

An Exploration of Cognitive Demands in Group Interaction as a Moderator of Information Processing Variables in Perceptions of Leadership

TODD J. MAURER¹

Georgia Institute of Technology

ROBERT G. LORD

University of Akron

In the application of information processing (IP) models in organizational settings, potential boundary or moderator variables are sometimes overlooked. We investigated whether the impact of important IP variables in the leadership perception literature was affected by a potentially important boundary variable: cognitive demands extraneous to impression formation. In contrast to past research, both quantity and quality (prototypicality) of behavior affected leadership perceptions in both low *and* high information load conditions. This result implies that prototype-related processing may be automatic enough to influence perceptions of leadership in actual organizational settings where cognitive demand is often high. Further, quantity of verbal behavior had a significant impact on causal attributions for level of group task performance and on perceptions of control of the groups' activities, suggesting that this variable may have important implications for inferences about a person's influence on work group processes and outcomes. The significance of these findings for the issues of leader influence and for the measurement of leader behavior is discussed.

Leadership is a phenomenon that has been widely studied and discussed. One interesting focus has centered on variables that affect how leaders are perceived. Perceptions of leaders have become of practical and applied interest for two important reasons. First, the power or discretion a leader has depends largely on how he or she is perceived by subordinates, superiors, or even individuals external to the organization (Hollander & Julian, 1969; Pfeffer, 1977). Empirical work shows a close tie between leadership perceptions and social power and influence (Lord, 1985a; Lord, Phillips, & Rush, 1980). Lord (1985a) also suggested "Practically [leadership perceptions] are of interest since being perceived as a leader may have indirect symbolic effects such as increasing acceptance of organizational decisions and policies and increasing the organizational commitment and positive affect of employees

¹Correspondence concerning this article should be addressed to Todd J. Maurer, School of Psychology, Georgia Institute of Technology, Atlanta, GA 30332.

(Pfeffer, 1981)" (p. 102). Further it has been illustrated in the political arena that knowledge of the leadership perception process might help leaders accentuate important characteristics to manage their public impressions (Foti, Fraser, & Lord, 1982). Thus, an understanding of leadership perceptions helps explain how leaders gain and maintain power, which in turn affects their latitude of discretion in managing groups, organizations, or governments. As a result, a clear understanding of leadership perceptions is of value to leaders in the effective execution and management of their roles as well as to researchers studying leadership.

A second reason why leadership perceptions have become of practical interest centers on the issue of measuring and reporting the behavior of leaders or potential leaders. Accurate behavioral measurement is important in the domain of leadership in at least three areas. First, measurement of behavior is especially important in research on leadership where the predominant paradigm used to study real world leaders is to compare behavioral descriptions of effective and ineffective leaders (Lord, 1985a; Yukl, 1981). Second, in leadership or management development programs, behavioral measures are frequently used to provide feedback to leaders from their subordinates or co-workers regarding their management or supervisory skills and behavior. Third, accurate measurement of leadership behavior is also important in managerial assessment centers (Thornton & Byham, 1982). Most assessment centers include measurement of leadership skill or leadership potential in order to provide either developmental feedback to managers or to make selection decisions for a leadership or managerial role.

Perceptual processes have been recognized as being important in the measurement situations identified above because it is now clear that perceptions and measurement of leader behavior are inextricably tied together (Lord, 1985a). Behavioral measures have only an *indirect* relation to actual behavior by leaders, and they are mediated by the perceptions of observers. Thus, the influence of perceptual processes in measurement is key when applied psychologists or managers measure leader behavior. It has been repeatedly demonstrated that leadership behavioral measurement may be directly influenced by general impressions developed through various perceptual processes (see, for example: Phillips & Lord, 1981; Lord, Binning, Rush, & Thomas, 1978; Lord, Foti, & DeVader, 1984; Rush, Phillips, & Lord, 1981). With an understanding of relevant perceptual processes and associated limitations and biases, one may more effectively design and apply measurement procedures (Phillips & Lord, 1986).

Although some attention has been paid to several variables and processes that seem to influence perceptions of leadership (see, for example, Calder, 1977; Cronshaw & Lord, 1987; Giacalone, 1988; Hollander & Julian, 1969; Price & Garland, 1981; Sorrentino & Boutillier, 1975; Stein & Heller, 1979),

there has been little investigation of situational moderators of such relations. Lord and Smith (1983) have outlined situational (boundary) conditions that may moderate the type of information processing used by observers in forming social perceptions. One relatively unexplored, yet potentially very important moderator is available information processing capacity—that is, the amount of an observer's IP capacity that can be allocated to the impression formation task. The amount of information processing capacity that is available should influence whether processing is restricted to limited, automatic processes or whether processing can be more extensive and controlled.

Information Processing Variables and Perception of Leadership

Two variables have received consistent empirical support as important influences on impressions of leadership. They are frequency of verbal participation and prototypicality of behavior with respect to a leadership category (see Stein & Heller (1979) for a review of results on frequency and Lord and Maher (1989) for a review of prototypicality results). In the frequency model, information processing requirements are minimal. Frequency information is highly salient and is stored in memory almost automatically (Hasher & Zacks, 1979). There is no requirement for assessment of type or quality of behavior and as a result, frequency creates a minimal cognitive load. Thus, frequency is likely to be the basis for leadership perception when other information processing tasks use a large portion of a perceiver's processing capacity (Lord & Alliger, 1985). A substantial number of studies have illustrated the effects of frequency on leadership perception (Gintner & Lindsfold, 1975; Lord & Alliger, 1985; Regula & Julian, 1973; Sorrentino & Boutillier, 1975; Zdep & Oakes, 1967).

In the categorization model of leadership perceptions (Lord, Foti, & Phillips, 1982), characteristics and behaviors are assessed as to how prototypical they are with respect to a leadership category. (A prototype is an abstraction of common category features (Mervis & Rosch, 1981).) Thus, the prototypicality of behavior with respect to a leadership category also affects leadership perceptions as has been demonstrated in a number of studies (Cronshaw & Lord, 1987; Lord et al., 1984; Taylor, Lord, & Kollar, 1987). Relevant literature to be discussed below has suggested that a higher level of processing (and higher IP capacity) is likely to be required to assess prototypicality than is necessary for just assessing frequency information.

What is of central importance in the present study is the difference between the two models in the level of processing required. Two of the studies reported above found that the effect of frequency is so strong that simple quantity but *not* quality of verbal behavior may predict leadership ratings (Sorrentino & Boutillier, 1975) and perceived ability to influence others (Regula & Julian,

1973). In these studies, impressions were formed while simultaneously performing a task and being involved in live interpersonal interaction. The high information processing demands in these situations may have precluded the assessment and storage of quality information, enhancing the impact of frequency information on leadership perceptions.

However, it is also possible that in these studies involving interaction in groups, frequency of verbal behavior was naturally confounded with the social perceptions researchers attempted to explain, enhancing the observed relation of behavioral frequency to leadership perceptions. That is, during social interactions, behavior and perceptions are reciprocally related in ongoing cycles. In perceptions of leadership, as one person in a group begins to exhibit a few leadership behaviors, he/she may begin to be perceived by others as well as by himself/herself as taking on a leadership role, resulting in even more frequent contribution to the group interaction being solicited from and exhibited by the person. Thus, when behavior is measured over any substantial period of time, it partially reflects the effects of prior social perceptions. Therefore, experimental research (involving manipulated variables) may be required to separate the causal effect of behavioral frequency on social perceptions from the effects of ongoing leadership perceptions on frequency of behavior.

In contrast to the two studies conducted in group settings discussed above, the effects of prototypicality on leadership perceptions have been demonstrated by varying the prototypicality of behavior in written vignettes or videotapes under laboratory conditions where observers could use *all* of their IP capacity to form impressions. It seems very likely that everyday organizational settings differ substantially from these lab settings with respect to information processing demands. Similarly, Lord (1985a) suggested that the use of such laboratory stimulus materials minimized any selective attention or encoding demands. In settings involving more extensive information loads, assessment of prototypicality may be more difficult.

This line of reasoning was explored by Lord and Alliger (1985) who provided a direct test of the impact on leadership ratings of both prototypicality and frequency in group settings very similar to those of the two earlier studies which compared the effect of quality and quantity of behavior. Lord and Alliger found support for the frequency model of leadership perceptions, yet in this high information load condition they found *no* support for the categorization model. One interpretation of this finding is that higher information processing demands enhanced the use of frequency information in forming impressions and made the assessment of prototypicality more difficult. However, because of methodological weaknesses in the Lord and Alliger study such as restricted variability in the stimulus behaviors (see p. 56), a rigorous test of the prototype model was not provided. Further, the potential

confound between frequency and perceptions discussed previously may have been present in this study.

In light of the current interest in information processing and social perception in organizational settings, a direct experimental assessment of frequency and prototypicality effects on leadership perceptions as potentially moderated by information processing capacity is needed. Based on the previous logic, we hypothesized (H1) a higher level process (e.g., utilizing prototypicality information) would be used when information processing capacity was greater and (H2) a lower level process (e.g., utilizing frequency information) would be used when processing capacity was low due to extraneous demands. Thus, two separate two-way interactions were hypothesized. We developed a $2 \times 2 \times 2$ between-subjects design to test the hypotheses. Videotapes of group interaction were developed which varied both frequency (high/low) and prototypicality (high/low) of a target person's behavior, and these tapes were viewed under either high or low processing demands.

In developing an experimental design to study the effects of these variables on leadership perception, various approaches were carefully considered in an attempt to achieve the best balance between control and generalizability. It was decided that a laboratory study employing videotape stimuli would be best for several reasons. First and most importantly, there is the likely possibility that the two variables frequency and prototypicality of behavior are sometimes confounded in live group settings. It seems reasonable that many times the two could co-occur, which would make it very difficult to separate the effects in correlational data. Using standardized videotape stimuli would allow independent manipulation of the variables while still providing observation of actual behavior. Second, as already explained previously, behavioral frequency and leadership perceptions may be naturally confounded in ongoing social interaction.

Third, a laboratory study employing videotape stimuli would eliminate the potential influence of nonconstant factors in ratees (e.g., dress, voice, physical characteristics). Finally, this approach would still allow for attention to external validity. That is, manipulations could be introduced during observation of the videotape stimuli which would stimulate the cognitive demands of live group interaction while maintaining adequate control of the frequency and prototypicality factors.

In the present study, it was important to create two different cognitive demand conditions to investigate the impact of differential information processing capacity. One condition conformed to the standard laboratory (passive observer) conditions in which the prototype model had been supported. The other attempted to simulate the information processing demands of live task-related group interaction. For example, at a meeting participants might simultaneously attend to the discussion going on while reviewing written

information, notes, or data relevant to the group task. Similarly, one might be thinking about the group task while another group member's behavior is occurring. Likewise, other participants may speak simultaneously, distracting attention from critical behaviors. In other words, a number of competing information processing demands are likely to be present in normal group interaction, making it unlikely that an observer's resources are focused solely on a target person's behavior. An attempt was made to stimulate these cognitive demands in the high cognitive load condition. Further, we sought active involvement of the subject in the experimental setting by assigning responsibility to each individual for contributing to performance of the group's task.

Finally it should be noted that there is a third information processing variable that has received attention in the leadership perception literature. Some theorists have asserted that causal attributional processes precede and influence how leaders are perceived (Calder, 1977; Pfeffer, 1977). According to these authors, attributional reasoning is necessary before leadership impression formation can occur. For example, if observers form an overall impression of a work group's performance and then infer causes of that performance, to the extent that an individual is seen as an important cause, his or her perceived leadership ability should be affected. With high causal attribution to the person should come a linear relationship between group performance and perceived leadership ability.

What is especially relevant from the current perspective is that causal attributional processes seem to involve a higher level of processing than do categorization or frequency information processes (Lord & Smith, 1983). So we hypothesized that (H3) if these attributional processes do have an effect on perceptions, the effect should logically appear in situations involving low extraneous processing demands. Thus, we expected causal attribution to moderate the relationship between outcomes or group performance and leadership perceptions in the low cognitive demand condition only.

Method

Subjects

Two hundred thirteen subjects participated in the experiment and received course credit for their participation. The proportion of males to females within each cell was the same across all conditions (10m:16f).

Stimulus Materials

We developed four videotapes of a carefully scripted and rehearsed, four-person group meeting. The tapes were constructed to ensure that only the

constructs frequency and prototypicality (of the leader's behavior) varied across tapes. To do this we controlled the number of behaviors and number of words spoken by the leader, the content (including the number of behaviors and the number of words) of the other group members' contributions, and each group member's "operating power" (Mayhew, Gray, & Richardson, 1968). No leadership primes were administered and the target person was not identified as a leader to subjects.

Manipulations

Prototypicality. To manipulate this variable, the target person's leadership behaviors were varied across tapes by including in the scripts behaviors that were determined in previous studies (Fraser, Lord, & Cronshaw, 1983; Fraser & Lord, 1988; Lord et al., 1984) to be either prototypical (typical of leadership) or antiprototypical (atypical of leadership). Examples of behaviors determined in previous research to be prototypical of leadership are (a) "lets other group members know what is expected of them" and (b) "praises good work." Examples of behaviors determined to be antiprototypical with respect to leadership are (a) "lets others decide what should be done [by the group]" and (b) "is confused about an issue." Prototypicality could be manipulated *while maintaining a constant level of frequency (and vice versa)* by using a ratio developed by Cantor and Mischel (1979) to predict prototypicality:

$$\frac{\# \text{ prototypical behaviors} - \# \text{ antiprototypical behaviors}}{\text{total \# behaviors}}$$

Using the equation above, the appropriate number of prototypical and antiprototypical behaviors was scripted to create the same prototypicality scores across both the high- and low-frequency conditions.

Frequency. The quantity of the target's behavior was varied to create this experimental factor, being 15 behaviors in both high-frequency conditions and 5 behaviors in both low-frequency conditions. The other group members' behavior was always neutral with respect to leadership and the same number of behaviors for each member was maintained across each tape (eight for Member 1, seven for Member 2, and six for Member 3).

Cognitive demand. This variable was manipulated by creating four types of "cognitive loads" which were present in the high-demand condition, but not in the low-demand condition. Groups of subjects were informed that they were to be involved in a group problem-solving study and were about to view a videotape of another group which was trying to solve a problem. Subjects were given a description of the problem. Subsequently, an attempt was made to get subjects to actively think about the problem and solutions to the prob-

lem by collecting information on it while the videotaped meeting was running. This was intended to be similar to what an individual might do when taking part in a live group meeting in which he/she must allocate some processing time to preparation of his/her own thoughts or ideas for presentation to the group. To do this, the "next-in-line" effect (Bond, 1985) was created by telling all subjects present that they would present to the group a list of their own suggestions for a problem solution immediately after the tape was over, so they must formulate suggestions while the tape is running.

They were told that one source of information in addition to the videotaped meeting was written background material relevant to the group's problem. Subjects were given this material and were allowed to review it while the tape was running. This was intended to be analogous to reviewing notes, data, or background material while at a group meeting. Additionally, a distracting confederate was placed strategically in the group of subjects attending. The confederate asked planned/rehearsed questions to the other subjects at predetermined points in the videotape, just as when persons at a group meeting speak out of turn, distracting attention from the speaker(s). Finally, subjects in the high cognitive demand condition were seated in close physical proximity creating minor distractions from being seated together closely, just as what might occur at a group meeting.

Procedure

Subjects participating in the high-demand conditions were run in groups of from four to six (including the confederate). After being seated together at tables in front of the television monitor, they were informed that they were to be involved in a group problem-solving experiment and were given instructions (written and verbal) that explained their task as a subject. The experimenter then started the tape, instructed them to turn over the reading material (that was lying face down in front of them), and left the room.

The same procedure was followed in the low-demand condition without the concurrent processing demands listed above. Subjects in this condition were separated from each other by wooden barriers. In both conditions, subjects were not informed that they were going to rate any of the actors' behavior. The focus was kept on problem solving in order to capitalize on naturally occurring impressions. At the end of the tape, the experimenter returned to the room and distributed the dependent measures described below. After completing those measures, subjects were thanked and debriefed.

Dependent Variables

General Leadership Impression (GLI). This composite scale contains five questions about the level or amount of leadership exhibited by the ratee

($\alpha = .93$). An example of an item on the GLI which is accompanied by a 5-point rating scale is "How much leadership did the person exhibit?"

Causal attribution. This was a multi-item questionnaire used to collect data from subjects on how they perceived both the target's ($\alpha = .94$) and the other group members' ($\alpha = .91$) causality for group performance. Examples of items rated in terms of how much they caused the group's performance are (a) "the ability of the ratee" and (b) "the other group members' motivation."

Manipulation Checks

Attention allocation. Each subject rated the percent of their total attentional capacity allocated to different factors in the experimental setting while the videotape was running. These factors were (a) the videotape, (b) the reading, (c) distractions from others present, (d) trying to think of a problem solution, and (e) daydreaming.

Memory for neutral facts. This consisted of a multiple-choice memory test for neutral facts in the videotape (who spoke first and last, who asked questions, clothing and hair color, meeting room characteristics, etc.).

Leadership behavioral questionnaire. This was a specially prepared questionnaire on which subjects in the high-prototypicality, high-frequency conditions were to identify, with an "x," behaviors emitted by the target in the videotape. The target's true score was derived from scripts of the videotape content. Ten graduate student judges determined if the behaviors were indeed present or absent on the tape.

Other items. Other checks included questions about perceived group performance, the ratee's control over the others' activities, the frequency of the ratee's contribution to the interaction, and how well formed subjects' impressions of the ratee were.

Results

Manipulation Checks

Table 1 displays the descriptive statistics for several manipulation check variables. Effects for attention allocated to the videotape stimulus, background reading, and distractions from others all differed significantly between the high and low cognitive demand conditions and all were in the appropriate direction. Surprisingly, subjects in the high-demand condition apparently did not use more of their attention for thinking of solutions to the problem. Further, despite explicit instructions to engage in problem solving, there was not a significant difference in a related variable (which is not shown in Table 1), the number of suggestions for solutions ($F(1,211) = .014, p = .906$). We

suspect the reading and confederate manipulations were strong enough to preclude actual problem solving. Also note in Table 1 that subjects in the low-demand condition apparently had enough spare processing capacity to spontaneously engage in thinking of solutions or to daydream significantly more than in the high-demand condition.

Further, as shown in the bottom of Table 1, subjects in the high cognitive demand condition did not have as well formed an impression of the ratee as

Table 1

Descriptive Statistics for Attention Manipulation Checks

Dependent variables	Low cog. dem.	High cog. dem.	F
Percent of subjects' attention allocated to:			
Videotape			
mean	54.16	31.01	70.89***
SD	24.20	14.99	
Reading			
mean	8.14	36.81	248.06***
SD	7.95	16.91	
Distractions from others (subjects/ confederate)			
mean	1.82	8.11	59.75***
SD	3.93	7.39	
Thinking of solutions			
mean	19.89	17.69	1.12
SD	18.07	11.66	
Daydreaming			
mean	15.99	6.72	20.79***
SD	18.74	9.19	
How well formed an impression of the ratee			
mean	2.92	2.41	16.16***
SD	.94	.94	
Fact question accuracy			
mean	9.94	8.59	21.44***
SD	1.93	2.31	

Note. $N = 213$ (low dem = 105, high dem = 108), F 's with $df = (1,211)$.

* $p < .05$; ** $p < .01$; *** $p < .001$.

did subjects in the low-demand condition. Similarly, accuracy for neutral facts about the stimulus was lower in the high than in the low-demand condition. Finally, behavioral rating accuracy (d' , Lord, 1985b) was compared across the low- and the high-demand conditions. Generally, d' is an index in signal detection theory applied to rating which denotes the accuracy with which a rater can discriminate between behaviors that did and did not occur. Raters were significantly more accurate ($F(1,52) = 10.96, p < .01$) in the low cognitive demand condition (mean = 1.31) than in the high cognitive demand condition (mean = .43). Overall, these findings demonstrate the effectiveness of the cognitive demand manipulations.

Three questions used as frequency manipulation checks ($\alpha = .90$) indicated that subjects thought that the ratee participated significantly more often in the high-frequency conditions ($F(1,210) = 53.73, p < .001$).

Tests of Hypotheses

ANOVA results for the GLI leadership index reflected relatively equal main effects for both frequency ($F(1,205) = 11.77, p < .01$) ($\eta^2 = .05$) and prototypicality ($F(1,205) = 9.11, p < .01$) ($\eta^2 = .04$) in the expected directions. The ratee was seen as being significantly more like subjects' conception of a leader in the high-frequency conditions and the high-prototypicality conditions. However, there was no main effect for cognitive demand, nor were the hypothesized prototypicality by cognitive demand (H1) ($F(1,205) = .03, p > .05$) or frequency by cognitive demand (H2) ($F(1,205) = .64, p > .05$) interactions significant.

To test Hypothesis 3, the relationship between the GLI and group performance measure was investigated using moderated regression with causal attribution to the ratee as the hypothesized moderator. If subjects were assessing causality for group performance, as causality ascribed to the target increases, the relationship between leadership ratings and group performance should also increase. We predicted such an effect only for the low-demand condition. The interaction term for causal attribution and group performance was significant in both the low-demand ($F(1,211) = 12.645, p < .001$) and the high-demand ($F(1,211) = 8.773, p < .01$) conditions. The two regression equations are not significantly different from each other. Confidence intervals for the unstandardized betas overlap across the two equations. The moderating action of causal attribution operated as expected; as values of causal attribution to the ratee became higher, there was an increase in the rate of positive change in leadership impressions as a function of positive change in group performance (see Figure 1). Caution must be taken when inferring causal direction from this correlational analysis (see discussion).

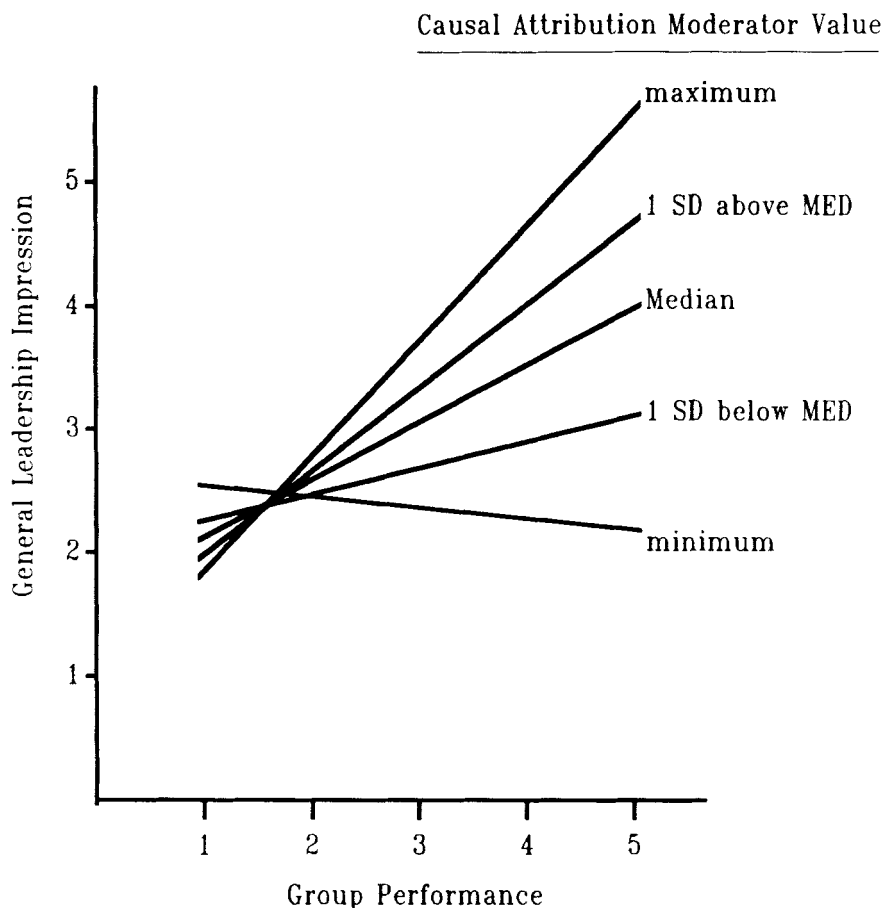


Figure 1. The interaction of causal attribution to the ratee and group performance in predicting leadership perceptions.

Discussion

The present study, which investigated the effects of three important information processing variables in leadership perception, has supplemented the literature in several ways and has implications for both impression management by leaders and for measurement of leader behavior. First, studies in the past that have addressed the relative influence of quality and frequency of behavior have reported that quantity and not quality of behavior predicts leadership impressions (Lord & Alliger, 1985; Regula & Julian, 1973; Sorren-

tino & Boutillier, 1975). The present results have suggested that prototypicality can affect perceptions of leadership both in conditions of low- and high-cognitive demand. This finding implies that categorization processes may be automatic enough to influence leadership perceptions in actual organizational environments where IP demands are often high.

Second, the present results also suggest that frequency information can affect leadership perceptions not only in cognitively demanding situations where people might be forced to rely on salient information, but that raters may also utilize frequency information when they are free to scrutinize a person's behavior for type or quality. It is worthwhile to note that in the present study, the target received the second highest average rating with respect to leadership likeness in the high frequency-low prototypicality condition, despite the fact that 12 of the 15 behaviors he displayed were determined to be *very unlike* those of a leader. It seems possible that high frequency may help to counteract the effects of low prototypicality. This is especially interesting because ratings were previously obtained ($N = 160$) for the behavior of talking frequently and subjects perceived this as being neutral with respect to leadership. Thus, even in low cognitive demand conditions, frequency effects may occur through automatic processes of which subjects are unaware. Future research should address this issue.

The results suggest that *both* the variables frequency and prototypicality should be considered potentially relevant and influential in impressions of leadership both in passive observation settings and in relatively more complex situations involving participation by observers. To the extent that these variables impact on general impressions of leadership, they may have direct implications for social power and influence (Lord, 1985a; Lord et al., 1980) and for the understanding and management of impressions by persons in leadership roles.

Further, the effects of the variables frequency and prototypicality on impressions also have implications for accurate behavioral measurement. To the extent that general impressions held by observers influence ratings of leader behavior (Phillips & Lord, 1986) using such instruments as the LBDQ (Stogdill, 1963), both of the variables frequency and prototypicality may have implications for the measurement of leadership behavior in leadership research (Lord, 1985a), in management development programs, and in managerial assessment centers (Thornton & Byham, 1982).

In the assessment center setting it has been demonstrated that assessor's dimension ratings may be dominated by a single general factor (Russell, 1985; Sackett & Hakel, 1979) which may stem from assessors' beliefs regarding what an effective manager is like (Gaugler & Thornton, 1989). To the extent that leadership is usually considered to be a key aspect of the managerial role,

leadership perceptions should be relevant to this general factor and thus to dimension ratings.

Interestingly, recent research has begun to investigate cognitive demands placed on assessors in assessment centers (Gaugler & Thornton, 1989). The role of an assessor can be very complex and demanding. Not only might assessors be required to evaluate ratees on as many as 25 dimensions (Sackett & Hakel, 1979), but also they may be actively involved in an exercise (Thornton & Byham, 1982), interacting or role playing with ratees. The cognitive demand variable explored in the current study is thus directly relevant to measurement of behavior in assessment centers where impressions of leadership may play an integral role.

The current data also illustrated that causal attributions moderated the relationship between perceived outcomes (group performance) and leadership ratings. However, because this effect was obtained in both the high- and low-cognitive demand conditions, care must be taken in the interpretation. The data may seem to support a model analogous to that purported by Calder (1977). That is, subjects might have observed outcomes, assessed causes for the outcomes, and to the extent that the ratee was seen as being responsible (and outcomes were favorable), leadership perceptions were enhanced. However, because the causal ascription ratings were made after viewing the stimulus, it is not possible to determine if spontaneous causal thinking (Weiner, 1985) occurred as a precursor to leadership impressions or if causal ascriptions were made retrospectively in response to specific questions. Hence, it seems entirely reasonable that causal ascriptions might have been derived from a general impression based on frequency or prototypicality information. Past leadership perception research (Cronshaw & Lord, 1987; Lord et al., 1984; Phillips & Lord, 1981) has consistently supported this alternate interpretation. Results from the current study also support this interpretation. That is, an analysis of variance by the experimental factors on ratee causal attribution scores revealed that the ratee was seen as being more responsible for the group's level of performance in the high-frequency conditions ($F(1, 205) = 25.29, p < .001$).

Thus, frequency can also affect retrospective causal attributions in a manner consistent with salience manipulations (Phillips & Lord, 1981). To the extent that the leader talked more frequently (and was more salient), he was seen as being more responsible for the outcomes of the meeting. Further, he was seen as having more control over the others' activities ($F(1, 205) = 25.29, p < .001$).

The significant effect of frequency on leadership perceptions in both cognitive demand conditions parallels the tendency for leaders to be seen as distinct from the other group members. Calder (1977) identifies this as being a potentially important precursor to perceiving an individual as a leader. Sim-

ilarly, Pfeffer (1977) discusses how leaders are made salient through organizational processes. To the extent that salience is a critical aspect of leadership, making an individual salient may facilitate the activation of a leadership schema (Phillips & Lord, 1981).

Further, the effects of frequency on causal attributions for level of group task performance and on perceptions of control have interesting implications. To be seen as an important determinant of group performance and others' behavior may not require a display of leadership behavior as much as it requires simply being salient during the group's interaction. Lord and Maher (1989) illustrate the impact that salience may have in real world settings at a higher organizational level. They discuss Lee Iacocca's leadership at Chrysler and his salience through testimony in front of Congress and appearances in numerous television ads. Lord and Maher suggest that this salience and automatic processing by observers may have contributed to the natural tendency to attribute Chrysler's turnaround largely to Iacocca. Perhaps the effects observed in the present study at the work group level might be examined more closely in future investigations.

Caution is warranted in generalizing too far from the present results. Although information processing capacity has been directly manipulated and attempts were made to simulate the types of extraneous demands that are likely to be encountered in an organizational setting, this was still a laboratory study involving student subjects and videotape stimuli. As a result, manipulations probably didn't exactly match information processing variables encountered in real world settings. (For example, there were no affective or task interdependence relations among perceivers and stimulus persons which, when present, might tend to maximize involvement.) There are two issues here, however, that are relevant and are worth noting.

The first is unfortunately only anecdotal in nature. That is, subjects seemed to find the concurrent demands very difficult and challenging. Thus, the authors were not concerned that the cognitive demand manipulations were not strong enough. The second issue, however, is more conceptual and is based on related research which has implications for the interpretation and generalizability of the overall level of cognitive demand imposed on subjects.

An important question to be asked is whether the overall cognitive demand imposed on observers in the current study was high enough to approach that actually experienced by organizational members performing their ongoing roles. On first consideration, one may conclude that actual organizational members in such a group meeting may experience greater overall cognitive demand than subjects faced with the simulated demands in the current study. However, it is important to note one important aspect on which actual organizational members and the subjects in the current study should have

differed which increases confidence in the strength of the overall cognitive demand manipulation.

In both settings (the present study and actual organizational settings) the group meeting/ problem solving situation is very complex and involves multiple cognitive resource demands by several concurrent tasks. However, actual organizational members who frequently find themselves in this situation as part of their everyday, ongoing roles are likely familiar with constraints and resources present, may be familiar with their co-workers or other people around them and their habits and perspectives, etc., and are likely relatively familiar with the problem setting and other variables involved. Further, these organizational members who are frequently involved in such settings by definition have fairly extensive practice with such situations and have likely developed strategies that help in coping with overall demands. For the subjects in the current study, however, the problem being worked on by the group, the group members in the tape, other subjects present, the background material, etc., and perhaps even the group format involving all of the concurrent tasks were all novel to subjects, and thus very demanding in terms of cognitive resources required by them.

Psychological research has illustrated that in learning a complex task involving simultaneous demands, performance early on is very difficult and demanding, but with practice and experience people can develop situation-specific knowledge and skills (Hirst, Spelke, Reaves, Caharack, & Neisser, 1980; Spelke, Hirst, & Neisser, 1976) allowing performance of the originally demanding task with ease.² The component cognitive, perceptual, or motor processes which originally needed to be coordinated consciously, eventually become embedded in larger schemes and no longer need to be consciously orchestrated with other parts of the task. This reduces overall cognitive demand on the individual. Of course, none of this information allows a statement regarding the direct transferability of results in the current study. It does, however, increase confidence in comparing overall cognitive demand imposed on the subjects facing the novel, unpracticed task to that experienced by actual organizational members who may frequently face such a task in their ongoing roles. Future work might address cognitive demand and other potential moderators in actual organizational settings.

In summary, the present study provided a direct test of the contribution of important IP variables to perceptions of leadership under conditions differing in cognitive demand extraneous to impression formation. It seems that both

²For example, people can learn to do such demanding tasks as read short stories while writing lists of words at dictation, or to even identify relations among dictated words, and categorize words based on meaning while reading for comprehension at normal speed (Spelke et al., 1976). A more familiar example is carrying on a conversation while driving a car.

of the variables frequency and prototypicality may have implications for perceptions and measurement of leadership not only in standard laboratory or passive observer conditions, but also in settings which are more complex with respect to information processing demands. To the extent that information processing models continue to maintain a central role in theory, research, and practice, explorations of potentially important boundary or moderator variables should be carefully executed.

References

- Bond, C. F. (1985). The next-in-line effect: Encoding or retrieval deficits. *Journal of Personality and Social Psychology*, **48**, 853-862.
- Calder, B. J. (1977). An attribution theory of leadership. In B. M. Staw & G. R. Salancik (Eds.), *New Directions in organizational behavior* (pp. 179-204). Chicago: St. Clair Press.
- Cantor, N., & Mischel, W. (1979). Prototypes in person perception. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 12, pp. 3-52). New York: Academic Press.
- Cronshaw, S. F., & Lord, R. (1987). Effects of leader categorization, attribution, and encoding processes on leadership perceptions. *Journal of Applied Psychology*, **72**, 97-106.
- Foti, R. J., Fraser, S. L., & Lord, G. G. (1982). Effects of leadership labels and prototypes on perceptions of political leaders. *Journal of Applied Psychology*, **67**, 326-333.
- Fraser, S. L., & Lord, R. G. (1988). Stimulus prototypicality and general leadership impressions: Their role in leadership and behavioral ratings. *The Journal of Psychology*, **122**, 291-303.
- Fraser, S. L., Lord, R. G., & Cronshaw, S. F. (1983). *Sex and age related differences in leadership prototypes*. Unpublished manuscript, University of Akron.
- Gaugler, B., & Thornton, G. (1989). Number of assessment center dimensions as a determinant of assessor accuracy. *Journal of Applied Psychology*, **74**, 611-618.
- Giacalone, R. A. (1988). The effect of administrative accounts and gender on the perception of leadership. *Group and Organization Studies*, **13**, 195-207.
- Gintner, G., & Lindsfold, S. (1975). Rate of participation and expertise as factors influencing leader choice. *Journal of Personality and Social Psychology*, **32**, 1085-1089.
- Hasher, L., & Zacks, R. T. (1979). Automatic and effortful processing in memory. *Journal of Experimental Psychology: General*, **32**, 356-388.
- Hirst, W., Spelke, E., Reaves, C., Caharack, G., & Neisser, U. (1980). Divid-

- ing attention without alternation or automaticity. *Journal of Experimental Psychology: General*, **109**, 98–117.
- Hollander, E. P., & Julian, J. W. (1969). Contemporary trends in the analysis of leadership processes. *Psychological Bulletin*, **71**, 387–397.
- Lord, R. G. (1985a). An information processing approach to social perceptions, leadership and behavioral measurement in organizations. *Research in Organizational Behavior*, **7**, 87–128.
- Lord, R. G. (1985b). Accuracy in behavioral measurement: An alternative definition based on rater's cognitive schema and signal detection theory. *Journal of Applied Psychology*, **70**, 66–71.
- Lord, R., Binning, J., Rush, M., & Thomas, J. (1978). The effect of performance cues and leader behavior and leader behavior on questionnaire ratings of leadership behavior. *Organizational Behavior and Human Performance*, **21**, 27–39.
- Lord, R. G., & Alliger, G. M. (1985). A comparison of four information processing models of leadership and social perceptions. *Human Relations*, **38**, 47–65.
- Lord, R. G., Foti, R. J., & DeVader, C. (1984). A test of leadership categorization theory: Internal structure, information processing, and leadership perceptions. *Organizational Behavior and Human Performance*, **34**, 343–378.
- Lord, R. G., Foti, R. J., & Phillips, J. S. (1982). A theory of leadership categorization. In J. G. Hunt, U. Sekaran, & C. Schriesheim (Eds.), *Leadership: Beyond establishment views* (pp. 104–121). Carbondale: Southern Illinois University Press.
- Lord, R. G., & Maher, K. J. (1989). Leadership perceptions and leadership performance: Two distinct but interdependent processes. In J. Carroll (Ed.), *Advances in applied social psychology: Business contexts* (Vol. 5, pp. 129–154). Hillsdale, NJ: Erlbaum.
- Lord, R. G., & Smith, J. E. (1983). Theoretical information processing, and situational factors affecting attribution theory models of organization behavior. *Academy of Management Review*, **8**, 50–60.
- Mayhew, B. H., Gray, L. N., & Richardson, J. R. (1968). Behavioral measurement of operating power structures: Characterizations of asymmetrical interaction. *Sociometry*, **32**, 474–489.
- Mervis, C. B., & Rosch, E. (1981). Categorization of natural objects. *Annual Review of Psychology*, **32**, 89–116.
- Phillips, J., & Lord, R. (1981). Causal attributions and perceptions of leadership. *Organizational Behavior and Human Performance*, **28**, 143–163.
- Phillips, J., & Lord, R. (1986). Notes on the practical and theoretical consequences of implicit leadership theories for the future of leadership measurement. *Journal of Management*, **12**, 31–41.

- Pfeffer, J. (1977). The ambiguity of leadership. *Academy of Management Review*, 2, 104-112.
- Pfeffer, J. (1981). Management as symbolic action: The creation and maintenance of organizational paradigms. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational Behavior* (Vol. 3, pp. 1-52). Greenwich, CT: JAI Press.
- Price, K. H., & Garland, H. (1981). Compliance with a leader's suggestions as a function of perceived leader/member competence and potential reciprocity. *Journal of Applied Psychology*, 66, 329-336.
- Regula, R. C., & Julian, J. W. (1973). The impact of quality and frequency of task contributions on perceived ability. *Journal of Social Psychology*, 89, 115-122.
- Russell, C. J. (1985). Individual decision processes in an assessment center. *Journal of Applied Psychology*, 70, 737-746.
- Rush, M., Phillips, J., & Lord, R. (1981). The effects of a temporal delay in rating on leader behavior descriptions: A laboratory investigation. *Journal of Applied Psychology*, 66, 442-450.
- Sackett, P., & Hakel, M. (1979). Temporal stability and individual differences in using assessment information to form overall ratings. *Organizational Behavior and Human Performance*, 23, 120-137.
- Sorrentino, R. M., & Boutillier, R. G. (1975). The effect of quantity and quality of verbal interaction on ratings of leadership ability. *Journal of Experimental Social Psychology*, 11, 403-411.
- Spelke, E., Hirst, W., & Neisser, U. (1976). Skills of divided attention. *Cognition*, 4, 215-230.
- Stein, R. T., & Heller, T. (1979). An empirical analysis of the correlations between leadership status and leadership participation rates reported in the literature. *Journal of Personality and Social Psychology*, 37, 1993-2002.
- Stogdill, R. M. (1963). Manual for the leader behavior description questionnaire—form XII. Columbus: Bureau of Business Research, Ohio State University.
- Taylor, M., Lord, R., & Kollar, L. (April, 1987). *The role of priming and prototypicality in assessments of male and female managers. Paper presented at the Second Annual Meeting of the Society for Industrial/Organizational Psychology, Atlanta, GA.*
- Thornton, G. III, & Byham, W. (1982). *Assessment centers and managerial performance*. New York: Academic Press.
- Weiner, B. (1985). "Spontaneous" causal thinking. *Psychological Bulletin*, 97, 74-84.
- Yukl, G. A. (1981). *Leadership in organizations*. Englewood Cliffs, NJ: Prentice-Hall.
- Zdep, S. M., & Oakes, W. F. (1967). Reinforcement of leadership behavior in group discussion. *Journal of Experimental Social Psychology*, 3, 310-320.