SOCIAL CAPITAL AND TRANSACTIVE MEMORY SYSTEMS IN WORK GROUPS: A MULTILEVEL APPROACH

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ABSTRACT

A multilevel, multi-theoretical model of transactive memory was developed by integrating the emergence model with social capital theories. Empirical tests showed that individual social capital significantly impacted the development of the micro-level component of transactive memories, but collective social capital did not significantly influence the development of macro-level transactive memories.

INTRODUCTION

The burgeoning research interest in studying how organizations pool these distributed resources together has brought about fundamental changes in how we conceptualize organizational cognition. One major change is recognition of the importance of communication for organizational learning (Weick & Ashford, 2000). Communication provides not only conduits for information exchange, but also mechanisms to generate, transfer and retain knowledge (Wegner, 1987). Conscious efforts have been made to incorporate communication in organizational learning theory. One prominent example is Wegner's transactive memory theory (1987; 1995). He proposes that a transactive memory system is "a group information-processing system" (1987, p 191) made up of individual memory systems, as well as communication processes linking them together. In the past two decades, the theory has attracted considerable attention in the research community about the developmental processes of transactive memories and their impact on performance (Brandon & Hollingshead, 2004; Liang, Moreland, & Argote, 1995; Moreland & Myaskovsky, 2000; Rulke & Rau, 2000; Wegner, 1987, 1995).

Although transactive memory theory has shown great promise for understanding distributed intelligence, the theory needs further development in two critical areas: cross-level linkages and network properties. First, the theory falls short of spelling out the multilevel nature of group cognition. Wegner (1995) argues that individual directory updating, information allocation and information retrieval are vital for the development of shared transactive memory systems (p. 320). In essence, transactive memory is a macro-level concept describing collective cognition. But the actual actions of encoding, storage and retrieval of knowledge are all taken by individual persons at the micro level. How do the three individual-level actions produce results at the collective level? What are the cross level mechanisms that link micro-level activities and collective outcomes? In the original articulation of transactive memory theory, the multilevel nature of the concept and the cross-level linkages between individual and collective cognition were implied, but were not made explicit enough to draw the attention of subsequent researchers. Ensuing discussions of the development of transactive memory systems tend to shift between levels of analysis, without specific efforts to make cross-level connections. Second, although the theory asserts that transactive memory systems describe networks of individual minds (Wegner, 1987), this property has never been fully explored in either his original articulation of the theory (1987), further theoretical developments (1995), or empirical research. Yet network relationships are crucial for the development of transactive memories because they provide connections among disparate individual memory systems, and validate false judgments of expertise.

The current research explores solutions to these two problems. First, it develops transactive memory theory from a multilevel perspective using the emergence framework developed by Kozloswski and Klein (2000). Second, it formulates a network theory of transactive memory by developing a series of propositions from social capital theories about how individual and collective social capital shape the development of knowledge directories at the individual level and transactive memory systems at the collective level. Finally, the research provides a multilevel structural equation test of the proposed multilevel, multi-theoretical model.

TRANSACTIVE MEMORY THEORY FROM A MULTILEVEL PERSPECTIVE

To develop transactive memory theory from a multilevel perspective, Kozlowski and Klein (2000) conceptualization of emergence is used as the guiding framework. They argue that a phenomenon is emergent when properties of individual elements manifest at the collective level via interactions. Elemental content describing individual cognition, affect and behavior, is "the raw material of emergence" (p. 55). Interaction is the process through which people share feelings and exchange resources. "The form of interaction process, in combination with the elemental content, comprises the emergent phenomenon" (p 56).

Reframed from a multi-level perspective, transactive memory refers to a macro-level cognitive representation of knowledge distribution of a group or organization that emerges from micro-level interactions. Individual mental maps of knowledge distribution form the elemental content for emergent transactive memory systems at the macro-level. Information allocation and retrieval are the two major interactive processes through which people develop and update the elemental content for the emergent transactive memory. Through social interactions, congruent knowledge directories develop at the collective level from the bottom up. The extent to which this mental map is accurate, consensual, and convergent across individuals reflects the level of development of transactive memory at the macro level (Brandon et al., 2004). Top-down influences can happen when individuals modify their respective knowledge directories and subsequent information allocation and retrieval activities in accordance with the shared knowledge directory.

SOCIAL CAPITAL AND TRANSACTIVE MEMORY SYSTEMS

Building on social capital theories, the dissertation develops a multilevel, multi-theoretical model to explore how different properties of exchange network influence the level of development of individual knowledge directories and the emergent collective transactive memory systems. At the individual level of analysis, Burt's (1992; 2001) structural hole theory , Granovettor's (1973) strength of weak ties theory, Krackhardt's (1992) the strength of strong ties argument, and Lin's (1982; 2001) social resources theory are used as the guiding conceptual frameworks. At the collective level of analysis, Coleman's network closure (1988) argument is used to guide the investigation of the impact of macro-level social capital on the development of collective expertise directories. The dissertation also examines the moderation effects of macro-level variables on micro-level relationships between variables. The model is depicted in Figure 1.

Insert Figure 1 about here

METHODS

The proposed model was tested on data collected from 179 people in 15 project groups in several industries. The response rate was 100% because extensive follow-ups were made to remind participants. The model presented in Figure 1 was analyzed via multilevel structural equation modeling (SEM) for three reasons. First, the model contains multiple levels. Second, intraclass correlation analysis showed that the data were clustered by groups, which rendered the use of OLS regression inadequate (Klein et al., 2000). Third, multilevel SEM can provide tests of overall model fit, in addition to the evaluation of each individual path. The tests were conduced using Mplus 3.0 (Muthen & Muthen, 2003).

RESULTS

Group-by-group zero-order correlations showed that the four indicators of individual social capital were correlated highly with each other (above .90 in certain groups). To deal with the problem of multicollinearity, a separate confirmatory factor analysis (CFA) model was run to evaluate whether strength of ties, structural holes, closeness centrality, eigenvector centrality were significant indicators of individual social capital. These results indicate that all four variables were important measures of individual social capital. The four network indicators were then combined to create a scale measuring individual social capital. The results of the baseline model are represented in Figure 2. To improve the overall fit of the baseline model, additional links were added. The final model achieved adequate fit, and the results are reported in Figure 3.

Insert Figure 2 & 3 about here

To sum up, results showed that individual social capital had a significant impact on the development of individual expertise directories. Collective social capital and task interdependence did not impact the development of transactive memory systems at the group level, but task interdependence had significant direct impact on collective access to information. It was also found that both network density and task interdependence moderated the relationship between the development of individual expertise directories and individual access to information. It means that in (a) dense networks, or (b) high task interdependence groups, the relationship between the development of individual expertise directories and individual access to information was weaker than in (a) sparse networks or (b) low task dependence groups. Development of TM systems had no moderating effect on the relationships between the development of individual expertise directories and individual access to information.

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FIGURE 1

Multilevel, Multi-Theoretical Model of the Impact of Social Capital on the Development of Transactive Memory Systems

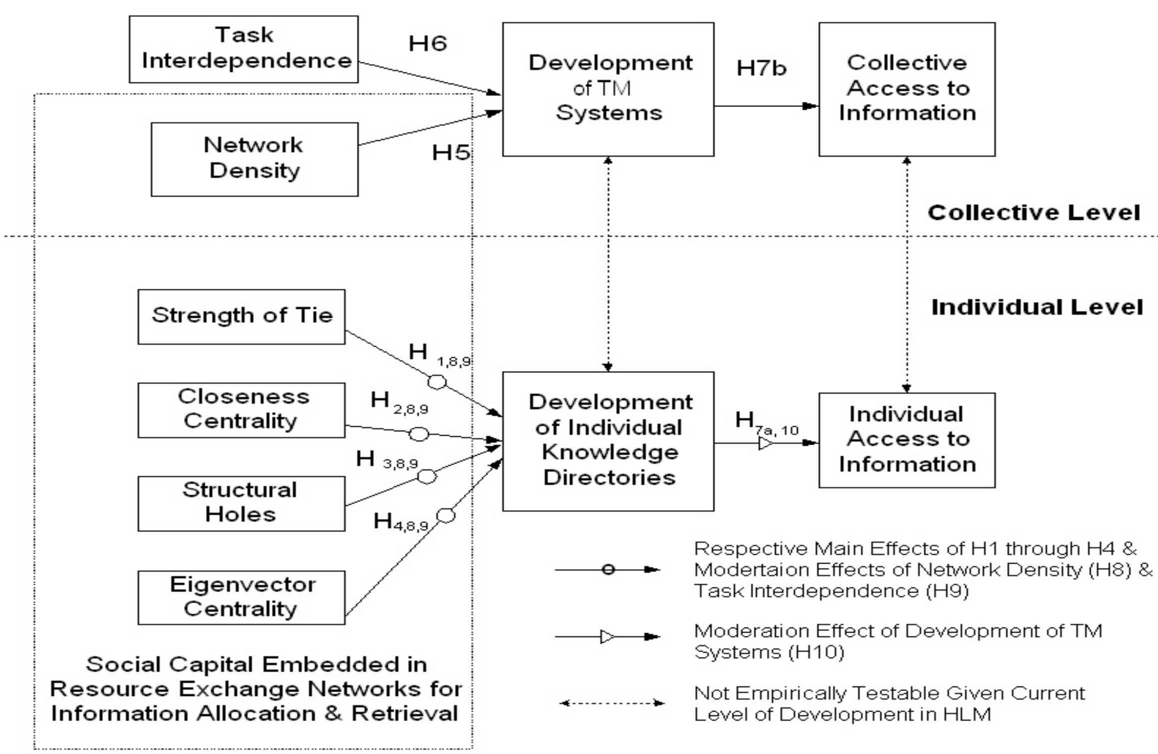

FIGURE 2

Results of the Baseline Model

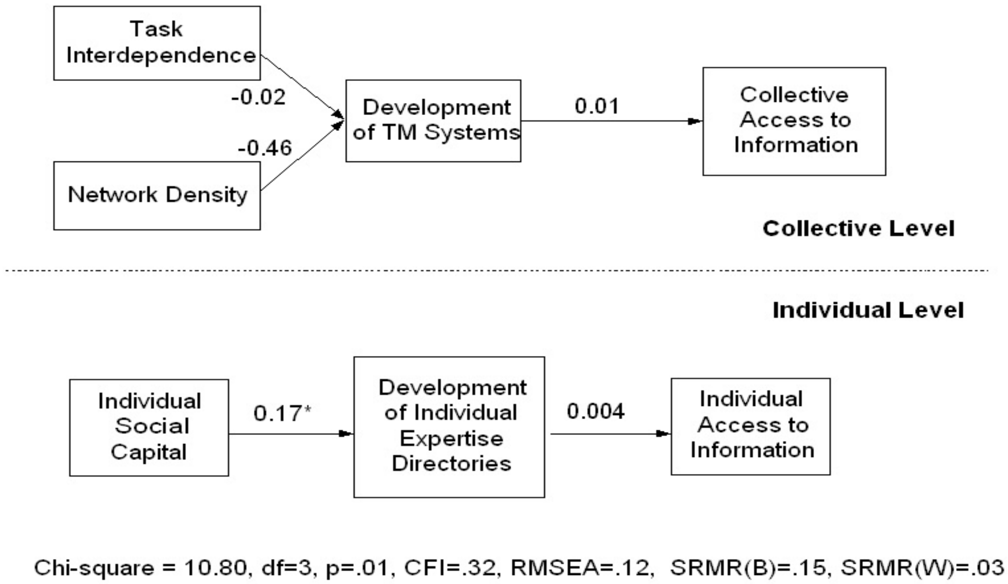

FIGURE 3

Results of the Final Model