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ANTECEDENTS AND PERFORMANCE BENEFITS OF RECIPROCAL VICARIOUS LEARNING IN TEAMS

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INTRODUCTION

Team learning – the process of sharing, distributing, and coordinating knowledge across individuals within a team (Argote & Gino, 2009) – has been recognized as a critical activity for high-performing teams and organizations. Particularly in modern organizations, where work tasks and the expertise required to perform them are increasingly distributed across both people and places, sharing and integrating team members' diverse knowledge is a key competitive advantage (Davenport, David, & Beers, 1998; Moreland & Myaskovsky, 2000). This interpersonal experience- and knowledge-sharing component of group learning (in contrast to groups' collective learning from a common experience) can be characterized as a form of *vicarious learning* (Bandura, 1977), reflecting individuals' efforts to learn from others' experiences, which are shared through observational or interactional means (Myers, 2015).

A vicarious learning perspective emphasizes individual interactions as the fundamental building blocks of team learning, as team members share and seek knowledge and experiences through their network of relationships with one another (e.g., Glynn, Lant & Milliken, 1994). Correspondingly, substantial research attention has been devoted to the factors that drive these sharing and seeking processes underlying vicarious learning, such as individuals' expertise, personality, and motivation (Hofmann, Lei, & Grant, 2009; Quigley, Tesluk, Locke, & Bartol, 2007), as well as broader social factors such as trust, psychological safety, team goal orientation, and relationship strength (Bunderson & Sutcliffe, 2003; Edmondson, 1999). However, despite these efforts toward understanding vicarious learning in groups, existing perspectives on how team members learn from one another's experiences are still limited in at least two important ways. First, prior research has tended to view this process of vicarious learning as unidirectional – that there is a "sharer" of knowledge and a "learner" who receives the knowledge, and that these roles are stable within a dyadic learning relationship. Second, prior studies of team learning have made a key assumption of uniformity, viewing learning as happening equivalently between all individuals in the team (i.e., that team members all learn the same "lesson" from the shared experience). However, each team member likely participates in vicarious learning differently as a function of different individual attributes, and may draw different lessons from another's experiences based on the nature of his or her relationship with the sharer.

These critical assumptions of unidirectionality and uniformity mask key differences in the way individuals learn from one another within a team, resulting in overly broad generalizations of this learning process (i.e., an emphasis on *how much* a team learns from its members, rather than *how* this learning occurs among team members) that inhibit the field's understanding. There is thus a need for a more nuanced understanding of the patterns of how this learning occurs (e.g., examining the impact of two-way, vs. unidirectional, learning relationships and the potentially non-uniform distribution of these learning relationships within a team) rather than simply assessing how much learning goes on overall in the team.

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One critical element of this pattern of learning lies in the degree of *reciprocity* of vicarious learning between individuals in a team – where person A learns from the experiences and insight shared by person B, and B in turn learns from those shared by A. Broad concerns for reciprocity have been conceptually linked (at the unit- and organizational-level of analysis) to greater motivation to engage in knowledge sharing (between organizational subunits or subsidiaries; Dyer & Nobeoka, 2000; Schulz, 2001), and recent work has empirically observed reciprocity as an important feature of inter-unit knowledge relationships (e.g., Caimo & Lomi, 2014). Yet, notwithstanding this evidence that reciprocity exists in learning relationships at work (at least at aggregated unit- or firm-levels), relatively little is known about the process of reciprocal learning between individuals (i.e., members of a particular team or unit). The degree of reciprocity in team members' vicarious learning relationships thus reflects a fundamental, but poorly understood, feature of a team's learning network. Therefore, this paper offers an early exploration of the antecedents and consequences of reciprocal vicarious learning in work teams.

RECIPROCITY IN VICARIOUS LEARNING

Apart from a general norm or expectation of reciprocity in learning (e.g., Kang, Morris, & Snell, 2007), little is known about who is more or less likely to engage in reciprocal learning, or about the relative performance effects of reciprocal vicarious learning (compared to one-way knowledge sharing). To better conceptualize this phenomenon, I first distinguish between two levels of reciprocity: one at the individual level and the other at the team level. At the individual level, I define *individual vicarious learning reciprocity* as the extent of a person's involvement in reciprocal (vs. non-reciprocal) vicarious learning relationships. The more vicarious learning that occurs in both directions between an individual and another team member (across all of an individual's dyadic learning relationships in the team), the greater the individual's degree of vicarious learning reciprocity. Correspondingly, I define *team-level reciprocation of vicarious learning* as the proportion of these individual-level reciprocal vicarious learning relationships within a team (out of all the member-member relationships in the team network). In this sense, team-level reciprocation is distinct from other characteristics of a network, such as its density (Newman, 2009). Whereas density reflects the overall proportion of ties realized in the network out of all possible ties, reciprocation emphasizes the directionality of these ties, specifically capturing the proportion of bi-directional ties out of the total number of realized ties.

Antecedents to Individual Vicarious Learning Reciprocity

In light of the potential benefits of reciprocal vicarious learning, it is valuable to determine its antecedents – in other words, what might make individuals more or less likely to reciprocate in their network of team learning relationships. Indeed, the bulk of research on learning networks focuses on the consequences of an individual's network position (see Borgatti & Cross, 2003), but there is growing interest in understanding the determinants of an individual's network of knowledge and advice relationships at work (e.g., Singh, Hansen, & Podolny, 2010).

Team Learning Norms. One key influence on team member's engagement in reciprocal vicarious learning lies in the learning norms developed in the team. Teams can develop shared language and anticipated behaviors centered around learning from one another, and establishing this mutual learning as a norm reduces the costs and risks of engaging in knowledge sharing (Borgatti & Cross, 2003). Stronger team learning norms should thus help facilitate greater

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reciprocity in vicarious learning in the team by removing some of the barriers to sharing one's knowledge and experience (Bartol & Srivastava, 2002), and also by developing a shared expectation that vicarious learning is to occur in the team. In this sense, in the presence of strong learning norms, one person sharing an experience with another team member should act as a cue of the team norm, thereby encouraging the other to share in return, yielding greater individual vicarious learning reciprocity among team members.

Hypothesis 1: Team norms promoting learning and knowledge sharing positively influence an individual's reciprocal vicarious learning with other team members.

The Moderating Role of Learning Motives. Though team norms can alter individuals' motivation to engage in more reciprocal vicarious learning, this motivation is complex and multi-determined (e.g., Quigley et al., 2007). Recent research has explored individuals' differing motives for engaging in learning at work, finding that people vary in their underlying reasons for learning, including the desire to use learning to help others at work (an intrinsic, other-focused learning motive; Myers & DeRue, 2013). This motive encourages individuals to engage in learning experiences at work that allow them to not only improve their own work, but also use the experience to help others develop. As such, greater intrinsic, other-focused (IO) motives for learning should create a stronger belief that one person's experiences are beneficial to others' learning in the team, and should encourage more reciprocity in knowledge sharing even in the absence of shared learning norms. IO learning motives can thus be seen as compensatory with strong learning norms (such that strong norms for sharing knowledge in the team substitute for low IO learning motives, and vice versa).

Hypothesis 2: Greater intrinsic, other-focused (IO) motives for learning attenuate the positive effect of team norms on an individual's reciprocal vicarious learning.

Performance Benefits of Team-level Reciprocation of Vicarious Learning

Organizations have long used teams as a vehicle for channeling individuals' knowledge into performance outcomes, and the effectiveness of this performance is driven by teams discerning and incorporating the relevant experience of each team member (Littlepage, Robison, & Reddington, 1997). As such, understanding how this learning is distributed across individuals in the team (i.e., who learns with and from whom) is critical for understanding the downstream performance effects of team learning (e.g., Argote & Ophir, 2002).

Direct Effects of Team-level Reciprocation. Recent theorizing about coactive vicarious learning (Myers, 2015) suggests that reciprocal vicarious learning relationships can generate a number of benefits above and beyond one-way vicarious learning relationships, including greater transactive knowledge (Moreland & Argote, 2003) and the development of shared mental models (Cannon-Bowers, Salas, & Converse, 1993). For instance, though one-way vicarious learning or knowledge sharing allows the receiver to become aware of what the sharer knows (transactive knowledge), the reverse is not true – a sharer is assumed to gain no new awareness about what the receiver knows. By contrast, in a reciprocal vicarious learning relationship, each person develops a rich set of transactive knowledge about the other, affording them a more robust "map" of the expertise in the group, which significantly enhances group performance (Moreland & Myaskovsky, 2000). Greater reciprocation of vicarious learning should thus have a direct,

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positive effect on team performance, stemming from team members' greater understanding of each other's knowledge and mental models.

Hypothesis 3: Greater team-level reciprocation of vicarious positively influences team performance.

Team-Level Reciprocation and the Effects of External Learning. Beyond this direct effect on performance, the degree of reciprocation in a team's vicarious learning relationships can also impact performance indirectly, by resolving the contradictory effects of teams' engagement in external learning on performance observed in prior research. In addition to their internal learning (i.e., vicarious learning among team members), teams often engage in learning beyond their boundaries (external learning; Ancona & Bresman, 2005), through processes such as team member rotation or knowledge transfer through a team member's outside relationships (e.g., Kane, 2010; Uzzi & Lancaster, 2003). This external learning has been paradoxically viewed as complementing teams' internal learning (positively interacting to build capacity and enhance performance) but also as conflicting with internal learning (as engaging in both internal and external learning harms performance by over-taxing teams' cognitive and temporal resources), with empirical evidence in support of both perspectives (e.g., Bresman, 2010; Wong, 2004).

Considering a team's reciprocation of vicarious learning relationships may help reconcile this paradox. As noted earlier, teams with greater vicarious learning reciprocation should have pairs of team members with richer shared mental models and greater cross-understanding of each other's perspectives, which can allow team members to learn and perform more effectively and efficiently (allowing members to devote less time and energy to communicating and sharing knowledge; Huber & Lewis, 2010). Thus, greater reciprocation of vicarious learning should enable teams to engage in internal learning more efficiently, freeing cognitive and temporal resources to engage in external learning without impeding performance.

Hypothesis 4: Greater team reciprocation of vicarious learning moderates the relationship between team external learning and team performance. Specifically, when team vicarious learning reciprocation is higher (lower), greater external learning will more positively (negatively) influence team performance.

METHODS

I tested these hypotheses in a sample of MBA student project teams (n = 441 individuals in 88 teams), who worked full-time over 7 weeks on a consulting project for an organizational client. Participants completed multiple surveys over the course of their consulting projects to assess their own attitudes and behaviors, as well as their learning relationships with other team members. After the conclusion of the project, the company project sponsor (i.e., the client for each team's consulting project) rated the team's performance.

Measures and Analysis

The main variables of interest in this study – individual-level vicarious learning reciprocity and team-level reciprocation of vicarious learning – were assessed using a novel measurement approach. This approach builds on recent developments in network methodology

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introduced by Squartini and colleagues (2013), who model reciprocity not as the simple presence or absence of bi-directional ties (the prevailing method in extant research), but rather as the relative strength of the reciprocated tie, such that dyads can have more or less reciprocal relationships (rather than simply being reciprocal or not). As an example, consider a dyad where individual *i* reports learning vicariously from the experience of individual *j* to a great extent (reporting a value of 5 on a 5-point scale; w_{ji}= 5), while individual *j* reports learning vicariously from the experiences shared by *i* to a lesser extent (reporting a value of 2 on the scale; w_{ij}= 2). As Squartini and colleagues (2013) demonstrate, this dyadic relationship can be decomposed into a fully reciprocated tie of weight 2 ($w_{ij}^{\leftrightarrow}$= 2) and a fully unreciprocated tie (from *j* to *i*) with a weight of 3 ($w_{ij}^{\leftarrow}$= 3, which inherently makes $w_{ij}^{\rightarrow}$= 0). Stated more formally, any dyadic relationship (w_{ij}, w_{ji}) can be equivalently decomposed as $\left(w_{ij}^{\leftrightarrow}, w_{ij}^{\rightarrow}, w_{ij}^{\leftarrow}\right)$, where $w_{ij}^{\leftrightarrow}$ represents the fully reciprocal portion of the tie weight and $w_{ij}^{\rightarrow}$ and $w_{ij}^{\leftarrow}$ represent the fully unreciprocated portions of the out-degree and in-degree weight (for individual *i*), respectively.

Following this approach, *individual vicarious learning reciprocity* was measured via a whole-network, within-team survey, asking individuals to rate the extent to which they learned from the experiences shared by each other team member. I used these responses to compute the reciprocal and unreciprocated tie weights for the dyadic vicarious learning relationship between a given individual and each other team member as described above. I then calculated total reciprocal and unreciprocated tie strength for each individual using common node-level tie weight aggregation methods (Squartini et al., 2013), and adjusted for differences in the number of potential ties in each team network. This yielded a measure of individuals' average vicarious learning reciprocity ($\bar{s}_i^{\leftrightarrow}$) defined as the total reciprocal tie strength among an individual's dyadic learning relationships in the team, divided by the number of these dyadic relationships (i.e., one less than the number of team members [n]):

$$\bar{s}_i^{\leftrightarrow} = \frac{\sum_{j \neq i} w_{ij}^{\leftrightarrow}}{(n-1)} \tag{1}$$

Team-level reciprocation of vicarious learning was measured using the same survey responses, but aggregated to capture the overall degree of reciprocal vicarious learning strength within the team. Again following Squartini and colleagues (2013), team vicarious learning reciprocation (r) was calculated by taking the proportion of the sum of all team members' total reciprocal vicarious learning tie weight out of the total weight of the team network:

$$r = \frac{W^{\leftrightarrow}}{W} = \frac{\sum_i \sum_{j \neq i} w_{ij}^{\leftrightarrow}}{\sum_i \sum_{j \neq i} w_{ij}} \tag{2}$$

In addition to these focal measures of reciprocity, individual *IO learning motives* were assessed using the measure developed by Myers and DeRue (2013), *team learning norms* were measured with items adapted from existing studies (Bunderson & Sutcliffe, 2003; Quigley et al., 2007), and *team external learning* was measured by surveying all team members regarding the extent to which they engaged in learning from a variety of sources outside of the team (e.g., industry experts, other teams, or faculty). After testing for adequate within-group agreement, the latter two measures were aggregated to the team-level. *Team performance* was assessed by the company project sponsors, using a measure developed for the consulting project program.

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As my hypotheses involve effects at the individual- and team-levels, I conducted two sets of analyses. For testing individual-level hypotheses (H1 and H2), I employed a set of multi-level regression models, and for team-level hypotheses (H3 and H4) I used a set of OLS regression models. In these analyses, I examined my focal constructs of interest above-and-beyond the effects of a number of theoretically relevant controls, including individuals' age, gender, expectations for learning, feedback seeking behavior, and other motives for learning, as well as team size and familiarity. I also account for other characteristics of the vicarious learning network in the team (specifically its centrality and density at the team level, and the unreciprocated in- and out-flows of vicarious learning at the individual level).

RESULTS AND DISCUSSION

The results of these analyses provided support for all four hypotheses. At the individual level, multi-level regression results revealed that individual team members' vicarious learning reciprocity was positively influenced by learning norms in the team (H1), although this influence was attenuated by individuals' intrinsic other-focused motives for learning (H2). At the team level, results revealed that greater reciprocation of vicarious learning within a team positively influenced team performance, both directly (H3) and indirectly through increasing the performance benefit of external learning activities (H4). Indeed, the effects of external learning differed significantly depending on the team's vicarious learning reciprocation, such that greater external learning positively influenced performance in high-reciprocation teams, but negatively influenced performance in low-reciprocation teams. These effects were above and beyond a variety of controls related to individual- and team-level learning, which generally had sparse effects on reciprocal vicarious learning and team performance.

Introducing reciprocity to the study of vicarious learning advances the literature on learning in teams in multiple ways. By considering individuals' vicarious learning reciprocity, the results presented here shift the conversation about team learning, providing a dyadic-level explanatory mechanism for differences in teams' ability to learn from their members' unique experiences and knowledge. At the same time, focusing on reciprocity of vicarious learning challenges a long-standing (albeit largely implicit) assumption in prior literature that learning occurs only in one direction between individuals (e.g., novices learning from experts). These prior approaches have also tended to over-simplify interpersonal learning at work, examining merely the one-way sharing or seeking of knowledge with little attention to whether the recipient actually learned from the shared knowledge. By placing conceptual and empirical emphasis on an individual's actual learning from others' experience, the present study addresses the true underlying process of interest (i.e., learning), rather than inferring learning from the presence of constituent components (e.g., knowledge sharing). Indeed, seeking or sharing knowledge are necessary, but not sufficient, components of the learning process (as sought knowledge may not be shared, and shared knowledge may not actually be learned). A vicarious learning lens may thus provide a means for integrating prior research on knowledge sharing and seeking into a more unified perspective of interpersonal learning at work, while also providing a mechanism of aggregation to the collective-level through the distribution (including the reciprocity) of vicarious learning dyads within the broader group, team, or organization.

REFERENCES AVAILABLE FROM THE AUTHOR