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Separating the confident from the correct: Leveraging member knowledge in groups to improve decision making and performance

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ABSTRACT

Groups often struggle to distinguish expert members from others who stand out for various reasons but may not be particularly knowledgeable (Littlepage & Mueller, 1997). We examined an intervention designed to improve group decision making and performance through instructing group members to search for information they already possessed that was relevant to a problem. Participants estimated values and expressed their confidence in their estimates individually and then a second time either individually or in a group. This was done with or without the intervention. Results indicated that: (1) groups were more confident than, and out-performed, individuals, (2) group decision making was best captured by models predicting more influence for more accurate members when the intervention was used and more influence for more confident members in its absence, and (3) groups that received the intervention out-performed groups that did not.

Introduction

In a group, each member brings different expertise, and confidence in that expertise, to the task. However, to be successful, this expertise must be properly utilized (Faraj & Sproull, 2000; Littlepage, Hollingshead, Drake, & Littlepage, 2008; Stasser, Stewart, & Wittenbaum, 1995). So, the challenge in many problem-solving situations is how to leverage the knowledge of group members to solve a given problem (Lightle, Kagel, & Arkes, 2009; McGrath, 1984), or how problem solvers can bridge the gap between what they already know and what they are trying to figure out (Hummel & Holyoak, 1997).

To effectively leverage their knowledge, group members must be capable of distinguishing member inputs in terms of their accuracy. This may be difficult because some of the more salient factors that seem to signal an individual's competency do not consistently correlate with actual accuracy (Bonner, Sillito, & Baumann, 2007; Littlepage, Schmidt, Whistler, & Frost, 1995; Trotman, Yetton, & Zimmer, 1983). Importantly, research has shown that member confidence, irrespective of its merit, can serve as a compelling proxy for member accuracy (Sniezek, 1989), as can member extroversion (Bonner, 2000). The problem, then, is how group members can demonstrate the actual merits of their preferences to one another in a context filled with potentially misleading cues (Laughlin & Ellis, 1986).

We examined how a knowledge transfer intervention aimed at increasing the ability of group members to demonstrate the quality of their preferences affects the decision-making process of cooperative groups. This intervention involves accessing knowledge already held by group members; it does not require external sources of information (e.g., performance feedback) that may be difficult or costly to acquire (e.g., Ashford, Blatt, & VandeWalle, 2003; Bonner, Baumann, & Dalal, 2002) or intensive coaching (e.g., Hackman & Wageman, 2005a). It could thus be implemented across a wide range of real world problem-solving tasks. We tested the impact of member accuracy, confidence, extroversion, and other factors on decision making with and without this intervention and examined how the intervention affects performance and if social context moderates its effectiveness.

Enhancing demonstrability through knowledge transfer

People solve unfamiliar problems by transferring knowledge they possess from past learning to the new situation (Blanchette & Dunbar, 2001; Ellis, 1965; Haslered, 1972; Holyoak & Thagard, 1997; Kolodner, 1997; Nokes-Malach, 2009). The defining feature of knowledge transfer interventions is that they help people recognize the potential usefulness of knowledge in the context of an

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unknown problem (Cronbach, Hilgard, & Spalding, 1963; Hume, 1961; McGeoch, 1942; Nokes-Malach, VanLehn, Belenky, Lichtenstein, & Cox, 2012; Simon, 1973, 1980). The most efficient and broadly applicable method of promoting transfer is to engage the meta-cognitive processes of problem solvers through facilitating reflection on what they already know as it relates to the problem at hand (Borkowski, 1985; Resnick, 1989). This type of intervention would also be expected to enhance the ability to demonstrate the value of one's knowledge to others.

Demonstrability is a function of several factors (Laughlin, 1999; Laughlin & Ellis, 1986). First, problem solvers must share the conceptual systems necessary to comprehend and meaningfully communicate about the task (i.e., a shared mental model, Cannon-Bowers, Salas, & Converse, 1993; Orasanu, 1994). Second, problem solvers must have access to adequate information. Finally, problem solvers who are accurate must be motivated and able to communicate their preferences to other members, and individuals who are inaccurate must be able to recognize accurate proposals when such proposals are introduced. By definition, factors that alter the nature of the task (e.g., making more information accessible) or that affect the problem solvers themselves (e.g., increasing understanding of the problem space or their ability to communicate effectively about the problem) often affect demonstrability (Laughlin & Ellis).

In many contexts, it is difficult to judge the accuracy of group members' preferences (Littlepage & Mueller, 1997). To the extent that group members cannot adequately convince others of the accuracy of their preferences or judge the accuracy of others' preferences, salient proxies that are not directly related to objective task performance can be influential. A number of factors may play this role, including how conservative (Davis, 1996) or extreme (Van Swol, 2009) a member's preference is, the confidence conveyed by group members (Henry, 1993), or member extroversion (Bonner et al., 2007). Reasons for relying on proxies to infer expertise include cognitive efficiency (Fiske & Taylor, 1991; Sy, 2010) as well as the tendency to conflate the characteristics associated with leadership prototypes (e.g., confidence and extroversion) with an individual's expertise (Lord & Maher, 1993; Schyns & Meindl, 2005). Research has shown that confidence, which is often evaluated by having problem solvers supply "credibility intervals" around their estimates (Judge & Remis, 2002), can affect both the consensus process and performance of groups (Hinsz, 1990; Johnson & Torcivia, 1967; Stephenson, Abrams, Wagner, & Wade, 1986; Zarnoth & Sniezek, 1997). Yet a number of studies have shown that confidence may not strongly reflect an answer's actual quality (e.g., Henry, 1993; Sniezek, 1989). Similarly, extroverted group members may exert a substantial degree of influence on interactive group decisions (Bonner, 2000), particularly in the absence of external information (Bonner et al., 2007), regardless of how accurate those members are.

Although attempts to promote effective knowledge transfer in individuals have had little success over the 112 years of research on the topic (Detterman & Sternberg, 1993; McKeough, Lupart, & Marini, 1995; Thorndike & Woodworth, 1901), recent research suggests that this may be due to the focus of that research on individuals rather than on groups. Bonner and Baumann (2012) argue that groups, by virtue of their superior processing power relative to individuals (Hinsz, Tindale, & Vollrath, 1997), may be better equipped to handle the extensive processing and memory demands of knowledge transfer interventions, and that facilitating knowledge transfer in groups could benefit decision making and performance by increasing the demonstrability of the task.

Interventions promoting the transfer of knowledge are likely to affect task demonstrability in multiple ways. First, a broader conceptual understanding of a problem, and thus the likelihood of developing a shared understanding, is facilitated when people are encouraged to relate a given problem to information more broadly (Bruner, 1973; Reeves & Weisberg, 1994). That is, by reflecting expansively on what can be recalled about the object of the problem prior to attempting to solve the problem itself, problem solvers can establish the foundation for a shared understanding of the problem (c.f., Cannon-Bowers et al., 1993; Hollingshead & Brandon, 2003). Similarly, knowledge transfer interventions may reveal "social sharedness," the degree to which group members share cognitions that allow them to combine their skills, abilities, and insights more effectively (Kameda, Tindale, & Davis, 2003; Laughlin, 2011; Laughlin, Hatch, Silver, & Boh, 2006). Furthermore, facilitating reflection on relevant information would be expected to increase the amount and variety of information that is cognitively available. This parallels research showing that generating multiple hypotheses de-biases judgments in a variety of contexts (Asare & Wright, 1995; Hirt & Markman, 1995; Janis, 1972) and can thereby lead to improved performance (Laughlin, Bonner, & Altermatt, 1998). Finally, those with better access to relevant knowledge, or who have a better understanding of a problem, are better at assessing the value of others' contributions (Birnbaum & Stegner, 1979; Kruger & Dunning, 1999) and are more effective at influencing others (Bottger, 1984; Hastie, 1986; Voss, Kennet, Wiley, & Schooler, 1992), as compared to those with less information or understanding.

To summarize, groups, as compared to individual problem solvers, may be better able to benefit from knowledge transfer interventions. This superiority stems from groups' superior storage and processing capacity compared to individuals (Hartwick, Sheppard, & Davis, 1982; Hinsz et al., 1997; Polson, 1988). This effect is further enhanced as a function of increasing demonstrability (Laughlin & Ellis, 1986) through which members of the group become more proficient at assessing the merit of one another's preferences.

Associated knowledge

Henry (1995) explored an information-sharing intervention designed to enable group members to use their existing knowledge more effectively. Her research included an information-sharing condition, in which members of groups were instructed to list relevant pieces of information that came up in their discussions after the fact. This approach was designed to facilitate a shared understanding of the value of the information that group members possessed. Similarly, we instructed participants in our research to search their memories for information relevant to the problem at hand. In contrast to Henry's study, we instructed participants to conduct this search early in the problem solving process rather than after the group discussion.

There are at least two primary methods that problem solvers might use to search for information. First, we would expect problem solvers to seek factual task-relevant information (Henry, 1993). Problem solvers, particularly those working in groups, do a better job of estimating the land area of Illinois when given the area of Michigan (Laughlin, Bonner, Miner, & Carnevale, 1999). Second, problem solvers could actively consider the processes and strategies that one might apply to approaching the problem at hand. That is, problem solvers may consider their meta-knowledge (i.e., strategy and process information) relevant to the problem-solving enterprise (Masui & De Corte, 1999). Strategy and process information, as we define it, deals with the issues of how information should be obtained (e.g., first-hand experiences, formal training, television, etc.), shared, weighted, or evaluated (e.g., first-hand experience constitutes the most reliable information; information from tabloids should be discounted; etc.), or how to approach the problem (e.g., first establish the range of possible answers; what would a likely or unlikely value for this problem look like?; etc.).