# TRANSACTIVE MEMORY AND POWER:

# DO LEADERS HAVE ACCESS TO DIFFERENT TYPES OF INFORMATION?

by

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A transactive memory system is a shared understanding of who knows what in a group. Groups complete tasks more efficiently when group members have access to transactive memory systems (Liang, et al., 1995). However, some group members may have more access than others. Some research indicates that the powerful know less about others (Fiske, 1993), while other research indicates that they know more about others, but only about task-relevant characteristics (Guinote, 2008; Overbeck & Park, 2006). Therefore, powerful individuals may have more access to some aspects of transactive memory systems. In this experiment, high power participants saw task-relevant and personal information about other group members. They recalled more information of both sorts than did low power participants. This indicates that powerful people may indeed have greater access to the information in transactive memory systems, and that this advantage is not limited to task-relevant information.

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## PREFACE

I would like to thank Dr. JeeWon Cheong and Dr. Elizabeth Votruba-Drzal for their assistance with the statistical analysis for this project. I would also like to thank my advisor, Dr. Richard Moreland, and my committee members, Dr. Martin Greenberg and Dr. John Levine, for their assistance during this project.

# 1.0 INTRODUCTION

Transactive memory was first identified by Wegner and his colleagues (Wegner, 1987; 1995; Wegner, Erber, & Raymond, 1991; Wegner, Giuliano, & Hertel, 1985), who defined it as "a shared system for encoding, storing, and retrieving information" (Wegner et al., 1991, p. 923). Participants in such a system agree about who knows what and can thus access information by asking one another for it, rather than relying exclusively on their own memories. Knowledge about who knows what can arise from several sources, including the explicit division of tasks (assigned memory), direct perception of others' skills (observation), shared experience, knowledge about others' prior exposure to information, and stereotyping.

Early research on transactive memory focused on romantic couples (Hollingshead, 1998a; 1998b; Wegner et al., 1991). For example, Wegner and his colleagues found that natural couples, with a history of collaborative remembering, performed a memory task more effectively when allowed to adhere to their own memory system than when a novel system was imposed upon them. The opposite was found for artificial couples (created in the laboratory) that had no prior history of collaborative remembering. Similar results were later obtained by Hollingshead (1998a).

Transactive memory has also been studied in the context of groups. For example, Liang, Moreland, and Argote (1995) found that laboratory work groups whose members were trained together (and thus had more shared experience) remembered more about an electronics assembly task, and performed that task better, than did work groups whose members were trained

separately. Using videotapes made of the groups while they worked, several symptoms of transactive memory were measured. These were: *memory differentiation* (unique expertise developed by different group members), *task coordination* (synchronization of group members' assembly efforts), and *task credibility* (faith in group members' expertise claims). These symptoms were strongly correlated, and when they were combined to form a transactive memory index, that index mediated the relationship between type of training (collective vs. individual) and subsequent task performance.

In later research, group members' knowledge about one another was measured more directly, and members who were trained together were indeed found to know more about the distribution of knowledge in their groups (see Moreland, 1999). Further research also showed that the performance increase associated with group training was associated with transactive memory and not with other factors that might be associated with group training, such as group development or strategic learning (see Moreland, 1999), or improved communication among group members (Moreland & Myaskovsky, 2000).

The benefits of transactive memory for group performance have been observed in natural groups as well. For example, Lewis (2004) examined transactive memory systems in consulting teams during different phases of a project. Higher scores on a transactive memory scale completed by team members during the planning and the implementation phases of these projects were positively correlated with team performance ratings made by both team members and customers. Similar results have been obtained for other work groups (Austin, 2003; Faraj & Sproull, 2000; Rau, 2005; Yoo & Kanawattanachai, 2001), and even for small organizations (Peltokorpi, 2004).

Generally, transactive memory has been conceptualized as a group characteristic to which all members can contribute and from which all members can benefit. But does everyone in a group benefit equally? Maybe some group members benefit more than others from transactive memory systems because they know more than others about how knowledge is distributed. Who are these individuals? Some potentially important individual characteristics in this regard include self-monitoring (Flynn, Reagans, Amanatullah, & Ames, 2006), tenure within the group (Moser & Galais, 2007), and power. My research will focus on power. Research indicates that having power over others often reduces the attention paid to them (see Emory, 1988; Galinsky, Magee, Inesi, & Gruenfeld, 2006; Goodwin, Gubin, Fiske, Yzerbyt, 2000; LaFrance & Henley, 1997). Reduced attention could impair transactive memory participation by limiting how much a powerful person learns about who knows what in a group.

### 1.1 POWER'S IMPACT UPON LEARNING ABOUT OTHERS

Some evidence for the effects of power on attention can be found in studies of primates (Keltner, Gruenfeld, & Anderson, 2003). For example, the theory of "social attention structure in primates" states that low status members of primate groups attend to high status members so that low status members can participate more effectively in defense against predators, avoid antagonizing dominant group members, and monitor shifting status hierarchies in the group (Chance, 1975; Dovidio & Ellyson, 1985; Emory, 1988; Emory & Harris, 1981). However, high status group members do not attend to low status members (Dovidio & Ellyson, 1985; Emory, 1988). Evidence for this theory has been garnered from observations of several primate species (Chance, 1976; Emory, 1988; Emory & Harris, 1981), and even some non-primates, such as pigeons (Chance, 1976).

Because of its evolutionary benefits (Emory & Harris, 1981), the effects of power on attention ought to be apparent in human groups as well (Chance & Jolly, 1970). Power indeed seems to affect attention in human groups, just as it does in groups of primates (Keltner et al., 2003). Consider, for example, the social skills of men and women. Women are better than men at decoding nonverbal behavior (Galinsky et al., 2006; Henley & LaFrance, 1984), determining others' opinions of them (Snodgrass, 1985), and making distinctions among different types of touch (Henley & LaFrance, 1984). Additionally, they direct their gaze at their interaction partners more than men do, perhaps in an effort to learn more about those persons (Frances, 1979; Henley & LaFrance, 1984). The "oppression hypothesis" (LaFrance & Henley, 1997) identifies status, which is often correlated with power, as the explanation for these sex differences. According to that hypothesis, lower power persons need to understand the meaning of behavior by higher power persons, in order to react appropriately to them, because this helps lower power persons to achieve their goals. Because they often have less power than men, women have thus developed a greater ability to decode the behavior of others, particularly those of higher power (Henley & LaFrance, 1984). The oppression hypothesis has also been successfully applied to African Americans, another group that is seldom powerful (LaFrance & Henley, 1997).

Snodgrass (1985) found that the oppression hypothesis even generalizes to teacher/learner relationships, in which power often plays an important role. People assigned the role of learner in a fictive student-teacher relationship are better able to gauge how those assigned the role of teacher feel about them than vice versa. Because teachers determine students' outcomes, it is important for students to determine how teachers feel about them. Other research on power and emotions indicates that increasing participants' feelings of power

decreases their ability to interpret the emotional displays of others and to determine the meaning behind ambiguous communications (Galinsky et al., 2006). This further supports the link between power and accuracy in perceptions of others.

Power may have an impact upon other mental processes as well. In a broad review of research on power, Keltner et al. (2003) hypothesized that greater power leads to less controlled processing, and more automatic processing, of information about others. Support for that hypothesis comes from research showing that ingroup bias and stereotyping, both examples of automatic processing, are greater among members of higher power groups (Mullen, Brown, & Smith, 1992) and among higher power individuals (Goodwin et al., 2000). These results have been obtained in samples of both adults (Davidson & Birch, 2004) and children (Bigler, Brown, & Markell, 2001; Woods, Kurtz-Costes, & Rowley, 2005).

Fiske (1993) actually used power to help explain stereotyping. According to Fiske, powerless individuals need powerful individuals to accomplish their goals. The powerless thus focus on the powerful and use the information they acquire to make dispositional inferences about those persons. Dispositional inferences are useful because they allow the powerless to make predictions about the behavior of the powerful. The powerless also create more individualized impressions of those who have power over them. Conversely, powerful people do not need to know as much about powerless persons, because they are less dependent upon them. They may, therefore, pay less attention to them. Powerful people also may have more subordinates to monitor, sapping their cognitive resources, and they may not even want to know more about the powerless, so that their stereotypes about those persons can be maintained (supporting the status quo). Subsequent research has supported Fiske's theorizing (Goodwin et al., 2000; Jost, Banaji, & Nosek, 2004; Rodrigues-Bailon, Moya, & Yzerbyt, 2000).

Others have studied the powerless. Powerless people are better at individuating (Guinote, 2004) and decoding the non-verbal signals of those who have power over them (Henley & LaFrance, 1984), and they process stereotype-inconsistent traits in those on whom they depend, presumably so that they can form more accurate impressions of them (Goodwin et al., 2000). Powerful people, in contrast, do not process such information about the powerless. Additionally, Neuberg and Fiske (1987) found that people whose outcomes depended on others paid more attention to information about them and based their impressions of these persons on more individuating information. This suggests that powerless people may be especially knowledgeable about the powerful.

## 1.2 NEW PERSPECTIVES ON POWER

As the literature shows, powerful people often pay little attention to the powerless and sometimes seek out stereotypical, and possibly inaccurate, information about them. However, this research has largely focused on generalized attention (Chance, 1976), the decoding of nonverbal behavior (Galinsky et al., 2006; Henley & LaFrance, 1984), and stereotyping (Fiske, 1993; Goodwin et al., 2000). What about situations in which the powerful <u>are</u> motivated to process information about the powerless? Keltner et al. (2003) claimed that powerful individuals exhibit greater approach tendencies, which may focus them more on their goals. So, it may be hasty to conclude that powerful people always pay less attention to others. Perhaps the relationship between power and attention is moderated by goals. Indeed, recent research shows that powerful people are more interested than others in achieving their goals (Galinsky, Jordan, & Sivanathan, (in press), and are better able to process information that assists them in achieving these goals (Guinote, 2007a). One possible reason for this is the ability of powerful people to

ignore unnecessary information while doing a task (Guinote, 2008). However, few studies have examined situations in which focusing on the powerless might help the powerful to achieve their goals. The available evidence suggests that powerful people may retain more information (not less) about the powerless when information about the powerless seems relevant to the task at hand (Overbeck & Park, 2001), or when this information otherwise helps the powerful to achieve their goals (Overbeck & Park, 2006). For example, people that feel powerful are more likely to select job applicants that "fit" a position than are people that do not feel powerful (Gruenfeld, Inesi, Magee, & Galinsky, 2008). Such findings indicate that power does not always impair social perception. Under some circumstances, it may actually be helpful

## 1.3 TRANSACTIVE MEMORY IN POWERHOLDERS

One way that people learn what others know is by observing them (Wegner, 1987). Therefore, any factor that affects the vigilance of social perceivers has implications for access to transactive memory systems. Transactive memory improves group performance (Lewis, 2004; Liang et al, 1995; Moreland & Myaskovsky, 2000), and powerful individuals work harder at tasks and seize opportunities to meet their goals more readily (Guinote, 2007b). Taken together, these findings indicate that powerful people may opportunistically learn the skills of other group members, when given the goal of improving their group's performance.

In the past, research has shown that powerful people pay little attention to the powerless and sometimes seek out stereotypical, and often inaccurate, information about them. Given such findings, the prospect that powerful people will use transactive memory systems seems poor. However, given that the powerful do pay attention to information about others when that

information is task-relevant, it is possible that they are actually very good at using transactive memory systems when task-relevant information is involved. This suggests two hypotheses:

### 1.4.1 Hypothesis 1

Powerful people will remember more task-relevant information about others than will powerless people.

### 1.4.2 Hypothesis 2

Powerful and powerless people will remember about the same amount of task-irrelevant information about others.

Powerless people, however, have good reason to be interested in the powerful (Fiske, 1993). Due to their greater interest in powerful people (Goodwin et al., 2000; Neuberg & Fiske, 1987), the powerless may be especially knowledgeable about the powerful people in their group. This suggests a third hypothesis:

### 1.4.3 Hypothesis 3

Powerless people will remember more information (of both kinds) about powerful people than they will remember about one another.

## 1.4 RELATED PERSONALITY VARIABLES

Several personality variables may be relevant to the relationship between power and transactive memory systems. For example, Keltner et al. (2003) speculated that dominance and extroversion can increase the effects of power on information processing. Research indicates that dominance replicates some of the effects of power (Goodwin et al., 2000), and that people low in dominance may pay more attention to competence in an interview situation (Operario & Fiske, 2001). And just as extroverts are more susceptible to a positive mood induction (Larsen &

Ketelaar, 1989; 1991), they may be more susceptible to the affects of power, because extroversion and power are both related to approach tendencies (Keltner et al., 2003). Finally, although high self-monitors are less likely to seek help, and thus may use transactive memory systems less often, they pay more attention to helping relationships than do low self-monitors, because high self-monitors believe that people who seek help are generally lower in status than those who provide help (Flynn et al., 2006). Therefore, high self-monitors may know more about the special skills of others. Data were thus collected on all these personality characteristics.

# 2.0 METHOD

## 2.1 OVERVIEW

Participants believed that they were the last person in a group to be trained in a radio-building procedure. They were told either that they would be the leader of the group, that someone else would be the leader of the group, or they were told nothing about group leadership. Participants expected all members of their group to return to the laboratory in about a week to build the radio together. After each participant was trained, the radio he built was scored and some personal information was collected from him. He was then shown the radio-building scores and some personal information for the other three group members. Each participant then completed several personality scales, a measure assessing his recall for the information about the other group members, and a manipulation check measure.

## 2.2 PARTICIPANTS

Participants (N=89) were drawn from Introduction to Psychology courses at the University of Pittsburgh. Participation helped the students to meet a course requirement. Participants (all male) were randomly assigned to conditions. Five participants were excluded because one of them could not understand the instructions (due to language difficulties) and four others expressed suspicion about the cover story. This left 28 participants in the high power condition, 28 participants in the low power condition, and 28 participants in the control condition.

## 2.3 MATERIALS

A blank time sheet was used for participants to report their typical weekly schedules.

An information sheet was used to record the number of assembly errors each participant made, after he was trained, on each component of the radio (see Moreland and Myaskovski (2000)). Some personal information about him (see Appendix A) was also collected. This sheet contained nine pieces of information about the participant's radio-building skills and nine pieces of personal information about him.

Participants were shown an information sheet for each of three other group members, ostensibly collected during previous training sessions. These were identical in format to the sheet used to record the participant's own information. Each sheet was written in different handwriting and contained plausible information about a different (fictitious) person.

Participants next completed an assertiveness scale, an extraversion scale, and a self-monitoring scale. The assertiveness scale had 10 items, each of which participants rated on a 1 to

5 scale. This scale has a reported coefficient alpha of .80, and scores on the scale are highly correlated with dominance, as measured by the CPI (Gough & Bradley, 1996; International Personality Item Pool, 2009). The extraversion scale had 12 items, each of which participants simply agreed or disagreed with. This scale has a reported coefficient alpha of .88 (Eysenck, Eysenck, & Barrett, 1985). Finally, the self-monitoring scale had 13 items, each of which participants rated on a 0 to 5 scale. This scale has a reported coefficient alpha of .75 (Lennox & Wolfe, 1984).

Later in the experiment, participants were given a questionnaire that asked them to rate, using 1 to 7 scales (1 = *Little* and 7 = *A Lot*), how much they knew about each group member's radio-building skills. They were also asked to recall the specific radio-building scores they saw for each group member. This was similar to the questionnaire described by Moreland (1999, Experiment 3). The same ratings were also obtained, and similar questions were also asked, regarding each group member's personal information.

Participants were also given a questionnaire that first asked them whether they would be the leader of the group. This questionnaire also contained a power scale comprised of four items rated on 1 to 7 scales, namely "How powerful do you expect to be in this group?" (1 = *Totally Not Powerful*, 7 = *Highly Powerful*), "How easy do you think it will be for you to get what you want in this group?" (1 = *Totally Not Easy*, 7 = *Highly Easy*), "How much authority do you feel that you will have in this group?" (1 = *Much Less Authority Than Anyone Else*, 7 = *Much More Authority Than Anyone Else*), and "How influential do you expect to be in this group?" (1 = *Totally Not Influential*, 7 = *Highly Influential*). The questionnaire also asked "Are you embarrassed (*Yes* or *No*) by your radio-building ability?." Finally, participants answered two questions (also rated on 1 to 7 scales) designed to test whether the power manipulation affected

their attitude toward the experiment. These questions were “How involved have you felt in this study, so far?” (1 = *Totally Not Involved*, 7 = *Highly Involved*), and “How much have you enjoyed participating in this study, so far?” (1 = *Totally Did Not Enjoy*, 7 = *Highly Enjoyed*).

Participants were given a similar questionnaire for each of the other three group members. Each questionnaire asked the four questions about power and the question about leadership described above, except in reference to a different group member than the participant. These questionnaires did not contain the questions involving embarrassment about radio-building ability, involvement in the study, and enjoyment of the study.

## 2.4 EQUIPMENT

The AM portion of a Tandy Corporation Model 28-175 transistor radio (described in Moreland & Myaskovsky, 2000) was used for the assembly task. This portion of the kit includes many small components (e.g., transistors, resistors, capacitors, and batteries), all of which must be placed on a circuit board and wired together. The circuit board was marked with symbols and numbers to guide the assembly process.

A Wenger wristwatch was used to record how much time participants spent looking at information about other group members.

## 2.5 PROCEDURE

Each participant was brought to the laboratory individually by the experimenter. After informed consent was obtained, the participant learned that my research focused on teamwork. The main goal of the research was (supposedly) to discover whether advance information about a group helps people fit into that group faster, thereby improving group performance. The

participant was told that three other people had already received individual training and practice at assembling a transistor radio, and that the participant would now receive similar training himself. He would then join those other three persons about a week later for a group testing session. The participant was told that the goal of that group was to build a radio as quickly and accurately as possible in the time allotted, and that the best group would be given a $250 prize.

At this time, participants in the high power condition were told that they would be the leader of the group, and thus would be able to determine the day and time of the group's next meeting. Participants in the low power condition were told that another person would be the group's leader; they were also told who that person would be and that he would determine when the group's next meeting occurred. Finally, participants in a control condition were not told anything regarding group leadership. They were told that the experimenter would determine when the group's next meeting would be.

After these introductory remarks, the experimenter demonstrated to the participant the proper procedure for assembling the AM portion of a transistor radio. The participant was free to ask questions during this demonstration. Afterwards, he was given 30 minutes to practice building the radio. The experimenter then identified all of the assembly errors that were made, communicated them to the participant, and recorded them on an information sheet.

Next, the experimenter asked the participant to provide personal information on the same information sheet. The participant was told that this sheet would later be given to the other group members so that they could get to know him better. The participant was told that information sheets describing the other members were already available, because he was the last participant to receive training. He was then given a packet containing those information sheets (which the

experimenter had actually prepared). The experimenter surreptitiously recorded the total amount of time that the participant spent looking at all of these information sheets.

The participant next received tests measuring personality characteristics that could affect transactive memory or the relationship between power and transactive memory. Those characteristics were assertiveness, extroversion, and self-monitoring. After completing these tests, the participant was given a questionnaire to assess how much he thought he remembered, and how much he actually remembered, about the information sheets describing the other members of his group. Finally, the participant was given a questionnaire containing the questions about group leadership and the power scales for himself and for the other members of his group.

After the participant's session was over, he was probed for suspicion, debriefed, thanked for his help, and dismissed.

# 3.0 RESULTS

## 3.1 DATA PREPARATION

Transactive memory errors could potentially be costly to groups. Thus, on the measures of recall for task-relevant and recall for personal information, a correct response was coded as "1," an incorrect response was coded as "-1," and a non-response was coded as "0."

## 3.2 PRELIMINARY ANALYSES

Descriptive statistics for the data can be found in Table 1. The extraversion scale[1] had an alpha of .82, the self-monitoring scale had an alpha of .83, and the assertiveness scale had an alpha of .82. Thus, these scales had acceptable reliability. The obtained range of scores for recall of task-relevant information was -21 to 5 (the possible range was -27 to 27) and the obtained range of scores for recall of personal information was -17 to 23 (the possible range was -27 to 27). The "How much do you know about your group members' skills?" scale had three items (one for each participant) and an alpha of .88. The "How much do you know about your group members' backgrounds?" scale had three items (one for each participant) and an alpha of .89. Thus, these scales also had acceptable reliability. The alpha for the power scale (the manipulation check questions asking participants how much power they expected to have in the group) was .72. However, deletion of the item asking, "How easy do you think it will be for you to get what you want in this group?" improved the reliability to .83. Therefore, that item was

dropped. The range of time that participants spent looking at the information about the other group members was 38 seconds to 366 seconds.

Overall, the mean amount of task-relevant information recalled was very low ($M$ = -7.95, $SD$ = 7.43). In fact, most participants made more errors than correct responses. This may be due to the technical nature of this information and/or the unfamiliarity of the task. The mean amount of personal information recalled was much higher ($M$ = 6.67, $SD$ = 8.97), maybe because of greater familiarity with such information or because it seemed more interesting. There was no correlation between recall of task-relevant information and participants' ratings of how much task-relevant information they knew ($M$ = 2.34, $SD$ = 1.20). Perhaps participants did not realize how poor their recall for this information actually was. A significant positive correlation ($r$ = .52) between recall for personal information and participants' ratings of how much personal information they knew ($M$ = 3.32, $SD$ = 1.08) indicated that participants were more aware of their knowledge in this area.

The lack of a correlation between recall for task-relevant information and the power scale was surprising. This may reflect the difficulty participants had in remembering such information. The significant positive correlation ($r$ = .33) between participants' ratings of how much personal information they knew and the power scale was also surprising. Anecdotally, several participants mentioned during debriefing that they thought some personal information was relevant to the task (e.g., high school GPA might indicate overall intelligence, which might lead to better radio assembly), so perhaps participants who felt powerful thought they should know more about this information because they thought it was relevant to the radio-assembly task.

The significant correlation between participants' recall for personal information and the time they spent looking at information about the other group members ($r$ = .52) was expected

since participants who looked longer at this information should have remembered more. The same holds true for the significant correlation between participants' ratings of how much personal information they knew and the time they spent looking at this information ($r$ = .30). The lack of a correlation between time participants spent looking at information about the other group members and their recall for task-relevant information may, again, be due to the confusing nature of this information The same may hold true for the correlation between participants' ratings of how much task-relevant information they knew about their group members and the time they spent looking at that information.

The conceptual similarity between power and assertiveness may partially explain the significant correlation ($r$ = .28) between these variables. The positive correlations between extraversion and self-monitoring ($r$ = .27), and between extraversion and assertiveness ($r$ = .51), were consistent with previous research (Bono & Vey, 2007; Bouchard, Lalonde, & Gagnon, 1988), although the correlation between assertiveness and self-monitoring ($r$ = .29) is difficult to explain given the nature of these variables. However, an individual's level of self-monitoring is correlated with others' attributions of status to that individual (Flynn et al., 2006), and individuals with high status use assertion to influence others more than do individuals with low status (Kipnis, Schmit, Wilkinson, 1980). Therefore, individuals who are dispositionally high in self-monitoring may be more assertive as well.

## 3.3 PRIMARY ANALYSIS (I)

A one-way ANOVA, $F(2, 79) = 1.67$, $p > .05$, indicated that participants in the high power condition ($M = 4.93$, $SD = .88$), the low power condition ($M = 4.52$, $SD = .85$), and the control condition ($M = 4.83$, $SD = .82$) did not respond differently to the power scale. This constituted a failure of the manipulation check.

Additionally, a (2) (Information Type: Task-Relevant vs. Personal) x 3 (Power: Low vs. Control vs. High) MANCOVA of the recall scores, with order of recall (for task-relevant and personal information) as a covariate[2], showed a significant main effect for information type, $F(1, 81) = 142.40$, $p < .01$. Participants recalled more personal information ($M = 6.67$, $SD = 8.97$) than task-relevant information ($M = -7.95$, $SD = 7.43$). However, the main effect for power, $F(2, 80) = .52$, $p > .05$, and the interaction of power with information type, $F(2, 81) = .88$, $p > .05$, were not significant.[3]

## 3.4 RECODING

A closer examination of the data showed that some participants reported an incorrect leader for their group (e.g., some participants reported that they would lead their group, although they were not in the high power condition). This problem was almost entirely confined to the control condition, where participants were told nothing about group leadership. In spite of this, some still believed that they or another person would lead the group. To correct this problem, some new data were collected with more explicit instructions to participants regarding group leadership (e.g., participants in the control condition were told that the group would <u>not</u> have a leader and group members were expected to work together as equals). Unfortunately, participants

still made incorrect choices about the leaders of their groups. At this point, a decision was made to recode the data already collected (and the newly collected data) to reflect participants' perceptions of their power in the group (see Raven & Fishbein, 1961, for a similar procedure). As a result, 39 participants who believed that they would lead their group were assigned to the high power condition, 34 participants who believed that someone else would lead their group were assigned to the low power condition, and 26 participants who believed that their group had no leader were assigned to the control condition.[4]

### 3.5 PRIMARY ANALYSIS (II)

A one-way ANOVA on the power scale indicated that this new coding scheme captured differences in participants' feelings of power, $F(2, 96) = 4.83$, $p < .05$. Dunnett's $t$ indicated that the high power condition ($M = 5.12$, $SD = .91$) was significantly different ($p < .05$) from the control condition ($M = 4.65$, $SD = .76$), but the low power condition ($M = 4.56$, $SD = .76$) was not significantly different from the control condition. A $t$ test indicated that the mean of the high power condition was significantly different ($p < .01$) from the mean of a new low power condition comprising both the original low power and control conditions ($M = 4.60$, $SD = .76$). Thus, the control condition and the original low power condition were collapsed, yielding 60 participants in the new low power condition. The mean of the high power condition and the mean of the new low power condition also differed significantly ($p < .01$) from the midpoint (4.0) of the power scale.

Hypothesis 1 predicted that powerful people would remember more task-relevant information than powerless people. And Hypothesis 2 predicted that powerful people would remember about the same amount of personal information as powerless people. For the main

analysis, a (2) (Information Type: Task-Relevant vs. Personal) x 2 (Power: Low vs. High) MANCOVA (with order of recall as a covariate) produced a significant main effect of power, $F(1, 98) = 4.67$, $p < .05$. Participants in the high power condition recalled more information overall ($M = .86$, $SD = 12.24$) than did participants in the low power condition ($M = -3.48$, $SD = 12.11$). A significant main for information type was also found, $F(1, 99) = 170.04$, $p < .01$. Participants recalled more personal information ($M = 6.14$, $SD = 8.92$) than task-relevant information ($M = -7.89$, $SD = 7.42$). The interaction between power and information type was not significant, $F(1, 99) = 2.03$, $p > .05$. These results did not support Hypotheses 1 and 2.

Further analyses examined participants' perceptions of their own knowledge about other group members. The ratings by high power participants of how much they knew about group members' personal information contained two outliers, which were deleted from the analysis. Several scores for the ratings of knowledge about task-relevant information and personal information were missing. Little's MCAR test determined that these scores were missing on a random basis, so replacement data were created using an expectation-maximization algorithm (Dempster, Laird, Rubin, 1977). Assertiveness was significantly correlated with participants' ratings of their knowledge about the personal information of other group members, so assertiveness was included as a covariate. A (2) (Type of Knowledge: Task-Relevant vs. Personal) x 2 (Power: Low vs. High) MANCOVA showed that power marginally affected how much participants thought they knew about others overall, $F(1, 96) = 3.59$, $p < .10$. Participants in the high power condition believed they knew more overall ($M = 5.93$, $SD = 1.54$) than did participants in the low power condition ($M = 5.33$, $SD = 1.69$). It should be noted, however, that when the imputed scores were not used, this effect became non-significant. A main effect for type of information, $F(1, 97) = 20.90$, $p < .01$, indicated that participants thought they knew

more personal information ($M$ = 3.14, $SD$ = 1.00) than task-relevant information ($M$ = 2.43, $SD$ = 1.24), which, in fact, they did. The interaction between power and type of information was not significant, $F(1, 97) = .38$, $p > .05$. So, although high power participants did know more about other group members than did low power participants, they were apparently unaware of their knowledge.

The next analysis focused on the total amount of time participants spent looking at information about other group members. Several scores were missing on this variable. Little's MCAR test again determined that the scores were missing on a random basis, so replacement scores were again created using an expectation-maximization algorithm (Dempster et al., 1977). The number of seconds participants spent looking at information about other group members was significantly non-normal, so a log transformation was used to normalize the data. Two outliers were also deleted from the analysis. An ANOVA comparing the number of seconds that high and low power participants spent looking at information about others was not significant, $F(1, 97) = 1.25$, $p > .05$. Participants in the high power condition ($M$ = 102.87, $SD$ = 42.83) did look at group member information longer than did participants in the low power condition ($M$ = 91.93, $SD$ = 32.24), but this difference was not significant. An analysis without the imputed scores yielded the same results. This suggests that high power participants did not consciously try to learn more about other group members, although they did recall more information than did low power participants.

Hypothesis 3 predicted that participants who did not think they would be leader of their group would pay more attention to the leader than they would to other group members. As a manipulation check, participants responded to three items (1 to 7 scales) regarding the power of each person in their group. An ANOVA, $F(1, 33) = 35.46$, showed that the average power rating

of the two persons that participants did not expect to be leader ($M$ = 4.56, $SD$ = .54) was indeed lower than their rating of the person they did expect to be leader ($M$ = 5.46, $SD$ = .65). Order of recall was related to the total amount of information that participants remembered about the expected leader and about other group members ($p < .05$), and so it was included as a covariate in the analysis. However, a within-subject ANCOVA[5] comparing the amount of information participants recalled about the leader of their group ($M$ = -1, $SD$ = 5.57) versus other group members ($M$ = -1.28, $SD$ = 4.22) was not significant, $F(1, 33) = .10$, $p > .05$, although the means were in the right direction. An additional MANOVA comparing low power participants' perceptions of how much they knew about the leader of their group with how much they knew about the two other group members was not significant either. This indicates that Hypothesis 3 was not supported.

## 3.6 EXPLORATORY ANALYSES

Because participants were assigned to power conditions based upon their perceptions of leadership, rather than through random assignment, alternative explanations may account for the results. For example, more involved participants may have been more likely to think they would be leader and to remember more information about others. However, participants' responses to questions about their involvement in and enjoyment of the experiment, as well as their scores on extraversion, self-monitoring, and assertiveness, did not vary significantly across the new high and low power conditions, indicating that differences in recall between those conditions cannot be explained by these variables. Nevertheless, other explanations are possible. For example, participants who remembered more information about other group members may have thought that this made them good candidates to be leaders (because a leader should know more about his

group), causing them to view themselves as leaders. If that were the case, then the amount of information that participants recalled should predict their scores on the power scale. Alternately, participants who spent a long time looking at information about other group members may have reasoned that such diligence qualified them to be group leaders. However, in a regression predicting participants' power scores using the total amount of information they recalled and the number of seconds they spent looking at the information about other group members, neither predictor was significant. Although these analyses do not conclusively prove that feeling powerful caused participants to remember more information about other group members, they at least cast doubt on some alternative explanations.

## 4.0 DISCUSSION

Overall, the results of this study did not support the hypotheses. High power participants did pay more attention to the information that they were given than did low power participants. However, the predicted interaction between power and type of information (task-relevant or personal) was not found. High power individuals did report knowing marginally more about other group members than did low power individuals, but they did not spend more time looking at information about those group members. Also, low power individuals did not remember more about the leaders of their groups than they did about the other members.

Despite the disappointing findings, some conclusions can be drawn about the relationship between transactive memory systems and power. Wegner's (1987) work on transactive memory systems conceptualized them as shared knowledge about who knows what in a group. The current findings suggest that powerful people may have good memory for information in transactive memory systems, because high power participants did remember more information of both kinds about other group members than did low power participants. Wegner's approach to transactive memory relied on general knowledge; he did not distinguish between task-relevant and irrelevant knowledge. Recent research (Galinsky et al., in press; Guinote, 2007a; Guinote, 2008; Keltner et al., 2003) indicates that powerful people should have a special proficiency for remembering task-relevant information, above and beyond irrelevant information. These results indicate this is not the case. Although theorizing by Fiske (1993) and others has portrayed the powerful as inattentive, and sometimes even motivated to maintain inaccurate perceptions, my

research indicates that they may know more information of all kinds about other group members. However, the powerful displayed no special memory for task-relevant information about fellow group members in this experiment.

Therefore, when transactive memory systems are conceptualized as containing only task-relevant information (Liang et al., 1995; Moreland, 1999; Moreland & Myaskovski, 2000), it appears that the powerful have no special advantage. The finding that high power people do not remember more task-relevant information is puzzling, given previous research that indicates otherwise (Overbeck & Park, 2001). Why wouldn't high power participants selectively seize opportunities to better achieve their goals, when previous research indicates that goal pursuit is important to them (Guinote, 2007b), and that they filter out unneeded information (Guinote, 2008)? Several explanations are possible.

My results showed that powerful people recall more information than the powerless from two different domains (task-relevant and personal). Perhaps their goal orientation is equally diffuse. When a person feels powerful in one domain, a stronger goal orientation (Guinote, 2007b) may carry over into other domains, leading the person to retain more information in every domain. In the context of my experiment, high power participants were given a goal (i.e., efficiently building a radio) that was specific to a domain. They may have spontaneously generated other goals (i.e., interacting harmoniously with other group members) in what they viewed as related domains. Pursuit of the first goal would motivate the retention of task-relevant information alone, but pursuit of the second goal would motivate retention of personal information as well. As a result, high power participants remembered more information of both sorts. A slight variation of this reasoning suggests that high power people may believe that all information could (potentially) allow them to better pursue a goal, because they can never be

sure what their future goals are. With this in mind, they may retain as much information as possible in an effort to "hedge their bets" against the uncertainty of the future. In the unpredictable context of a laboratory experiment, high power participants may have been particularly vigilant for any information that could potentially assist them in the future. Additionally, they may have feared that the leader role assigned to them by the experimenter would seem illegitimate to the other group members, which motivated the participants to do what they could to buttress their power by paying more attention to whatever information they saw. Either explanation leads to the same result -- greater recall by high power participants of any and all information about other group members.

Surprisingly, participants' responses to the questions about how much information they knew, and the time they spent looking at information, did not mirror the pattern of actual information recalled. This could mean that powerful people do not intentionally pay more attention to information or intentionally process information more deeply, but rather that ordinary attention and processing are more efficient (Guinote, 2007a), and perhaps even automatic (Keltner et al., 2003), for powerful people. Future research should examine how conscious powerful people are of their efforts to acquire information, and how accurate they are in their beliefs about how much they really know.

Low power participants did not know more about their leader than they did about other group members. This finding is inconsistent with research indicating that powerless people pay more attention to those on whom they depend (Fiske, 1993; Guinote, 2004; Neuberg & Fiske, 1987). Although dependency does motivate more attention and individuation on the part of the powerless, research also indicates that they are less affected by the affordances of their situation (Guinote, 2008), less able to differentiate relevant from irrelevant information (Guinote, 2007a),

and more likely to see patterns in information that are not really there (Whiston & Galinsky, 2008). Perhaps the powerless do pay attention to those on whom they depend, when they have the attentional resources to do so. However, when large amounts of information are available, the motivation to understand and predict the behavior of those on whom they depend may be outweighed by information processing deficiencies among the powerless. This would explain their poorer recall in this experiment. Perhaps if the task had been simpler, and low power participants had been presented with less information, then the predicted results would have emerged.

## 4.1 STRENGTHS AND WEAKNESSES

My research has several strengths. First, it expands current conceptualizations of transactive memory systems. In the past, those systems have been viewed as group resources of task-relevant information that all members share equally (Lewis, 2004; Liang et al., 1995; Moreland, 1999; Moreland & Myaskovsky, 2000; Wegner, 1987). My research investigated the possibility that even though all group members have some access to a transactive memory system, some members may have greater access than others, and some types of information may be more accessible than others. By examining who has the best access to different types of information in transactive memory systems, my research is informative to large organizations, where there are many roles and determining effective task assignments is often critical. By recognizing that different individuals know more (or less) about their fellow group members, my research acknowledges that knowing "who knows what" is a form of expertise in and of itself.

Additionally, my research was conducted in a setting that simulated actual workplace circumstances. The task and instructions participants received were similar to those they would

encounter in real organizations. And the participants saw information about fellow group members in a form that could be replicated in real work settings. In other words, this experiment had good external validity.

However, my research also had some weaknesses. Participants found task-relevant information more difficult to recall than personal information. Given the hypotheses, this is not necessarily a problem. However, if no main effect had been found for type of information, then comparisons between the recall patterns of high and low power participants might have produced stronger results.

Although additional analyses lent more credence to the claim that power caused the pattern of results, the reassignment procedure rendered firm claims of causation difficult. Several previously discussed factors could account for the apparent effects of power on recall. Future studies should use a cleaner manipulation in order to more effectively address the question of causality.

Finally, although a significance test showed that participants in the high power and low power conditions did respond differently to the power scale, the difference between the means for these two groups was little more than half a point. Moreover, the mean of the low power group was not below the midpoint of the scale. If a stronger manipulation had been used, the participants in these two conditions may have experienced stronger feelings of power (or powerlessness). This would likely have produced stronger results.

## 4.2 FUTURE DIRECTIONS

Although this research was informative, it left many questions unanswered. First of all, power was examined here by giving participants real control over their group. Power has also been manipulated in other ways, including majority group membership (Guinote, 2004), the presentation of semantic cues (Chen, Lee-Chai, & Bargh, 2001), and the induction of certain feelings (Galinsky et al., 2006). Future research should use different manipulations of power to determine if the relationship between power and transactive memory access varies under different circumstances.

Many interesting questions can be asked once the idea of differential access to transactive memory systems is recognized. For example, given previous research (Flynn et al., 2006), the lack a relationship between self-monitoring and recall for information about others is surprising. Perhaps, under different circumstances, such as when other individuals are physically present (and impression management becomes possible), a positive relationship would be found. Also research indicates that agentic individuals, who have a strong need for autonomy, may use greater differentiation when processing information than communal individuals, who have a strong need for interdependence (Woike, Lavezzary, & Barsky, 2001). Perhaps agentic individuals would learn more about the differences among group members, whereas communal individuals would be more comfortable asking others for help.

Finally, although the powerful may have greater access to transactive memory systems in groups, this experiment did not test whether they actually use that information. I assumed that those with greater transactive memory access would use that access to improve group performance (or their own performance). However, that assumption has not yet been

investigated. For example, powerful people, although they know a lot about others, may not ask them for assistance for fear of conferring status upon them (see Flynn et al., 2006) or threatening their own standing in the group (Lee, 1997). Furthermore, if a group contains one powerful individual with greater transactive memory access, will that person inform others of what he or she knows, thereby increasing the access of others to the system, or will the person hoard this information for his or her personal use? What if only the group leader knows anything about the group's members? Can that leader effectively use this information? Also, low power group members may not ask for help from high power group members because of their own motivation to become powerful (Lee, 1997). Will this prevent them from utilizing transactive memory systems when powerful people are present in a group? Finally, will any of these variables affect transactive memory system access enough to impact the performance of a group?

## 4.3 CONCLUSION

On one hand, these results argue for the efficacy of conventional status hierarchies in groups; the people in charge tend to know the most about those around them. A good manager should know his or her subordinates and this experiment indicates that most managers probably do. On the other hand, care must be taken when interpreting these findings. Retention of all information may sound as if it would be beneficial (and many times, it surely is). But this constant vigilance could come at a cost. Managers, like all people, have limited cognitive resources. By failing to focus narrowly on pertinent information (cf. Guinote, 2007a), the powerful may be missing opportunities to gain greater access to key aspects of transactive memory systems, which would allow them to better match tasks with workers. Although it is good to keep an eye on the forest, managers should remember that sometimes the trees are more important.

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## FOOTNOTES

[1]For items on this scale, a response of "*No*" was coded as "0" and a response of "*Yes*" was coded as "1," although two items were reverse scored. Then, all items were summed. This made the possible range of this 12-item scale 0 to 12.

[2]Assertiveness, extraversion, and self-monitoring were not related to the total amount of information that participants recalled. Therefore, they were not included as covariates. However, participants recalled significantly less information when they were asked to recall task-relevant information first, $F(1, 82) = 7.14$, $p < .05$. So, order of recall was included as a covariate.

[3]In the low power condition, participants' scores on recall for personal information contained one outlier. The exclusion of this outlier did not affect the analysis, however, so it was retained.

[4]In this new data set, assertiveness was significantly correlated ($r = .24$, $p < .05$) with ratings of how much personal information participants thought they knew about other group members.

[5]Inclusion of one outlier did not affect the analysis, so it was retained

Table 1. *Intercorrelations between dependent measures and scales*

| | *M*/*SD* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Task-relevant Information | -7.95/7.43 | - | | | | | | | | |
| 2. Personal Information | 6.67/8.97 | .08 | - | | | | | | | |
| 3. Task-relevant Information Scale | 2.34/1.20 | -.21 | .10 | - | | | | | | |
| 4. Personal Information Scale | 3.32/1.08 | .05 | .52** | .01 | - | | | | | |
| 5. Power | 4.80/.86 | -.11 | .19 | .14 | .33** | - | | | | |
| 6. Seconds Looking at Information | 100.35/51.15 | -.03 | .52** | .08 | .30* | .11 | - | | | |
| 7. Extraversion | 8.14/3.10 | .06 | -.05 | .08 | -.10 | .12 | -.17 | - | | |
| 8. Self-monitoring | 3.37/.58 | -.13 | .10 | .20 | .04 | .16 | .00 | .27** | - | |
| 9. Assertiveness | 3.65/.85 | -.02 | .16 | .16 | .20 | .28* | -.08 | .51** | .29** | - |

*$p < .05$. ** $p < .01$.

# 6.0 APPENDIX

Name:_____

Please provide the following information:

Age:

Year in school:

Major:

Hometown:

High school:

High school GPA:

Leadership experience:

Previous employment:

Current employment:

Assembly errors:

Resistors:

Capacitors:

Transistors:

Transformer:

The bar antenna:

Tuning capacitor:

The battery:

Wiring:

The earphone: