of complex decision tasks. Specific hypotheses regarding the interactive effects of cognitive ability are discussed in greater detail below.

The main experiment operationalized cognitive ability by using the combined SAT scores of the subjects. Although the subjects were students at a university with high admissions standards, it was expected that there would be sufficient diversity in subject SAT scores to allow any differences in cognitive ability to be manifested.

Prior Impressions

The results of the first study showed that prior impressions had an influence on the final ratings of the applicants, but surprisingly, there was no effect of prior impressions on the information gathering strategy of the subjects. As discussed above, one possible reason for these results is that in
the pilot study Prior Impressions was treated strictly as a within-group variable, and no control group was included. Thus, the main experiment included a control group which did not receive information regarding the impression dimension until after the information gathering phase. This allowed a comparison of the information processing strategies of subjects having prior impressions with the strategies of subjects having no prior impressions. In addition, this allowed a more thorough assessment of the influence of prior impressions on the final selection and on the final qualification ratings of the 14 applicants. This helped to ensure that any primacy affects that occurred were uniquely attributable to the presentation order of the impression information.

Another possible reason for the failure in the pilot study to find an effect of prior impressions on information gathering is that the dependent measures for information gathering in the first study were limited in scope, as they assessed only the amount of time spent, the proportion of questions asked, and the kinds of transitions that occurred for applicants with High, Medium, or Low prior impressions. It is possible that if given the opportunity, subjects would evidence a confirmatory bias by gathering information that is likely to be consistent with their prior impressions about the applicants. Alternatively, it is possible that subjects would prefer to gather information that is diagnostic regarding the decision task, regardless of prior impressions.

To better investigate the information gathering strategies of the subjects, several important changes were made in the main experiment. First, the nature of the task was changed from student admissions to the
selection of a dormitory resident associate. As the large majority of the subjects were students who have lived on campus at one time, and thus have had previous experience in selecting their dormitory resident associate, this information processing task was familiar to the subjects. The subjects were told that their task was to evaluate 14 applicants for the position of dormitory resident associate, and to choose the one applicant that would be best qualified to fill this position.

The prior impressions of the 14 applicants, as well as the six evaluative dimensions in the information display board, were based upon one of seven personality-trait adjectives. These personality-trait adjectives came from an extensively researched list of words compiled by Anderson (1968), and are described in greater detail below. Subjects thus received an impression regarding each of the 14 applicants, and also had the opportunity to gather information regarding six personality-trait adjectives in the information display board. Their task was to decide which of the 14 applicants was best qualified to serve as the dormitory resident associate.

Selection of the Personality-Trait Adjectives

As discussed above, the seven personality-trait adjectives that were used in the main experiment were taken from a comprehensive and well-researched list of words compiled by Anderson (1968). Beginning with approximately 18,000 trait-names, Anderson condensed the list to 555 personality traits through a series of eliminations, and then had subjects evaluate these 555 personality traits for likableness, variance, and meaningfulness. Likableness (hereafter referred to as favorability) was measured by having subjects rate each personality-trait adjective on a 7-
point scale, with 0 being defined as "least favorable or desirable", and 6 as "most favorable or desirable". Variance refers to the variance of the favorability ratings. Adjectives with a high variance indicate between-subject differences in the interpretation of the adjectives. For example, the adjectives discriminating ($\sigma^2 = 3.48$) and sensitive ($\sigma^2 = 2.00$) might be interpreted in two distinct ways. The meaningfulness ratings were obtained by having subjects rate the adjectives for meaningfulness, with 1 being defined as "I have almost no idea of the meaning of this word" and 4 as "I have a very clear and definite understanding of the meaning of this word".

There were four main phases in the selection of the seven trait adjectives to be used in the main experiment. In the first phase, only the adjectives with a favorability rating in the top or bottom 10% of the adjective list were considered. This was done in order to select trait adjectives with a high degree of favorability/unfavorability, and to equate these adjectives as closely as possible. In addition, only positive adjectives in the top 10% with a clear opposite in the bottom 10% were considered. For example, the trait adjective pair, trustworthy/untrustworthy was considered, while the trait adjective pair good-natured/malicious was eliminated, since the former pair of adjectives more clearly marks the endpoints of a specific dimension. The first phase reduced the list to a pool of 19 trait adjective pairs.

The second phase further reduced the pool of adjective pairs by considering only those adjectives with a variance $< 1$. This was done in order to reduce the possibility of alternative interpretations of the trait adjectives, and resulted in a pool of 16 trait adjective pairs.
The third phase eliminated all trait adjectives with a meaningfulness rating < 3.5 in order to select trait adjectives with a clear meaning to the subjects. This resulted in a pool of 14 adjective pairs.

Finally, the remaining adjective pairs were compared, and adjectives that described similar dimensions were eliminated. For example, the trait adjective pair, truthful/untruthful was eliminated, since it was partially redundant with the trait adjective pair, honest/dishonest. Where pair redundancy occurred, the trait adjective pairs with more extreme favorability ratings, with lower variance, and with higher meaningfulness were selected. This resulted in seven personality-trait adjective pairs: honest/dishonest, thoughtful/thoughtless, friendly/unfriendly, unselfish/selfish, humorous/humorless, responsible/irresponsible, and broad-minded/narrow-minded.

Prior Impressions Manipulation

These seven trait adjective pairs were randomized for each subject, such that the adjective which created the impression information regarding the 14 applicants varied among the subjects. Thus, one subject might have received impression information regarding the applicants' degree of honesty, while another subject might have received impression information regarding the applicants' degree of friendliness. This ensured that any evidence for a primacy effect was due to the sequence, rather than to the content, of the prior impressions. This is an important addition to previous research on prior impressions, since much of this research presents prior impressions to subjects on a fixed dimension, and consequently ignores the
possibility that any results might have been due to the nature of the information itself, rather than to the presentation order of the information.

In the pilot study, the prior impressions were manipulated to be High, Medium, or Low for the 15 student applicants. However, the information gathered from the information display board was dichotomous in nature, being either High or Low. To better equate the nature of the prior impressions with the information gathered from the information display board, the prior impressions were also dichotomous in nature, with seven applicants being depicted as having a High level of the adjective trait, and with seven applicants being depicted as having a Low level of the adjective trait. This helped to ensure that any effects of prior impressions would be due to the presentation order of the information, rather than to the trichotomous nature of the prior impressions.

In the main experiment, all subjects in the prior impression condition received prior impressions regarding a trait adjective with a high favorability rating (e.g., honesty, friendliness). Similarly, all subjects in the post impression condition (i.e., those subjects receiving the impression after the information search) received post impressions regarding a trait adjective with a high favorability rating. Thus, the prior or post impression given to subjects were controlled, such that it was always positive in nature.

**Measures of Confirmatory Bias**

To evaluate whether subjects search for information that corroborates their initial impressions, three of the remaining six trait adjectives in the information display had high favorability ratings, and the remaining three
trait adjectives had low favorability ratings. The order of these trait adjectives in the information display was randomly determined for each subject, as was the selection of which trait adjectives were positive, and which were negative. Thus, the six dimensional columns in the information display might be labelled, "honest, thoughtless, unfriendly, selfish, humorous, and broad-minded" for one subject, while the six columns might be labelled, "thoughtful, dishonest, humorless, responsible, friendly, and narrow-minded" for another subject. The division of the six trait adjective pairs into three positive and three negative dimensions thus provided for an investigation of whether subjects would search for information that was consistent with their positive/negative prior impressions about the 14 applicants.

Information Display

As with the pilot study, answers in the information display were randomly generated, so that there was an equal chance that an answer would be positive or negative. The subjects were told that the 14 applicants previously took six tests, each of which measured a particular trait adjective. When subjects clicked on a cell in the information display, a box appeared with the words "Yes" or "No", referring to whether or not the test assessed the particular applicant to have the particular trait. As with the pilot study, the advantage of generating random answers is that it allowed a determination of the unique influence of prior impressions on the final ratings of the 14 applicants.
Diagnosticity of the Information Search

In addition to evaluating the tendency to search for information that is consistent with prior impressions, the main experiment investigated the subjects' preference for diagnostic information. As discussed above, there has been mixed evidence regarding whether people demonstrate a confirmatory bias as a result of prior impressions. An alternative explanation has been offered to account for the information-gathering strategies people use to test their hypotheses. This explanation claims that rather than being biased processors of information, people test their hypotheses with diagnostic strategies that maximize the probability of drawing correct conclusions. In this diagnostic strategy, people thus prefer information that is unique, valid, and pertinent to the decision task.

As with the confirmatory view of information processing, the diagnostic view has found support in social psychology. For example, Kelley's (1967) attributional theory posits that people will make internal attributions to behavior only when the behavior is unique to the cause, i.e., people require diagnostic information in order to attribute internal causes to an individual's behavior. Much research has demonstrated that people are sensitive to many factors affecting the diagnosticity of information, including roles (Jones, Davis, & Gergen, 1961), statuses (Thibaut & Riecken, 1955), freedom of choice (Steiner, 1970; Trope & Burnstein, 1977), and cognitive context and epistemic motivations (Krulanski & Mayseless, 1988). Bayesian analyses of hypothesis testing imply that people think probabilistically about their hypotheses and gather information which will allow them to determine the likelihood of their original hypotheses.
(Ajzen & Fishbein, 1975). Thus, there appears to be some evidence that people prefer diagnostic information when testing hypotheses.

Trope and Bassok have conducted several studies to determine whether people use confirmatory or diagnostic information gathering strategies. In the first of these studies, Trope and Bassok (1982) asked subjects to analyze handwriting samples on the extent to which they typified either analytic or intuitive individuals. They were asked to indicate the extent to which they would like additional information on eight different handwriting features which would allow them to test either the analytic or the intuitive hypothesis about the target individual. Trope and Bassok found that subjects preferred to gather information which maximally discriminated between the two hypotheses. There was little evidence that subjects preferred to seek for information which confirmed rather than disconfirmed the original hypothesis. In a study that investigated diagnosticity in the employment interview, Trope, Bassok, and Alon (1984) asked subjects to generate questions for an interviewee which would test either the hypothesis that the interviewee was an extrovert or the hypothesis that s(he) was an introvert. A third group of subjects was not provided with an original hypothesis, but was asked to determine whether the interviewee was extroverted or introverted. Trope, Bassok, and Alon found that among those subjects who were provided with an original hypothesis, the percentage of questions which confirmed the original hypothesis was no greater than the percentage of questions which disconfirmed the original hypothesis. They also found that these subjects were as diagnostic in their information gathering strategies as were the
subjects not provided with an original hypothesis. Both of these studies provide support for the theory that people prefer diagnostic information gathering strategies to confirmatory strategies.

Thus, evidence has been found for the confirmatory strategy in some situations, and for the diagnostic strategy in others. The question of when people might be expected to prefer one strategy to the other remains largely unanswered. The main experiment was designed to help answer this question.

The main experiment included the operationalization of diagnosticity that was used by Trope and Bassok (1982, Trope, Bassok & Alon, 1984) in their line of research. As Trope and Bassok explain, people search their cognitive schemas for information that is unique either to the original hypothesis or to its alternative. This unique information allows the information processor to determine which hypothesis is most representative of the target individual. For example, when testing the hypothesis that a target is an extrovert, the information processor might ask whether the target enjoys being with other people, as well as whether the target is a quiet individual. The first question tests the extrovert hypothesis, while the second tests the alternative hypothesis that the target is an introvert. However, both questions provide information which is unique to one hypothesis and which, if supportive of one hypothesis, would make less probable the alternative hypothesis. Therefore, the questions are equally diagnostic. A person using a diagnostic strategy would not ask questions which are nonorthogonal, i.e., which might be answered the same way under both hypotheses. For example, the person would not ask whether the
target is energetic or optimistic, since these questions do not distinguish between the two hypotheses. Thus, Trope and Bassok define diagnosticity by investigating whether information is sought which allows the information processor to distinguish between alternative hypotheses regarding the target individual.

This definition of diagnosticity was incorporated into the current research in the following way. First, the experiment assessed whether subjects accessed dimensions that they felt were most predictive of performance as a dormitory resident associate. According to Trope and Bassok, subjects should have a greater proportion of accesses for dimensions that are most predictive of performance, regardless of the presence of prior impressions or time pressure. In addition, dimensional accesses should not depend upon the valence of the dimensions. As discussed above, three of the dimensions were labelled positively (e.g., honest, humorous, broad-minded), and the remaining three dimensions were labelled negatively (e.g., thoughtless, unfriendly, selfish) in the information display. According to Trope and Bassok’s definition of diagnosticity, subjects should show no preference for positive vs. negative dimensions. This is because both positive and negative dimensions provide information which is unique to one hypothesis and which, if supportive of one hypothesis, would make less probable the alternative hypothesis. For example, if the subject believes that honesty is an important predictor of performance as a dormitory resident associate, the subject should be as likely to access this dimension when it is labelled positively (i.e., “Honesty”) as when it is labelled negatively (i.e., “Dishonesty”). Thus, the
present research was designed to assess diagnosticity as traditionally defined by Trope and Bassok.

In addition, the main experiment measured the diagnosticity of the information search by assessing whether subjects preferred to gather information which was more likely to be accurate. It was hypothesized that more diagnostic subjects should prefer to gather information which is more likely to be accurate, while less diagnostic subjects should be less concerned with information accuracy. The experiment provided this additional operationalization of diagnosticity by telling subjects that the information regarding the six trait adjectives in the information display board came from the results of six tests taken by the 14 applicants, each test measuring one of the six trait adjectives. They were told that the six tests differ in their ability to correctly determine whether or not people have the particular trait that the test measures. Two of the six tests are 80% or more accurate in determining whether or not people have the particular trait that the test measures. Two more of the six tests are only 50% or more accurate in determining whether or not people have the particular trait that the test measures. Finally, the remaining two tests are only 20% or more accurate in determining whether or not people have the particular trait that the test measures. Therefore, subjects were told that the six tests differ in their ability to give accurate information regarding whether or not people have the particular trait that is measured by the test. Thus, the present research provided an additional operationalization of diagnosticity by assessing whether subjects preferred to gather information from sources which were more likely to be accurate.
The trait dimension that was randomly selected to create the prior (or post) impressions of the applicants was always depicted as being measured by a test that is 80% or more accurate. This is in harmony with previous research on prior impressions, which typically assumes that subjects believe the prior impression to be both valid and diagnostic. The remaining trait dimensions were randomly assigned in the information display, such that two of the dimensions were “80%” or more accurate, two were “50%” or more accurate, and the remaining two were “20%” or more accurate. Thus, it was possible to assess whether subjects asked a greater proportion of questions regarding the trait adjective dimensions that were more accurate.

Type 1 Transitions

The pilot study distinguished among four possible transition types during the information search, as reported by Jacoby et. al (1987). It will be recalled that Type 1 transitions refer to reaccesses of the same cell in the information display. To better understand the nature of the transitions occurring during the information search, the main experiment distinguished between two categories of Type 1 transitions. The first category (Type 1a) measured immediate reaccesses of the same cell, while the second category (Type 1b) measured subsequent reaccesses of the same cell.

Strategies for Resolving Contradictory Information

Schneider, Hastorf, and Ellsworth (1979) discuss two possible explanations for the robust finding that prior information is often weighted more heavily than subsequent information in reaching a decision. One
possible explanation is the *attention decrement hypothesis*, which posits that people become weary during the presentation of information, and thus pay less attention to subsequent information. An alternative explanation is the *discounting hypothesis*, which says that later information is discounted *because* it is inconsistent with prior information. This study will assess these two possibilities in the following ways. The attention decrement hypothesis was tested by comparing prior and post impression groups regarding the mean time spent evaluating the information contained in the information display. The attention decrement hypothesis would predict that subjects having prior impressions would spend less mean time evaluating applicant information during the subsequent information search than would subjects having no prior impressions. In addition, the total amount of time spent during the information search should be less for subjects having prior impressions. The discounting hypothesis was tested by assessing whether subjects sought more information that was consistent with prior impressions than information which was inconsistent. The discounting hypothesis suggests that subjects would ask more questions regarding the three positive trait adjective dimensions for people about whom they have a positive initial impression, and that subjects would ask more questions regarding the three negative trait adjective dimensions for people about whom they have a negative initial impression.

**Judgment vs. Choice Response Mode**

In the pilot study, subjects were told that their task was to evaluate the 15 student applicants, and to make a final rating for each applicant regarding the applicant's qualification to do well at the subjects' university.
The response mode in this study was therefore a *judgment* mode, where the task was to evaluate each alternative. However, recent research by Billings and Scherer (1988) suggests that a *choice* mode might be more effective in allowing subjects to choose a noncompensatory information gathering strategy, if they desire to do so. Instead of rating all the alternatives, a choice response mode requires that subjects select one alternative and reject the rest. Billings and Scherer found that subjects using a choice response mode demonstrated a greater tendency to use noncompensatory information gathering strategies. As compared to subjects using a judgment response mode, the choice response mode subjects gathered less information, demonstrated greater variability during the information search, and engaged in less interdimensional search. Billings and Scherer hypothesized that using a choice response mode will more accurately distinguish between the information gathering strategies of people under time pressure vs. people not under time pressure. This is because under high time pressure, choice would encourage noncompensatory behavior, while judgment would constrain people to use compensatory behavior in gathering information. While the pilot study did find strong evidence for noncompensatory behavior in subjects under time pressure as compared to subjects not under time pressure, the evidence provided by Billings and Scherer suggests that even more marked differences might arise if people are given a choice response mode during the information search. In addition, giving subjects a choice response mode might better distinguish between the information gathering strategies of people high in cognitive complexity vs. people who are low in cognitive complexity, and between
the information gathering strategies of people with prior impressions about the target individuals vs. people with no prior impressions. Therefore, the main experiment emphasized a choice response mode in the following way. Subjects were told that a group of judges previously reviewed the test scores of the 14 applicants regarding the seven trait adjectives, and selected the person that they judged to be best qualified to serve as the dormitory resident associate. The task of the subjects was to gather information regarding the trait adjectives for the 14 applicants, and to select the one person who was judged to be best qualified by the group of judges. Although subjects were also asked to rate each of the 14 applicants on a 7-point scale regarding their qualification to serve as the dormitory resident associate, they were told that their primary task was to select the best qualified applicant.

Cost of Information Search

Much of the previous research on information processing allows subjects to freely gather information without incorporating the idea of cost for the information search. However, the more common situation is that people tend to gather only a portion of the total pool of available information in order to reach decisions. Situational constraints, cognitive demands, etc., all contribute to the tendency to "satisfice", rather than to exhaustively search the information domain before reaching a decision. To better simulate this reality, the main experiment incorporated a cost for information gathering in the following way. Subjects were told that a prize of $25 would be awarded to the person who correctly selected the applicant who was selected by the group of judges as the best qualified to serve as the
dormitory resident associate. In the case where more than one subject correctly chooses the best qualified applicant, a random drawing would be held for these subjects. In reality, because the group of judges is hypothetical, the prize was given to the subject who had the highest joint correlation between prior impression information and information gathered and the selection of the best qualified applicant.

The information display contained 84 information cells (14 applicants x 6 trait adjective dimensions). Subjects were told that they could have up to 30 accesses from the information display board without penalty, but every cell accessed beyond that point would incur a $.50 penalty to be deducted from the grand prize. Thus, subjects with more than 30 accesses would win less than $25 even if they correctly select the best qualified applicant, and subjects with more than 80 accesses would win nothing. This methodology thus motivated subjects to take the information gathering task seriously, while incorporating a cost for information gathered. In addition, it reinforced the "choice" mindset of the subjects by rewarding subjects for choosing the best qualified applicant.

Based upon the research and methodology discussed above, the following additional hypotheses were tested in the main experiment:

**Hypothesis 1:** Subjects under time pressure will be more likely to gather information that is consistent with their prior impressions about the 14 applicants than will subjects not under time pressure.

**Hypothesis 2:** Subjects with greater cognitive complexity will be less likely to demonstrate the confirmatory bias discussed in Hypothesis 1 than will subjects with lesser cognitive complexity. This prediction is consistent
with the general hypothesis that people with greater cognitive complexity are more likely to integrate contradictory information into a meaningful impression than are people with less cognitive complexity. Thus, subjects with greater cognitive complexity are expected to be better able than subjects with lesser cognitive complexity to avoid confirmatory bias and treat the information gathered from the information display board as a unique and independent source of information about the qualifications of the applicants.

**Hypothesis 3:** Subjects with greater cognitive complexity will gather more information while under time pressure than will subjects with lesser cognitive complexity. However, cognitively complex subjects will gather less information than less cognitively complex subjects when there is no time constraint.

**Hypothesis 4:** Subjects with greater cognitive complexity will gather a greater proportion of diagnostic information than will subjects with lesser cognitive complexity.

**Hypothesis 5:** The effect discussed in Hypothesis 4 will be greater for subjects under time pressure than for subjects not under time pressure. Thus, it is predicted that subjects with greater cognitive complexity will be better able to adapt to the more complex cognitive demands imposed by the presence of time pressure by focusing on the most diagnostic information.

**Hypothesis 6:** Subjects with greater cognitive complexity will demonstrate less variability in the applicants considered than will subjects with lesser cognitive complexity. Thus, cognitively complex subjects will be more likely to ask an equal number of questions for each applicant,
while less cognitively complex subjects will be more likely to focus their information search on applicants about whom they have a positive initial impression.

**Hypothesis 7:** Subjects with greater cognitive ability who are under time pressure will be more likely to focus on a subset of the most important information, thus "filtering" out less important information during the information search than will subjects with lesser cognitive ability who are under time pressure. Thus, subjects with greater cognitive ability are expected to have a greater ability to optimally adapt their processing strategy by focusing their information search on the information that they judge to be most important.

**Hypothesis 8:** Subjects with greater cognitive ability who are under time pressure will demonstrate greater variability in the dimensions and applicants considered than will subjects with lesser cognitive ability who are under time pressure. Klayman (1985) did not find an effect of cognitive ability on the variability of the information search. However, the hypothesis that people with greater cognitive ability are better able to optimally adapt their processing strategy to meet various task demands would suggest that subjects with greater cognitive ability who are under time pressure will be more likely to selectively focus their information search on particular dimensions and applicants, thus demonstrating greater variability in the dimensions and applicants considered, than will subjects with lesser cognitive ability who are under time pressure.

**Hypothesis 9:** Subjects with greater cognitive ability who are under time pressure will engage in fewer Type 4 transitions than will subjects
with lesser cognitive ability who are under time pressure. It is expected that subjects with greater cognitive ability will be more systematic in their information search while under time pressure, and thus will be less likely than subjects with lesser cognitive ability to engage in the unsystematic processing approach that is suggested by a higher proportion of Type 4 (different applicant-different dimension) transitions.

**Hypothesis 10:** Subjects with greater cognitive ability who are not under time pressure will gather more information and spend more time during the information search than will subjects with lesser cognitive ability who are not under time pressure. This prediction is consistent with the hypothesis that people with greater cognitive ability are better able than people with lesser cognitive ability to consider the task and environmental demands and choose an information processing strategy that optimizes the information search accordingly. When there is little cost for obtaining information, the optimal strategy would be to gather as much information as possible in reaching a decision regarding the qualifications of the applicants. Therefore, it is predicted that subjects with greater cognitive ability who are not under time pressure will be more likely to gather more information regarding the applicants and spend more time processing the information than will subjects with lesser cognitive ability who are not under time pressure.

In a review of the research on process tracing methods, Ford, et. al (1989, pp. 102-103) discussed the relative paucity of research regarding the effects of individual differences on information processing strategies. The main experiment was designed to provide an important addition to
research in this area by measuring the effects of cognitive complexity and cognitive ability on information processing. In addition, this study included several important changes to the methodology used in the pilot study, which allowed a more comprehensive examination of the interactive effects of prior impressions, time pressure, cognitive complexity, and cognitive ability on the information gathering process.

**Method**

**Subjects and Experimental Design**

As in the pilot study, subjects in the main experiment were undergraduate students participating for course credit. A total of 80 subjects participated in the main experiment. Thirty-nine of the subjects were under time pressure during the information search. These subjects were given 12 minutes to gather information from the information display board. The remaining 41 subjects were not under time pressure. These subjects were given as much time as they desired to gather information from the information display board. In addition, 41 subjects received prior impressions on the 14 applicants regarding one of the seven trait adjective dimensions. The remaining 39 subjects received similar impressions, but not until after completing their information search. The main experiment thus included two between subject factors: Time Pressure (High vs. Low) and Impression Order (Pre vs. Post). In addition, the main experiment included four within subject factors: Applicant Impression (Positive vs. Negative), Dimension Type (Impression Dimension vs. Information Display Dimension), Dimension Valence (Positive vs. Negative), and Dimension Diagnosticity (80%, 50% or 20%). Also,
Cognitive Complexity and Cognitive Ability were included as individual difference variables.

Procedure

Subjects attended two different experimental sessions. In the first session, subjects were asked to complete the Impression Formation task discussed above. After completing this task, they were asked to report their SAT scores. This session took about 1/2 hour. Subjects were then dismissed and approximately one week later returned to participate in the main experimental session. The one week interim was included in order to disassociate the Impression Formation task from the information processing task performed in the second experimental session. The procedure for the second experimental session was identical to that of the pilot study, with the modifications noted in the discussion above. One exception is that subjects under time pressure were run in separate experimental sessions from subjects not under time pressure. This was done in order to reduce the possibility that subjects under time pressure would finish their processing task sooner and thus influence the remaining subjects who were not under time pressure. Prior and Post impression subjects were included in all experimental sessions. The second experimental session took approximately 1 hour.

Results

Manipulation Check

To evaluate the effectiveness of the Time Pressure manipulation, subjects were asked to complete a 7-point scale assessing their perceived time pressure during the experiment. As expected, subjects under time
pressure reported significantly greater perceived time pressure ($M = 5.28$) than did subjects not under time pressure ($M = 2.95$), $t(77.9) = -6.73$, $p < .0012$.

**Measurement of Cognitive Complexity and Cognitive Ability**

It will be recalled that the cognitive complexity of the subjects was measured by having them complete the Impression Formation test developed by Schroder, Driver, and Streufert (1967). The cognitive ability of the subjects was measured by using their combined SAT scores. The mean cognitive complexity score for the subjects was 3.57 (on a 7-point scale), and the standard deviation was 1.17. The mean cognitive ability (combined SAT) score for the subjects was 1350.91, and the standard deviation was 114.62. Thus, subjects were above average in cognitive ability, but there was sufficient variance in the cognitive ability scores to include the variable in the analyses. The results showed that the correlation between these two variables was significant ($r = .293$), $X^2(1, N = 72) = 6.22, p = .01$. Thus, while the variance accounted for was relatively small (8.6%), it is interesting to note that more intelligent individuals also tended to be more cognitively complex.

**Tests of the Hypotheses: Information Gathering Process**

It will be recalled that several process variables were measured to assess the effects of Time Pressure, Impression Order, Cognitive Complexity, and Cognitive Ability on the information gathering process of the subjects. The analyses of these variables are presented below.

**Time:** As expected, subjects under Time Pressure spent significantly less time ($M = 12.28$ minutes) gathering information about the 14
applicants than did subjects not under Time Pressure ($M = 22.19$ minutes), $t(40.7) = 11.05, \ p < .001$. In addition, subjects under Time Pressure spent less time on the average ($M = 7.41$ seconds) evaluating each item of applicant information than did subjects not under Time Pressure ($M = 11.02$ seconds), $t(72) = 4.03, \ p < .001$. These findings confirm the pilot study results, showing that one noncompensatory strategy employed by people under time pressure is to accelerate the rate of information processing.

There was not a significant difference in total information gathering time between subjects who received impressions about the applicants prior to gathering the information ($M = 17.77$ minutes) and subjects receiving impressions after gathering the information ($M = 16.93$ minutes). However, subjects receiving impressions about the applicants prior to gathering information spent a significantly greater time evaluating each item of information about the applicants ($M = 10.23$ seconds) than did subjects receiving impressions after gathering the information ($M = 8.24$ seconds), $t(73.8) = 2.08, \ p = .04$. During the information gathering process, the two major activities included (1) deciding which information to ask of which applicants, and (2) gathering this information and evaluating it. The results discussed above suggest that receiving Prior impressions about the applicants caused subjects to spend less time weighing the merits of various questions and more time evaluating the information gathered, relative to subjects who had no Prior impressions about the applicants. Although subjects in both groups spent an approximately equal amount of time during the information gathering process, the allotment of time to the
activities performed during this process appears to have been different for the two groups. The evidence suggests a possible bias created by receiving Prior impressions about the applicants, where subjects receiving these impressions spent less time evaluating the merits of various information dimensions and more time evaluating the information gathered. Further implications of these findings are presented in the discussion section below.

**Elimination of Applicants:** Although there was not a significant difference in the pilot study, it was predicted that subjects under Time Pressure would eliminate more applicants from consideration than would subjects not under Time Pressure. However, the results showed that just the opposite occurred: subjects under Time Pressure eliminated fewer applicants \( (M = 2.54) \) from consideration than did subjects not under Time Pressure \( (M = 5.02) \), \( t(68.6) = 2.78, p < .01 \). It will be recalled that in order to eliminate applicants from consideration, subjects were required to click in the “Elimination” box and wait a moment for the applicant to be eliminated from the information display. It is possible that because of time constraints, subjects under Time Pressure were less likely to take the time necessary to formally eliminate applicants from consideration, while subjects not under Time Pressure were free to eliminate applicants without concern for time. Thus, subjects under Time Pressure might have mentally eliminated applicants from consideration, without taking the time to do so in the information display. Subjects receiving Prior impressions \( (M = 5.55) \) about the applicants did not eliminate significantly more applicants from consideration than did subjects receiving Post impressions \( (M = 6.33) \) about the applicants.
In addition to measuring the number of applicants removed from consideration, the experiment assessed the proportion of time that passed before the first applicant was eliminated from consideration. As was found in the pilot study, subjects under Time Pressure ($M = .47$) did not differ significantly from subjects not under Time Pressure ($M = .50$) regarding the proportion of time passed before eliminating the first applicant. Similarly, subjects receiving Prior impressions ($M = .50$) about the applicants did not differ significantly from subjects receiving Post impressions ($M = .47$) regarding elimination time. It is interesting to note that subjects in all conditions waited, on the average, until approximately the midpoint of the information gathering process before starting to eliminate applicants from consideration. It was predicted that subjects with greater Cognitive Complexity would take longer to evaluate the strengths and weaknesses of various applicants before eliminating them from consideration, while subjects with lesser Cognitive Complexity would eliminate applicants sooner. As predicted, the correlation between Cognitive Complexity and Elimination Time ($r = .29$) was significant, $F(1,45) = 4.25$, $p = .05$. The tendency of less cognitively complex subjects to eliminate applicants from consideration sooner may indicate a desire to seek quick closure and to avoid evaluating contradictory information.

**Search Process:** It will be recalled that the search process of subjects was measured by assessing the proportion of Type 1a, Type 1b, Type 2, Type 3, and Type 4 transitions performed during the information search. The overall means for these search variables are presented in Table 7.
As discussed above, Type 1a transitions refer to immediate reaccesses of the same cell in the information display. Interestingly, the results showed a significant relationship between cognitive ability and Type 1a transitions \( r = -.27 \), \( F(1,75) = 5.68, p = .02 \). Subjects with lesser cognitive ability were more likely to immediately reaccess information than were subjects with greater cognitive ability. This finding suggests that an information processor's cognitive ability can influence the efficiency of that processor's information gathering strategy. There was not a significant difference between Time Pressure or Impression Order groups regarding the proportion of Type 1a transitions that occurred, nor was there an effect for Cognitive Complexity.

Type 1b transitions refer to subsequent accesses of previously accessed cells in the information display. There were no main effects on Type 1b transitions during the information search. An analysis of Total Reaccesses (Type 1a + Type 1b transitions) revealed a significant main effect for Impression Order. Subjects receiving Prior impressions about the applicants had significantly more reaccesses \( (M = .04) \) than did subjects receiving Post impressions about the applicants \( (M = .02) \), \( t(72.4) = 2.26, p = .03 \). Although the proportion of reaccesses was relatively low for both groups, the Prior impressions group engaged in twice as many reaccesses relative to the Post impressions group. Recall that subjects in the Prior impressions group also spent a significantly greater proportion of time evaluating applicant information than did subjects in the Post impressions group. This finding, in conjunction with the finding that subjects with
Table 7
Main Experiment
Means of Transition Type Proportions by Group Membership

<table>
<thead>
<tr>
<th>Group</th>
<th>Type 1a Mean</th>
<th>Type 1b Mean</th>
<th>Total Reacc. Mean</th>
<th>Type 2 Mean</th>
<th>Type 3 Mean</th>
<th>Type 4 Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Pressure</td>
<td>.011</td>
<td>.022</td>
<td>.033</td>
<td>.167</td>
<td>.682</td>
<td>.233</td>
</tr>
<tr>
<td>No Time Pressure</td>
<td>.009</td>
<td>.021</td>
<td>.029</td>
<td>.142</td>
<td>.692</td>
<td>.249</td>
</tr>
<tr>
<td>Prior Impressions</td>
<td>.013</td>
<td>.029</td>
<td>.042</td>
<td>.155</td>
<td>.643</td>
<td>.265</td>
</tr>
<tr>
<td>Post Impressions</td>
<td>.007</td>
<td>.013</td>
<td>.020</td>
<td>.153</td>
<td>.733</td>
<td>.217</td>
</tr>
</tbody>
</table>
Prior impressions engaged in a significantly greater proportion of reaccesses, suggests that having prior impressions about the applicants might have encouraged a confirmatory bias in these subjects. This possibility is investigated further below. There was not a significant difference between Time Pressure conditions regarding the proportion of reaccesses that occurred, nor was there an effect for cognitive complexity or cognitive ability.

Recall that Type 2 transitions refer to intra-applicant search strategies. The results showed a significant interaction between Time Pressure and Cognitive Complexity regarding the proportion of Type 2 transitions that occurred, \( F(1, 68) = 4.87, p = .03 \). This interaction is presented in Figure 2.

A subsequent investigation of simple effects revealed a positive correlation (\( r = .27 \)) between Cognitive Complexity and Type 2 transitions for subjects under Time Pressure. However, for subjects not under Time Pressure, the correlation between Cognitive Complexity and Type 2 transitions was negative (\( r = -.25 \)). Although neither of these correlations was significant taken alone, the significant interaction suggests that when under time pressure, subjects with greater cognitive complexity were more likely to focus on specific applicants than were subjects with lesser cognitive complexity. However, when not under time pressure, cognitively complex subjects were less likely to focus on specific applicants than were less cognitively complex subjects. These results provide support for the hypothesis that an individual's processing strategy can depend upon both individual and task demands. There was not a significant difference
Figure 2  Time Pressure x Cognitive Complexity interaction, with Proportion of Type 2 transitions as the dependent measure.
between Prior and Post impression subjects regarding the proportion of Type 2 transitions, nor was there an effect for Cognitive Ability.

Type 3 transitions refer to intra-dimensional search strategies. Thus, these transitions differ from Type 2 transitions by focusing on the available evaluative dimensions and using these dimensions to guide information gathering. There were no significant differences among the treatment groups (Time Pressure or Impression Order) regarding the proportion of Type 3 transitions that occurred, nor was there an effect for Cognitive Complexity or Cognitive Ability. As shown in Table 7, subjects engaged in .687 Type 3 transitions on the average.

Type 4 transitions refer to movement in the information display from a particular applicant and evaluative dimension to a different applicant and evaluative dimension. Thus, Type 4 transitions are less systematic and may reflect a noncompensatory processing strategy. It will be recalled that the pilot study results showed that subjects under Time Pressure engaged in significantly more Type 4 transitions than did subjects not under Time Pressure. However, this result was not replicated in the main experiment. A possible explanation for this finding is presented in the discussion section below. There was not an effect of Prior impressions, Cognitive Complexity, or Cognitive Ability on the proportion of Type 4 transitions that occurred. As shown in Table 7, subjects engaged in .241 Type 4 transitions on the average.

**Dimensional Importance:** It will be recalled that after completing the information search, subjects were asked to rate on a 7-point scale the importance of each dimension to them in determining the final ratings of
the applicants. In the pilot study, it was found that subjects under Time Pressure demonstrated a noncompensatory information processing strategy by focusing their information search on the information that they considered to be most important. Subjects not under Time Pressure were less likely to do this, instead asking a greater proportion of questions on dimensions they considered to be less important. However, in the main experiment, subjects under Time Pressure were no more likely than subjects not under Time Pressure to focus their questions on the dimensions most important to them. Similarly, there were no effects of Impression Order, Cognitive Complexity, or Cognitive Ability on the correlation between Dimensional Importance and Proportion of Dimensional Accesses. The mean correlation between Dimensional Importance and Proportion of Dimensional Accesses was .682. Thus, a fairly large percentage of the variance (46.5%) in dimensional accesses was accounted for by the importance of the dimensions to the subjects in evaluating the 14 applicants.

The next question of interest is whether dimensional importance was itself influenced by the experimental manipulations. In this analysis, Dimension Type is a within subjects variable having two levels: Impression Dimension vs. Information Display Dimension. The results showed that the Impression Order x Dimension Type interaction was significant, $F(1,78) = 13.76$, $p < .001$. This interaction is presented in Figure 3.

Subjects who received Prior impressions rated the impression dimension to be significantly more important in evaluating the applicants ($M = 5.98$) than the mean importance of the information display
Figure 3. Impression Order x Dimension Type, with Importance of Dimension as the dependent measure.
dimensions ($M = 4.50$), $F(1, 40) = 48.71$, $p < .001$. However, subjects who
received Post impressions did not significantly differ in their importance
rating of the impression dimension ($M = 4.78$), compared with their mean
importance rating of the information display dimensions ($M = 4.67$).

These results suggest a strong information processing bias whereby a
particular dimension is judged to be more important to the decision when
information on this dimension is received prior to information gathering.
However, when information on this dimension is received after the
information gathering process, this dimension is judged to be no more
important than the dimensions evaluated during the information search.

**Number of Accesses:** As was found in the pilot study, subjects under
Time Pressure accessed fewer items of information ($M = 25.4$) than did
subjects not under Time Pressure ($M = 32.7$), $t(77.8) = 4.71$, $p < .001$.
Recall that in the main experiment, a “cost mechanism” was incorporated,
whereby subjects were told that a penalty would be assessed when more
than 30 cells were accessed in the information display. This was done to
better simulate the reality that people often have situational constraints,
cognitive demands, etc., which encourage “satisficing”, rather than
exhaustively searching the information domain before reaching a decision.
It is noteworthy that in the pilot study, which did not include a cost for
information gathering, subjects not under Time Pressure searched the
information board exhaustively, accessing on the average 96.5/90 (107.2%) of
the information display. Subjects under Time Pressure accessed on the
average 50.3/90 (55.9%) of the information display. However, in the main
experiment, subjects not under Time Pressure accessed on the average only
32.7/84 (38.9%) of the information board, while subjects under Time Pressure accessed on the average 25.4/84 (30.2%) of the information board. These results suggest that including a cost for information gathering influences the amount of information search. In addition, it is significant that subjects not under Time Pressure still gathered more information than did subjects under Time Pressure, even when doing so incurred a penalty.

The results also showed that subjects having Prior impressions about the 14 applicants gathered significantly less information ($M = 27.0$) than did subjects with no Prior impressions ($M = 31.4$), $t(75.6) = -2.63$, $p = .01$. Thus, it appears that subjects with Prior impressions tended to rely upon those impressions to a greater degree and were less likely to draw upon the information available in the information board. This is consistent with the effects of Prior impressions discussed above, suggesting that having prior impressions about an information domain can significantly influence the subsequent information gathering process in order to reach a decision regarding that domain. This effect of Prior impressions on information gathering is discussed in further detail below.

Interestingly, there was a significant correlation between Cognitive Ability and the amount of information search ($r = .24$), $F(1, 75) = 4.68$, $p = .03$. Therefore, subjects with greater cognitive ability gathered more information about the 14 applicants than did subjects with lesser cognitive ability. This is an important individual difference finding, suggesting that cognitive ability can influence the way people gather information in order to reach a decision.
Confirmatory Bias: It will be recalled that three of the dimensions in the information display were worded positively while three dimensions were worded negatively. The selection of the dimensions was randomized for each subject, as was the selection of which trait adjectives were positive and which were negative. Thus, the six dimensions in the information display might be labelled, “friendly, selfish, humorless, irresponsible, broad-minded, and honest” for one subject and labelled “dishonest, thoughtful, unfriendly, humorous, unselfish, and narrow-minded” for another subject. This was done to assess the possibility that subjects would select positively phrased dimensions for applicants about whom they have a positive initial impression, and negatively phrased dimensions for applicants about whom they have a negative initial impression, thus demonstrating a confirmatory bias.

As predicted, the results showed a significant three-way interaction, predicting Proportion of Accesses from Dimension Valence (Positive vs. Negative) x Applicant Impression (Positive vs. Negative) x Impression Order (Prior vs. Post), $F(1, 78) = 6.75, p = .01$. The mean proportion of accesses by Impression Order are presented in Table 8.

For subjects who received Prior impressions about the applicants, the Dimension Valence x Applicant Impression interaction was significant, $F(1, 40) = 7.86, p<.01$. Subsequent simple effects analyses revealed that subjects with Prior impressions accessed significantly more positive than negative dimensions for applicants about whom they had positive initial impressions, $F(1, 40) = 6.02, p = .02$. In addition, subjects with Prior impressions accessed more negative than positive dimensions for applicants
Table 8
Main Experiment
Mean Proportion of Accesses
for Dimension Type and Applicant Impression
by Impression Order

<table>
<thead>
<tr>
<th>Impression Order</th>
<th>PDPI</th>
<th>PDNI</th>
<th>NDPI</th>
<th>NDNI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Impressions</td>
<td>.446</td>
<td>.136</td>
<td>.310</td>
<td>.151</td>
</tr>
<tr>
<td>Post Impressions</td>
<td>.277</td>
<td>.280</td>
<td>.231</td>
<td>.232</td>
</tr>
</tbody>
</table>

**Note.**
PDPI = Accesses of Positive Dimension for Positive Impression Applicants.
PDNI = Accesses of Positive Dimension for Negative Impression Applicants.
NDPI = Accesses of Negative Dimension for Positive Impression Applicants.
NDNI = Accesses of Negative Dimension for Negative Impression Applicants.
about whom they had *negative* initial impressions, although this difference was not statistically significant. Thus, subjects with Prior impressions demonstrated a bias to confirm their initial impressions about the applicants, particularly regarding applicants with positive initial impressions. However, for subjects with no prior impressions (Post subjects), the Dimension Valence x Applicant Impression interaction was not significant. In addition, there was no main effect of Dimension Valence or Applicant Impression for Post subjects. Therefore, these subjects did not ask a different proportion of questions regarding positive vs. negative dimensions, nor did they ask a different proportion of questions for positive vs. negative impression applicants.

These results provide evidence that initial impressions can bias subsequent information gathering, such that information processors may seek to confirm their initial impressions. Interestingly, Time Pressure and Cognitive Complexity did not interact significantly with the above process. Thus, regardless of whether subjects were under Time Pressure or not, and regardless of the Cognitive Complexity of the subjects, there was a general tendency for subjects with initial impressions to gather information consistent with those impressions, particularly regarding applicants with positive initial impressions.

**Diagnosticty:** In addition to evaluating the tendency to search for information consistent with prior impressions, this study investigated the subjects' preference for diagnostic information. It will be recalled that subjects were told that two of the evaluative dimensions were 80% or more accurate, two dimensions were 50% or more accurate, and the remaining
two dimensions were only 20% or more accurate, regarding the information contained under those dimensions. Thus, Dimension Diagnosticity was a within groups variable having three levels (80%, 50%, 20%). It was predicted that subjects with Prior Impressions would demonstrate an information processing bias by being differentially diagnostic for positive impression applicants than for negative impression applicants. In addition, this effect was predicted to be greater for subjects under Time Pressure, and for subjects with lesser Cognitive Complexity. Thus, regarding the proportion of accesses in the information display board, a five-way interaction was predicted: Impression Order (Pre vs. Post) x Time Pressure (High vs. Low) x Cognitive Complexity x Dimension Diagnosticity (80%, 50%, and 20%) x Applicant Impression (High vs. Low). The results showed that this interaction was significant, $F(2,66) = 3.28, p = .04$. The subsequent analyses and interpretation of this interaction are presented below. The mean proportion of accesses by Impression Order and Time Pressure are presented in Table 9.

For subjects having Prior impressions, the Time Pressure x Cognitive Complexity x Dimension Diagnosticity x Applicant Impression interaction was not significant. However, as predicted, the Time Pressure x Dimension Diagnosticity x Applicant Impression interaction was significant, $F(2, 38) = 4.35, p = .02$. For Prior impression subjects under Time Pressure, the Dimension Diagnosticity x Applicant Impression interaction was significant, $F(2, 18) = 4.84, p = .02$. A subsequent analysis of simple effects showed that Prior impression subjects under Time Pressure accessed significantly more 80% diagnostic dimensions for
Table 9
Main Experiment
Mean Proportion of Accesses
for Applicant Impression and Dimension Diagnosticity
by Impression Order and Time Pressure

<table>
<thead>
<tr>
<th>Group</th>
<th>P80</th>
<th>P50</th>
<th>P20</th>
<th>N80</th>
<th>N50</th>
<th>N20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior TP</td>
<td>.411</td>
<td>.256</td>
<td>.080</td>
<td>.216</td>
<td>.044</td>
<td>.031</td>
</tr>
<tr>
<td>Prior NTP</td>
<td>.431</td>
<td>.176</td>
<td>.142</td>
<td>.196</td>
<td>.068</td>
<td>.017</td>
</tr>
<tr>
<td>Post TP</td>
<td>.306</td>
<td>.113</td>
<td>.090</td>
<td>.277</td>
<td>.134</td>
<td>.095</td>
</tr>
<tr>
<td>Post NTP</td>
<td>.280</td>
<td>.168</td>
<td>.054</td>
<td>.285</td>
<td>.163</td>
<td>.066</td>
</tr>
</tbody>
</table>

Note.
P80 = Accesses of Positive, 80% Accurate Dimensions.
P50 = Accesses of Positive, 50% Accurate Dimensions.
P20 = Accesses of Positive, 20% Accurate Dimensions.
N80 = Accesses of Negative, 80% Accurate Dimensions.
N50 = Accesses of Negative, 50% Accurate Dimensions.
N20 = Accesses of Negative, 20% Accurate Dimensions.
positive impression applicants than for negative impression applicants, $F(1,19) = 8.42, p < .01$. Similarly, these subjects accessed significantly more 50% diagnostic dimensions for positive impression applicants than for negative impression applicants, $F(1,19) = 17.40, p < .01$. However, there was not a significant difference in accesses of the 20% diagnostic dimensions for positive vs. negative impression applicants. Therefore, subjects with Prior impressions who were under Time Pressure demonstrated an information processing bias by asking more diagnostic questions of positive impression applicants.

Unlike Prior impression subjects who were under Time Pressure, there was not a significant interaction between Applicant Impression and Dimension Diagnosticity for Prior impression subjects not under Time Pressure. Thus, these subjects did not demonstrate a diagnostic bias by asking more diagnostic questions of positive impression applicants. The results showed a significant main effect for Dimension Diagnosticity, $F(2, 19) = 18.57, p < .001$. The proportion of accesses for 80% Diagnostic dimensions was significantly greater ($M = .628$) than the proportion of accesses for 50% Diagnostic dimensions ($M = .244$), $F(1,20) = p < .001$. There was not a significant difference between the proportion of accesses for 50% Diagnostic dimensions ($M = .244$) and the proportion of accesses for 20% Diagnostic dimensions ($M = .159$). Thus, subjects with Prior impressions who were not under Time Pressure tended to prefer more diagnostic dimensions regardless of the prior impression of the applicants. However, there was also a significant main effect for Applicant Impression, whereby these subjects had a significantly greater proportion of accesses.
for positive impression applicants ($M = .907$) than for negative impression applicants ($M = .287$), $F(1,20) = 21.95$, $p < .001$. Therefore, although they did not demonstrate a diagnostic bias, these subjects nevertheless were influenced by prior impressions to focus their information search on applicants having positive initial impressions.

For all Prior impression subjects, there was a significant correlation between Cognitive Complexity and proportion of accesses ($r = .347$), $F(1,37) = 5.05$, $p = .03$. Thus, for Prior impression subjects, more cognitively complex subjects gathered significantly more information than did less complex subjects. This finding is consistent with previous theory on cognitive complexity, suggesting that less complex individuals may be more likely than cognitively complex individuals to rely upon initial impressions and avoid potentially discrepant information during the subsequent information search.

For subjects who received no Prior impressions (Post subjects), the Time Pressure x Cognitive Complexity x Dimension Diagnosticity x Applicant Impression interaction was not significant. Similarly, the seven composite interactions were all nonsignificant. As expected, there was not a significant main effect for Applicant Impression, since these subjects had no prior impressions to guide their information search. However, there was a main effect for Dimension Diagnosticity, $F(2, 37) = 25.93$, $p < .001$. Post impression subjects had significantly more 80% diagnostic accesses ($M = .574$) than 50% diagnostic accesses ($M = .290$), $F(1, 38) = 24.36$, $p < .001$. Also, Post impression subjects had significantly more 50% diagnostic accesses ($M = .290$) than 20% diagnostic accesses ($M = .151$), $F(1, 38) =
12.01, \( p < .01 \). Thus, subjects having no Prior impressions preferred to access diagnostic dimensions during the information search. This was true for subjects under Time Pressure, as well as for subjects not under Time Pressure. Unlike the subjects having Prior impressions, these subjects did not show a significant correlation between Cognitive Complexity and Proportion of Accesses. Thus it appears that cognitive complexity alone does not encourage additional gathering of information. However, when prior impressions are present, more cognitively complex subjects tend to gather more information than less cognitively complex subjects. It is possible that this tendency of less cognitively complex subjects to gather less information is motivated by a need to avoid the potential discrepancies inherent in the additional information.

**Process Variance:** As discussed above, one measure of noncompensatory information processing is the variance of accesses across dimensions, and the variance of accesses across applicants. Greater variance indicates a noncompensatory strategy, since certain dimensions (or applicants) are given greater attention than other dimensions (or applicants) during the information search. The results of the pilot study showed that subjects under Time Pressure demonstrated greater variance in accesses across both dimensions and applicants than did subjects not under Time Pressure. The results of the main experiment support this conclusion, as subjects under Time Pressure demonstrated greater variance in the proportion of accesses for the six evaluative dimensions (\( M = .034 \)) than did subjects not under Time Pressure (\( M = .026 \)), \( t(77.4) = 2.07, p = .04 \). Thus, subjects under Time Pressure demonstrated a noncompensatory
processing strategy by focusing the information search on specific dimensions, while subjects not under Time Pressure were more likely to have an equal proportion of accesses for all six dimensions. Unlike the pilot study, the main experiment did not find an effect of Time Pressure on the variance in the proportion of accesses across applicants. However, the main experiment did find a significant effect of Impression Order on the variance in the proportion of accesses across applicants, where subjects having Prior impressions demonstrated greater variance ($M = .004$) in applicant accesses than did subjects having no Prior impressions ($M = .003$), $t(78) = 2.80, p < .01$. Thus, having an initial impression regarding the 14 applicants encouraged subjects to employ a more noncompensatory processing strategy, whereby they focused the information search on specific applicants. This finding is consistent with the findings discussed above that demonstrate a disposition among subjects with Prior impressions to treat positive impression applicants differently from negative impression applicants during the information gathering process. In addition, the results showed an effect of Impression Order on the variance in the proportion of accesses across dimensions, whereby subjects having Prior impressions had significantly less variance across dimensions ($M = 19.12$) than did subjects having no Prior impressions ($M = 25.03$), $t(77.9) = -2.26, p = .03$. Again, this is consistent with the findings discussed above that subjects having Prior impressions tended to gather information consistent with these impressions, thus causing them to access a variety of dimensions, depending upon the initial impression of the applicant. However, subjects having no Prior impressions had no such bias, but demonstrated a strong
tendency to ask diagnostic questions of all applicants, thus focusing their information search on the more diagnostic dimensions. Thus, the finding of greater dimensional variance among subjects having no Prior impressions is consistent with the other findings discussed above.

**Tests of the Hypotheses: Decision Making Process**

In addition to evaluating the information gathering process of the subjects, this experiment investigated their decision making process. It will be recalled that after gathering their information, subjects were asked to select the one applicant that they felt was best qualified to serve as a dormitory resident associate. Then, they were asked to rate each of the 14 applicants on a 7-point scale regarding their qualification to serve as a dormitory resident associate. Finally, subjects were asked to recall the impression information for each of the 14 applicants. The results of the analyses regarding these dependent measures are presented below.

**Mean Rating of Applicants:** The mean rating of the 14 applicants was 3.38, and the standard deviation was .596. There were no significant effects of Time Pressure, Impression Order, Cognitive Complexity, or Cognitive Ability on this measure. Thus, regardless of condition, subjects tended to rate the 14 applicants slightly toward the negative end of the evaluative scale.

**Effect of Information Gathered on Selection of Best Applicant:** The mean correlation between the proportion of positive information received during the information search and whether the applicant was selected as the best qualified was significant ($M = .354$), $t(79) = 11.73, p < .001$. There were no significant effects of Time Pressure, Impression Order, Cognitive
Complexity, or Cognitive Ability on this measure. Thus, regardless of condition, approximately 12.5% of the variance in the selection of the best qualified applicant was accounted for by the proportion of positive information received during the information search.

**Effect of Information Gathered on Final Ratings of Applicants:** The mean correlation between the proportion of positive information received during the information search and the final ratings of the 14 applicants was significant \((M = .550), t(79) = 13.44, p < .001\). As with the selection of the best qualified applicant, this correlation was not significantly influenced by Time Pressure, Impression Order, Cognitive Complexity, or Cognitive Ability. Thus, regardless of condition, approximately 30.3% of the variance in the final ratings of the applicants was accounted for by the proportion of positive information received during the information search.

**Effect of Impressions on Selection of Best Applicant:** Because information was randomly generated in the information display, the information gathered by the subjects is independent of the impression information. Thus, it is possible to evaluate the unique effects of impression information vs. the effects of the information gathered during the information search. The mean correlation between the impression information and whether the applicant was selected as the best qualified was significant, \((M = .173), t(79) = 7.12, p < .001\). There were no significant effects of Time Pressure, Impression Order, Cognitive Complexity, or Cognitive Ability on this measure. It is interesting to note that regardless of condition, and even considering the information gathered during the information search, the impression information accounted for a significant
(albeit small) 3.0% of the variance in the selection of the best qualified applicant.

**Effect of Impressions on Final Ratings of Applicants:** As with the selection of the best qualified applicant, there were no significant effects of Time Pressure, Cognitive Complexity, or Cognitive Ability on the correlation between prior impressions and the final ratings of the 14 applicants. However, there was a significant effect of Impression Order, $t(77.2) = 2.62, p = .01$ on this measure. As predicted, subjects receiving Prior impressions had a significantly higher mean correlation between impression information and final applicant ratings ($M = .467$) than did subjects receiving Post impressions ($M = .266$). For subjects receiving Prior impressions, the mean correlation between impression information and final applicant ratings was significant, $t(40) = 8.09, p < .001$. Similarly, for subjects receiving Post impressions, the mean correlation between impression information and final applicant ratings was significant, $t(38) = 5.22, p < .001$. However, for Prior impression subjects, approximately 21.8% of the variance in the final applicant ratings was accounted for by the impression information, while for Post impression subjects, impression information accounted for only 7.1% of the variance in the final applicant ratings. Thus, receiving the impression information prior to conducting the information search caused subjects to weigh this information significantly more in reaching a decision regarding the qualifications of the 14 applicants.

**Recall of Impression Information:** After rating the 14 applicants, subjects were asked to recall the impression information for each of the 14
applicants. There were no significant effects of Time Pressure, Cognitive Complexity, or Cognitive Ability on this measure. However, there was a significant main effect for Impression Order $t(38.2) = 4.38, p < .001$. Subjects who received impressions prior to gathering their information recalled significantly more of the impression information ($M = 13.98/14.00$) than did subjects who received impressions after gathering their information ($M = 11.87/14.00$).

**Discussion**

Ford, et. al (1989, p. 113) state that very little research has investigated the possible interactive effects of task, environmental, and personal characteristics on information processing. The results discussed provide several insights into this process, showing that task characteristics (prior information), environmental characteristics (time pressure), and personal characteristics (cognitive complexity and cognitive ability) can exert important main and interactive effects on information gathering and decision making. The main findings of this research and their implications regarding human information processing are discussed below.

**Confirmatory Bias vs. Diagnosticity**

There has been substantial controversy in the research literature regarding whether people are biased processors of information, or whether they prefer diagnostic processing strategies. One of the more important contributions of the present research is the finding that the selection of a processing strategy can depend upon the interaction between environmental, personal, and task characteristics. The results discussed above show that in some situations individuals may be biased processors of
information, and in other situations they may prefer a more diagnostic strategy. This research has demonstrated that when given prior impressions, people may be biased by those impressions both in gathering subsequent information and in reaching a decision about the target domain.

The results discussed above show that subjects having prior impressions demonstrated a confirmatory bias by preferring to access dimensions that were consistent with these impressions, particularly regarding applicants with positive initial impressions. In addition, subjects having prior impressions tended to ask more questions for positive impression applicants, and gathered significantly less information during the information search. These subjects also judged the impression information to be more important and did significantly better in recalling the impression information than did post impression subjects. Also, prior impression subjects had significantly more reaccesses during the information search and demonstrated less variance in accesses across the information dimensions. Prior impression subjects also demonstrated greater variance in accesses across applicants. This suggests that having prior impressions caused subjects to focus on specific applicants during the subsequent information search. In addition, when under time pressure, subjects having prior impressions demonstrated an information processing bias by asking more diagnostic questions of positive impression applicants than of negative impression applicants. The cognitive complexity of the subjects was also found to influence this information processing bias. The results showed that prior impression subjects who were high in cognitive complexity gathered significantly more information than did less
cognitively complex subjects having prior impressions. This suggests that less complex individuals may be more likely than cognitively complex individuals to rely upon initial impressions and avoid potentially discrepant information during the subsequent information search. Finally, there was evidence that receiving the impression information prior to conducting the information search caused subjects to weigh this information significantly more in reaching a decision regarding the qualifications of the 14 applicants. Thus, the results show that having prior impressions can strongly influence subsequent information processing and decision making, especially when people are under time pressure, and particularly for less cognitively complex individuals.

It was found that subjects not having prior impressions tended not to demonstrate the processing biases discussed above. Instead, there was a main effect for dimension diagnosticity, where these subjects accessed more 80% accurate dimensions than 50% accurate dimensions, and accessed more 50% accurate dimensions than 20% accurate dimensions. These results suggest that people prefer a diagnostic processing strategy when they do not have initial impressions regarding an information domain. It is only when prior impressions are present that individuals begin to demonstrate the confirmatory biases discussed above.

**Reasons for Confirmatory Bias**

As discussed above, Schneider, Hastorf, and Ellsworth (1979) suggest two possible explanations for the finding that prior information can bias information processing. One possible explanation is the *attention decrement hypothesis*, which posits that people become weary during the
presentation of information, and thus pay less attention to subsequent information. An alternative explanation is the *discounting hypothesis*, which states that later information is discounted *because* it is inconsistent with prior information. This research evaluated the validity of these alternative explanations. The attention decrement hypothesis was tested by comparing prior and post impression groups regarding the mean time spent evaluating the information contained in the information display. The attention decrement hypothesis would predict that subjects having prior impressions would spend less mean time evaluating applicant information during the subsequent information search than would subjects having no prior impressions. However, the results showed that just the opposite occurred; subjects having prior impressions spent a greater amount of time evaluating each item of information about the applicants and less time choosing which information to access than did subjects having no prior impressions. In addition, the attention decrement hypothesis would predict that the total amount of time spent during the information search would be less for subjects having prior impressions. However, the results showed that subjects having prior impressions spent approximately the same amount of time during the information search as did subjects having no prior impressions. Thus, the results do not provide support for the attention decrement hypothesis.

The discounting hypothesis was tested by assessing whether subjects sought more information that was consistent with prior impressions than information which was inconsistent. The discounting hypothesis suggests that subjects would ask more questions regarding the three positive trait
adjective dimensions for people about whom they have a positive initial impression, and that subjects would ask more questions regarding the three negative trait adjective dimensions for people about whom they have a negative initial impression. As discussed above, this hypothesis was supported, as subjects having prior impressions who were under time pressure demonstrated a strong confirmatory bias, particularly regarding positive impression applicants. Therefore, the results of this research suggest that the discounting hypothesis provides a more feasible explanation than does the attention decrement hypothesis regarding the effects of prior impressions on subsequent information processing.

Effects of Time Pressure

There were several additional effects of time pressure on information processing. The results of the pilot study showed that subjects under time pressure demonstrated a noncompensatory processing strategy by gathering less information, by accelerating their rate of information processing, and by demonstrating greater variance in accesses across dimensions and applicants relative to subjects not under time pressure. In addition, these subjects tended to focus on the information that was most important to them, and engaged in more Type 4 transitions. The main experiment also found that subjects under time pressure demonstrated a noncompensatory processing strategy by gathering less information, by processing information at a faster rate, and by demonstrating greater variance in accesses across dimensions than did subjects not under time pressure. However, these subjects did not demonstrate greater variance in accesses across applicants, and were not more likely than subjects not under time
pressure to focus on the most important information, or to engage in Type 4 transitions.

One possible explanation for this difference in results is offered by Payne, et. al (1988, p. 551), who suggest the plausible hypothesis that there may be a hierarchy of responses to time pressure. People under a moderate degree of time pressure may attempt to adapt their information processing strategy by simply increasing the rate of information processing and gathering less information. As time pressure becomes more severe, people may then begin to filtrate information by focusing on the information that is most important, and may engage in more Type 4 (nonsystematic) transitions. The results of this research provide support for this hypothesis. It will be recalled that in the pilot study, subjects under time pressure reported feeling a much greater degree of time pressure ($M = 6.33$) than did subjects not under time pressure ($M = 2.29$). However, in the main experiment, there was less of a difference in perceived time pressure between subjects under time pressure ($M = 5.28$) and subjects not under time pressure ($M = 2.95$). Consistent with the predictions of Payne, et. al (1988, p. 551), time pressure subjects in both studies accelerated the rate of information processing and asked less information, but only subjects in the more severe time pressure condition tended to focus on the information that was most important to them, and to engage in more Type 4 transitions.

In addition, the results showed that when under time pressure, subjects with greater cognitive complexity were more likely to focus on specific applicants (i.e., had more Type 2 transitions) than were subjects with lesser
cognitive complexity. However, when not under time pressure, cognitively complex subjects were less likely to focus on specific applicants than were less cognitively complex subjects. Thus, the results showed that time pressure and cognitive complexity can produce an interactive influence on a decision maker's selection of information processing strategies.

**Cognitive Complexity**

In addition to the interactive effects discussed above, there was a main effect of cognitive complexity on elimination time. As predicted, subjects with greater cognitive complexity took longer to evaluate the strengths and weaknesses of various applicants before eliminating them from consideration, while subjects with lesser cognitive complexity were more likely to eliminate applicants sooner. The tendency of less cognitively complex subjects to eliminate applicants from consideration sooner may indicate a desire to seek quick closure and to avoid evaluating contradictory information.

**Cognitive Ability**

Although cognitive ability did not interact with the other variables, there were some interesting main effects of cognitive ability on information processing. The results showed that subjects with lesser cognitive ability were more likely to immediately reaccess information (i.e., had more Type 1a transitions) than were subjects with greater cognitive ability. This finding has not been investigated in previous research, and has implications regarding the potential influence of an information processor's cognitive ability on the efficiency of that processor's information gathering strategy.
In addition, there was a significant positive correlation between cognitive ability and the amount of information search. Therefore, subjects with greater cognitive ability gathered more information about the 14 applicants than did subjects with lesser cognitive ability. These findings suggest that the cognitive ability of the information processor can significantly influence the way information is processed in order to reach a decision.

Future Directions

One limitation of the present research is that the information provided in the information display was randomly generated, and thus was independent of dimension valence. However, it is intuitively obvious that the type of information sought can constrain the type of information that is received. For example, in an interview setting, an interviewer operating under a positive confirmatory bias may ask the applicant to describe his/her strengths. This would constrain the range of probable responses from the applicant, thus encouraging the applicant to provide positive information that confirms the interviewer’s original impression. Likewise, a prosecuting attorney in a legal case can effectively constrain the range of the defendant’s probable responses by seeking negative information. Given this fact, it is surprising that very little research has investigated this important phase of a decision maker’s processing strategy.

Considering the possibility that the information gathered can provide confirmation of prior impressions, it is possible that this confirmation would influence the subsequent information gathering process, leading to even more confirmatory behavior, and amplifying the effect of prior
impressions on the final decision process. Therefore, future research is needed to investigate whether people do in fact provide confirmatory information when they are asked confirmatory questions. In addition, research is needed to investigate the potential effects of confirmatory information on subsequent information gathering and decision making.

The results of the present research demonstrate that task, environmental, and individual characteristics can produce significant interactive and main effects on information processing. Although researchers have begun to investigate such main effects as task complexity and time pressure on information processing, there has been very little research on the effects of individual characteristics. More importantly, research addressing the interactive effects of task, environmental, and individual characteristics is extremely limited (Beach & Mitchell, 1978; Ford et al., 1989). Therefore, additional research addressing the interactive effects of these variables on information processing is much needed.
References


Footnotes

1The hypothesis was tested by applying an arcsine transformation (Winer, 1971, p. 400) to the dependent variables. The arcsine transformation was applied to all proportions in the tests that follow.

2As per the recommendation of Moser and Stevens (1991), all following t tests were performed using the assumption of unequal sample variances.