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# Transactive Memory Theory: A Review of the Literature and Suggestions for Future MIS Research

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# TRANSACTIVE MEMORY THEORY: A REVIEW OF THE LITERATURE AND SUGGESTIONS FOR FUTURE MIS RESEARCH

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## ABSTRACT

In this paper, we analyze extant literature to assess the state of transactive memory theory research and report the preliminary findings of our research in progress. Based on prevalent transactive memory themes identified in the literature, we content analyze 52 articles at the individual, group, and organizational levels of analysis, and identify several future MIS research opportunities. Our findings show that themes such as knowledge directories, transferring the knowledge didactically, and pooling knowledge centrally, have received the majority of research focus. Future research may investigate how information systems can enhance human abilities in the transactive memory system to relieve cognitive strain and enhance individual memory capacity. Additional research could examine the effects of information technologies on the relationship between transactive memory and performance outcomes in large groups or organizations. Future investigation of these topics will serve to both extend transactive memory theory and operationalize the theory in MIS research settings.

## Keywords

Transactive memory theory, management information systems, literature review, content analysis

## INTRODUCTION

The concept of *transactive memory* can be defined as an innate cognizance of which person holds what proficiencies among individuals who are working together, in either dyadic or group settings (Wegner, 1987). The theory of transactive memory considers it an extension of an individual's memory system to include the knowledge of others as a mode of an external memory system (Jackson and Klobas, 2008; Prichard and Ashleigh, 2007; Sharma and Yetton, 2007; Wegner, 1987, 1995; Wegner, Giuliano and Hertel, 1985; Yuqing, Carley and Argote, 2006). The memories of collaborative individuals aggregate to form a combined, interdependent memory body, or system, which elicits a synergistic effect; the individuals involved in and contributing to the transactive memory system are more effective at information recall and their recollections are generally of higher quality (Barnier, Sutton, Harris and Wilson, 2008). Contained within this system is a shared awareness of who has what expertise. The transactive memory body stores additional related information with these experts. Research has extended the transactive memory model to the management information systems (MIS) field by applying technology as an external memory resource or a directory linking resource of who knows what (Akgün, Byrne, Keskin and Lynn, 2006; Schmickl and Kieser, 2008; Yuan, Fulk and Monge, 2007). The purpose of this paper is to examine the use of transactive memory theory in the literature and offer recommendations for how the theory may be used in future MIS research applications.

The remainder of this paper is structured as follows. We begin by identifying the prevalent themes in the existing transactive memory literature. We then describe our systematic literature review and data analysis process. Subsequently, we present our preliminary results and discuss implications for future research. We close with a brief discussion of limitations and concluding remarks.

## TRANSACTIVE MEMORY THEMES

Mohammed and Dumville (2001) illuminate several core themes presented in transactive memory theory. In addition, we found additional recurring themes as more recent literature was examined. Integrating and expanding upon the work by Mohammed and Dumville (2001), we consider eight themes as a basis for our review of the literature on transactive memory. Table 1 lists these themes and provides a brief description of each concept.

Theme	Description
Shared awareness of who knows what	Each individual in the transactive memory body holds a directory structure of information about what other individuals have expertise in varied areas (i.e., a shared knowledge directory).
Storing information with individuals who have matching domains of expertise	Individuals have a proclivity toward sharing information with other individuals of similar knowledge and proficiency.
Decreasing redundancy of effort	Using the transactive memory body, those with a particular expertise are able to provide that expertise to the body, reducing the requirement for others to gain said expertise.
Complexity of transactive memory creating confusion	As transactive memory bodies grow in size, the number of shared memories can create perplexities for the body, due in part to the increased challenges of the directory structure of who knows what.
Sharing memory	Pooling information from different members of the transactive memory body.
Knowledge transfer	Addresses the details of the copying of information from one element in the body to another.
Cognition-based trust	The degree of intellectual faith that one member of the transactive memory body has before accepting knowledge transfer from another.
Organizational memory	Extending transactive memory to the organizational level of analysis.

**Table 1. Description of Themes**

## METHOD

Using Webster and Watson's (2002) exemplary treatise on preparing a literature review as our template, we began our research with an exhaustive search for relevant literature. We performed a search of the ERIC, Business Source Premier, and Academic Search Premier electronic databases for the phrase, *transactive memory*, using the EBSCOhost query module. Such an expansive search allowed us to include literature transcending the MIS discipline and garner a wide-lens perspective, thereby gaining a greater breadth of knowledge across a broad field of disciplines and thus gain a better understanding of the phenomena. We believe this broad-range approach provides us with the potential to reveal gaps in research that may reside outside of the purview of the MIS field. Notably, we truncated our date range to encompass only research published before 2009. As discussed later, this was done so that we may conduct citation analysis to determine research trends by examining which articles/themes are seemingly generating the most impact in more recent literature. Our queries yielded 172 articles and scholarly book chapters. Those documents not specifically focusing on researching transactive memory themes were eliminated, as well as those that were in foreign languages that had no equivalent English translation, and those which did not meet the thematic criteria discussed above. This yielded 52 remaining articles for analysis.

To complement our comprehensive literature review, we took a qualitative analytical approach toward the texts. To categorize each of the 52 articles by theme and level of analysis, we employed content analysis. Content analysis is a research technique for revealing meaning within a communication medium (Neuman, 2006), and is often used as a research method when large amounts of qualitative data are examined (Borrego and Cutler, 2010; Capobianco, Diefes-Dux, Mena and Weller, 2011). In this study, we used procedures for problem-driven content analysis as suggested by Krippendorff (2004) in order to ascertain the state of the research in the transactive memory field, at the individual, group, and organizational level. First, we determined the unit of analysis. Unitizing is the systematic distinguishing of segments of content that are of interest to an analysis (Krippendorff, 2004). Accordingly, the unit of analysis was each article found in our literature search. Next, we developed categories and recording instructions. The primary purpose of recording in content analysis is to transform or code original texts into analyzable representations (Krippendorff, 2004). A classical coding procedure was employed using an *a priori* categorization scheme (i.e., the eight themes in Table 1). To conduct this procedure, the coder matched the content of each of the articles with its corresponding theme in accordance with the operational definitions in Table 1. To maintain consistency, only one of the authors conducted the coding stage of the content analysis. At the time of submission of this conference paper, an analysis for determining whether the coding met appropriate standards of reliability remained to be conducted. However, use of additional coders will enhance reliability of our findings, and Krippendorff's alpha

coefficient for multiple observers and many nominal categories will be calculated (Krippendorff, 2004). If reliability is below the acceptable threshold, we will discuss discrepancies among coders and recode as necessary.

As alluded to earlier, additional analysis will examine the impact of the articles. Trend analyses and gap analyses will help us to extrapolate where the research in this area seems to be headed and what areas are overlooked. The end goal is to gain a clearer perspective on how MIS scholars may advance transactive memory theory while, potentially, finding areas in MIS that can benefit from being viewed through this theoretical lens. In the remainder of this paper, we discuss our preliminary findings based on our content analysis of articles and review of the literature.

**RESULTS**

Although our study is ongoing, our initial results are revealing. For brevity, we provide a summary concept analysis matrix (Table 2) based on our content analysis of the articles and book chapters. The detailed matrix, listing all of the 52 articles, is available from the authors upon request. The findings of our preliminary analysis illustrate some of the transactive memory concepts in which a relatively large amount of research has been performed. For example, 28 articles focused on the concept of *shared awareness of who knows what* at the group level of analysis (18 at the individual level) and 27 articles gave attention to the *sharing memory* concept at the group level (10 at the individual level). More importantly, however, there are a few areas in which scant research has been performed. We found only seven articles that address the concept of *decreasing redundancy of effort* at the group level (four at the individual level), and of the 52 articles, only four gave attention to *cognition-based trust* at the group level (eight at the individual level). In the next section, we describe the implications of our findings and suggest future research that may address some of the gaps that we found in the literature.

	Theme														
	Shared awareness of who knows what		Storing information with individuals who have matching domains of expertise		Decreasing redundancy of effort		Complexity of transactive memory creating confusion		Sharing Memory		Knowledge Transfer		Cognition-based trust		Organizational memory
Level of Analysis	Ind	Grp	Ind	Grp	Ind	Grp	Ind	Grp	Ind	Grp	Ind	Grp	Ind	Grp	Org
Count of Articles*	18	28	9	15	4	7	8	12	10	27	15	20	8	4	13

\*Note: 52 total articles; some articles yielded themes in multiple categories

**Table 2. Summary of Results**

**IMPLICATIONS AND FUTURE RESEARCH**

The results of our review above and content analysis of the transactive memory literature reflect the effect that work in this field has had on the organizational behavior, information systems (IS), and knowledge management (KM) literature as well as the gaps that still exist in these fields. Particularly, we believe that the thematic areas with low research quantities highlighted in the content analysis above can help to further refine the efforts in the IS and KM literature to increase both the quantity and quality of knowledge sharing in organizations. Overall, the most commonly researched themes (“Shared Awareness,” “Sharing Memory,” and “Knowledge Transfer”) are also core themes in KM (Alavi and Leidner, 2001; Huber, 1991; Lee and Hong, 2002; Levitt and March, 1988; Simon, 1991), as operationalized in organizations with information technologies such as decision support systems and management information systems. Below, we examine less investigated transactive memory areas where we believe research in information systems that incorporates these additional themes could assist in refining the operationalization and effectiveness of KM concepts in organizations.

Some of the more interesting findings are manifest in how the complexities involved in the body of transactive memory may create confusion among members. For instance, while some scholars note that individual stereotypes may negatively affect the use and effectiveness of the transactive memory body, others suggest that individuals’ emotions play a part in the effectiveness of its use (Barnier et al., 2008; Moye and Langfred, 2004; Sauer, Felsing, Franke and Rattinger, 2006; Sutton, 2008). Future research may wish to examine whether or not information systems may be used to facilitate transactive memory in a way that moderates the relationship between individual emotions, attitudes, and stereotypes and measures of effectiveness.

Investigating organizations with international/intercultural operations, Oshri, van Fenema, and Kotlarsky (2008) identify differences in personal contexts of different cultures (e.g., work habits, language, skill levels, etc.). The authors describe how one organization introduced several measures, such as standardized directories, common terms, and template forms, to close the gap between the cultures. Other research investigating how to counteract negative stereotype effects suggests that elements of training, teamwork and team familiarity have a positive impact on the transactive memory body (Akgün, Byrne, Keskin, Lynn and Imamoglu, 2005; Sharma and Yetton, 2007). Thus, managers are advised to develop training to overcome the obstacles of individuals' negative predispositions toward others. Research in this area can identify topics for more and better training to combat these issues.

There appears to be an emerging research stream employing information technology to counter challenges involving the size of the transactive memory body. Some research suggests limiting the extent to which transactive memory should be generalized to larger populations because of the increasing complexity of maintaining a mental directory structure of who knows what and the cultural implications thereof (Wegner, 1987; Wegner et al., 1985). While some earlier research discouraged extending the transactive memory model to a large unit of analysis because of people's limited capacity to retain and recall aspects of the transactive memory body, recent improvements in information technology offer options to reduce burdens on humans. We uncovered three articles that address successful use of information technology as part of the transactive memory system to reduce the load on the individual human members (Akgün et al., 2006; Schmickl and Kieser, 2008; Yuan et al., 2007). This, in turn, allows for an increase in the size of the body without a decrease in the effectiveness of the transactive memory system. Future research should investigate other benefits of information technology in the realm of relieving cognitive strain and enhancing transactive memory capacity.

Another discussion in the literature addresses the link between transactive memory system characteristics and performance (Barnier et al., 2008; Garner, 2006; Grunwald and Kieser, 2007; Lewis, 2004; Lewis, Belliveau, Herndon and Keller, 2007; Palazzolo, 2005; Schmickl and Kieser, 2008; Takahashi, 2007). For instance, Schmickl and Kieser (2008) point out that it becomes increasingly difficult to identify which individuals have the expertise as the body grows in size. In addition, Lewis (2004) posits that teams and small groups are more likely to obtain the value of the transactive memory body than larger groups, and Grunwald and Kieser (2007) identify many challenges to extending the benefits of transactive memory to much larger groups. Conversely, in the literature addressing the organizational level of analysis, some scholars revealed that large organizations often form multiple small groups of transactive memory. Certain individuals become the connecting point between two or more groups (Nevoa and Wand, 2005). Although the larger transactive member bodies tend to be less effective, these larger groups can usually respond to an information request more quickly—although potentially with lesser quality—than smaller groups (Prichard and Ashleigh, 2007). To summarize the size conundrum, finding ways in which larger groups can effectively employ transactive memory is a key research topic in extant literature. The MIS scholar can contribute greatly to this area by investigating the effects of various information technologies on the relationship between transactive memory and performance outcomes in large group settings.

Demian and Fruchter's (2006) research was unique in that it addressed a management team that actively and consciously cultivated the transactive memory system in their organization, which resulted in enhanced operational performance. However, because research regarding the relationship between transactive memory and performance is scarce, more research in a variety of settings is necessary to validate these results. Additionally, researchers can further identify methods practitioners can employ to improve the transactive memory body within organizations. As previously noted, we encourage research relating the use of information systems to enhance the human abilities in the transactive memory system.

Finally, our analysis reveals a gap in the literature related to the negative uses of the transactive memory system. Sutton's (2008) discussion motivated the concept of how an individual can inject information into a transactive memory body. Taking it a step further, studying how practitioners can identify and minimize the harmful effects of negative interaction within a transactive memory system will be valuable to the field. To illustrate, an individual may purposely infuse the transactive memory body with inaccurate data because of technical incompetence, a desire for personal gain, or a desire for vengeance. Identifying avenues in which managers may recognize the maligned use of the system and its ability to counter the effects will be valuable research.

## CONCLUSION AND LIMITATIONS

While the preliminary results of this research effort reveal much about the condition of the field of transactive memory research, there are indeed limitations. Although our intent was to include a breadth of literature by including articles from multiple disciplines, the preponderance of the papers are from the industrial/organizational behavior field. This may create a bias in the results. However, we feel that this potential bias further illustrates a lack of MIS research in transactive memory theory and presents opportunity for future investigation.

In this paper, we content analyzed existing literature to ascertain the state of research regarding transactive memory theory. Although our study is ongoing, the detailed analysis and matrix provide useful information for scholars seeking to advance transactive memory theory. The future research possibilities we identified, if pursued, will result in advances in understanding the intersection between MIS research and transactive memory theory.

## REFERENCES

1. Akgün, A.E., Byrne, J., Keskin, H., Lynn, G.S., and Imamoglu, S.Z. (2005) Knowledge networks in new product development projects: A transactive memory perspective, *Information & Management*, 42, 8, 1105-1120.
2. Akgün, A.E., Byrne, J.C., Keskin, H., and Lynn, G.S. (2006) Transactive memory system in new product development teams, *IEEE Transactions on Engineering Management*, 53, 1, 95-111.
3. Alavi, M.L., and Leidner, D.E. (2001) Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues, *MIS Quarterly*, 25, 1, 107-136.
4. Barnier, A.J., Sutton, J., Harris, C.B., and Wilson, R.A. (2008) A conceptual and empirical framework for the social distribution of cognition: The case of memory, *Cognitive Systems Research*, 9, 1/2, 33-51.
5. Borrego, M., and Cutler, S. (2010) Constructive alignment of interdisciplinary graduate curriculum in engineering and science: An analysis of successful igert proposals, *Journal of Engineering Education*, 99, 4, 355-369.
6. Capobianco, B.M., Diefes-Dux, H.A., Mena, I., and Weller, J. (2011) What is an engineer? Implications of elementary school student conceptions for engineering education, *Journal of Engineering Education*, 100, 2, 304-328.
7. Demian, P., and Fruchter, R. (2006) An ethnographic study of design knowledge reuse in the architecture, engineering, and construction industry, *Research in Engineering Design*, 16, 4, 184-195.
8. Garner, J.T. (2006) It's not what you know: A transactive memory analysis of knowledge networks at NASA, *Journal of Technical Writing and Communication*, 36, 4, 329-351.
9. Grunwald, R., and Kieser, A. (2007) Learning to reduce interorganizational learning: An analysis of architectural product innovation in strategic alliances, *Journal of Product Innovation Management*, 24, 4, 369-391.
10. Huber, G. (1991) Organizational learning: Contributing processes and the literatures, *Organizational Science*, 2, 88-115.
11. Jackson, P., and Klobas, J. (2008) Transactive memory systems in organizations: Implications for knowledge directories, *Decision Support Systems*, 44, 2, 409-424.
12. Krippendorff, K. (2004) Content analysis: An introduction to its methodology, Sage Publications, Thousand Oaks, CA.
13. Lee, S.M., and Hong, S. (2002) An enterprise-wide knowledge management system infrastructure, *Industrial Management & Data Systems*, 102, 1, 17-25.
14. Levitt, B., and March, J. (1988) Organizational learning, *American Review of Sociology*, 14, 319-340.
15. Lewis, K. (2004) Knowledge and performance in knowledge-worker teams: A longitudinal study of transactive memory systems, *Management Science*, 50, 11, 1519-1533.
16. Lewis, K., Belliveau, M., Herndon, B., and Keller, J. (2007) Group cognition, membership change, and performance: Investigating the benefits and determinants of collective knowledge, *Organizational Behavior & Human Decision Processes*, 103, 2, 159-178.
17. Mohammed, S., and Dumville, B. (2001) Team mental model in a team knowledge framework: Expanding theory and measurement across disciplinary boundaries, *Journal of Organizational Behavior*, 22, 2, 89-106.
18. Moye, N.A., and Langfred, C.W. (2004) Information sharing and group conflict: Going beyond decision making to understand the effects of information sharing on group performance, *International Journal of Conflict Management*, 15, 4, 381-410.
19. Neuman, L.W. (2006) Social research methods: Qualitative and quantitative approaches, Pearson, Boston, MA.
20. Nevoa, D., and Wand, Y. (2005) Organizational memory information systems: A transactive memory approach, *Decision Support Systems*, 39, 4, 549-562.
21. Oshri, I., van Fenema, P., and Kotlarsky, J. (2008) Knowledge transfer in globally distributed teams: The role of transactive memory, *Information Systems Journal*, 18, 6, 593-616.
22. Palazzolo, E.T. (2005) Organizing for information retrieval in transactive memory systems, *Communication Research*, 32, 6, 726-761.
23. Prichard, J.S., and Ashleigh, M.J. (2007) The effects of team-skills training on transactive memory and performance, *Small Group Research*, 38, 6, 696-726.
24. Sauer, J., Felsing, T., Franke, H., and Rattinger, B. (2006) Cognitive diversity and team performance in a complex multiple task environment, *Ergonomics*, 49, 10, 934-954.
25. Schmickl, C., and Kieser, A. (2008) How much do specialists have to learn from each other when they jointly develop radical product innovations?, *Research Policy*, 37, 3, 473-491.

26. Sharma, R., and Yetton, P. (2007) The contingent effects of training, technical complexity, and task interdependence on successful information systems implementation, *Management Information Systems Quarterly*, 31, 2, 219.
27. Simon, H.A. (1991) Bounded rationality and organizational learning, *Organization Science*, 2, 125-134.
28. Sutton, J. (2008) Between individual and collective memory: Coordination, interaction, distribution, *Social Research*, 75, 1, 23-48.
29. Takahashi, M. (2007) Does collaborative remembering reduce false memories?, *British Journal of Psychology*, 98, 1, 1-13.
30. Webster, J., and Watson, R.T. (2002) Analyzing the past to prepare for the future: Writing a literature review, *MIS Quarterly*, 26, 2, 13-23.
31. Wegner, D. (1987) Transactive memory: A contemporary analysis of the group mind, In B. Mullen & G. R. Goethala (Eds.), *Theories of group behavior*, Springer-Verlag, New York, 185-208.
32. Wegner, D. (1995) A computer network model of human transactive memory, *Social Cognition*, 13, 3, 319-339.
33. Wegner, D., Giuliano, T., and Hertel, P. (1985) Cognitive interdependence in close relationships, In W. J. Ickes (Ed.), *Compatible and incompatible relationships*, 253-276.
34. Yuan, Y.C., Fulk, J., and Monge, P.R. (2007) Access to information in connective and communal transactive memory systems, *Communication Research*, 34, 2, 131-155.
35. Yuqing, R., Carley, K.M., and Argote, L. (2006) The contingent effects of transactive memory: When is it more beneficial to know what others know?, *Management Science*, 52, 5, 671-682.