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Getting on the same page : team learning and team cognition in emergency management command-and-control teams

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APPENDIX A

Administration of emergency management exercises

In the exercise, each OSCT member faced a computer screen that represented the emergency scene and all the available people and resources. He or she was also virtually represented in the uniform. Using a joystick, the virtual world could be explored the same way as in reality. Decisions made (e.g. call in more ambulances) or actions taken (e.g. fire extinction) by the team were immediately introduced in the virtual scene by a technical facilitator. Response trainers played the part of , for instance, a fire commander or an ambulance driver, and provided teams with additional information about the development of the emergency situation and effects of their actions at the scene. Team members communicated by walkie-talkie or face-to-face. For face-to-face communication, a member needed to first find the person on the virtual scene.

Before the exercise started, the training staff briefed the team members about how the exercise would be conducted in virtual reality. OSCT members were then given different places, so that, like in reality, they received the initial on-call notice individually. The exercise started when each member was called in via a walkie-talkie and received general and discipline-specific information about the incident at hand. After that, they immediately collected information from response trainers, explored the virtual scene, and gave orders to their own units. Teams were free to decide when to have their face-to-face meetings and how long a meeting would last. Most teams held their first meeting after about 20 minutes; most of these first team meetings lasted eight to 10 minutes. After each meeting, the team members went back to their computer screens to coordinate their responsible units in the virtual reality. They also received new information about the latest development of the incident and were confronted with one or more new issues that required multidisciplinary coordination. The exercise took about one to one and a half hours to complete. An exercise ended when the training staff informed team members that time was up.

The team situation model (scale: priority / no priority)

After each team meeting, each team member was asked to tick the processes (Geveke, Huizing, Stijger, Sybrandi, & Temme, 2008) in the list below, which he or she think would had priority in the next action phase. Through previous training, teams in each safety region are trained to learn this list by heart. However, the checklists slightly differed between regions. Below the items marked with an asterix are not present in every checklist.

Fire department:

1. Firefighting and emission of chemicals *
2. Observations and measurements
3. Rescue and technical support *
4. Decontamination of people and animals
5. Decontamination of vehicles and infrastructure
6. Provision and logistics manpower *
7. Warn the civilian population *
8. Accessibility and clearance of the scene *

Police:

1. Evacuation
2. Containing and masking
3. Traffic control
4. Uphold legal order
5. Identification of (deceased) victims
6. Escort rescue services
7. Criminal investigation

Medical assistance unit:

1. Medical assistance (somatic)
2. Psychological assistance
3. Preventive public health care

Team effectiveness (Van der Haar, Segers, & Jehn, 2013; scale 1 “strongly disagree” to 7 “strongly agree”)

Quality of the actions:

1. The coordination of the own unit is tuned with the coordination of the other units
2. The actions on scene are justified
3. The actions on scene are adequate
4. The actions on scene are coordinated
5. On scene safety of professionals is taken into account
6. On scene safety of civilians / companies is taken into account

Goal achievement:

1. The source is diminished efficiently and effectively
2. The crisis is controlled
3. There is a fast stabilization
4. Stabilization happened safely

Error rate:

1. There are no unnecessary victims
2. There is no unnecessary damage
3. Based on what is happening and has happened, press can be positive

Stress (scale 1 “strongly disagree” to 7 “strongly agree”)

1. I experienced as much stress as I would have if the incident was real.
2. The stress level of the exercise was comparable with the real practice.
3. The amount of stress the exercise evoked in me was realistic.

Responsibility (scale 1 “strongly disagree” to 7 “strongly agree”)

1. The team had as much responsibility as if this incident happened in real.
2. I experienced as much responsibility as I would have if the incident was real.
3. The responsibility level of the exercise was comparable with the real practice.
4. The responsibility I had in this exercise was realistic.

Risk (scale 1 “strongly disagree” to 7 “strongly agree”)

1. The team had to deal with as much risks as it would have if the incident was real.
2. The risk level of this exercise is comparable with the real practice.
3. The risks we were confronted with as a team were realistic.

References

- Aiken, L.S. & West, S.G. (1991). *Multiple Regression: Testing and Interpreting Interactions*. Sage, Thousand Oaks, CA.
- Allen, N.J. & Meyer, J.P. (1990). The measurement and antecedents of affective, continuance, and normative commitment to the organization. *Journal of Occupational Psychology*, 63, -18.
- Adelman, L., Tolcott, M.A., & Bresnick, T.A. (1993). Examining the effect of information order on expert judgment. *Organizational Behavior and Human Decisions Processes*, 56, 348-369.
- Argote, L. (1999). *Organizational learning: Creating, retaining, and transferring knowledge*. Norwell, MA: Kluwer Academic.
- Argote, L., Gruenfeld, D. H., & Naquin, C. (2001). Group learning in organizations. In M. E. Turner (Ed.), *Groups at work: Advances in theory and research* (pp. 369–411). Mahwah, NJ: Lawrence Erlbaum Associates.
- Arrow, H. (1997). Stability, bistability, and instability in small group influence patterns. *Journal of Personality and Social Psychology*, 72, 75 - 85.
- Arrow, H., Poole, M.S., Henry, K.B., Wheelan, S., Moreland, R. (2004). Time, change, and development: The temporal perspective on groups. *Small Group Research*, 35 (1), 73 - 105.
- Baker, D.P., Day, R. & Salas, E. (2006). Teamwork as an essential component of high-reliability organizations. *Health Services Research*, 41 (4), Part II, 1576 – 1598.
- Becerra-Fernandez, I., Xia, W., Gudi, A., & Rocha, J. (2008). Task characteristics, knowledge sharing and integration, and emergency management performance: research agenda and challenges. *Proceedings of the 5th International ISCRAM Conference* – Washington DC, USA.
- Blicksanderfer, E., Cannon-Bowers, J.A., & Salas, E. (1997). Theoretical bases for team self-correction: fostering shared mental models. *Advances in Interdisciplinary Studies of Work Teams*, 4, 249-279.
- Bliese, P.D. & Halverson, R.R. (1998). Group size and measures of group-level properties: An examination of eta-squared and ICC values. *Journal of Management*, 24(2), 157-172.
- Bliese, P.D. (2000). Within-group agreement, non-independence, and reliability. Implications for data aggregation and analysis. In K.J. Klein & S.W.J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 349-381). San Francisco: Jossey-Bass Inc.
- Bolstad, C.A., & Endsley, M.R. (1999). Shared mental models and shared displays: an empirical evaluation of team performance. *Proceedings of the 43rd Human Factors & Ergonomics Society*.
- Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. L. (2006). Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology*, 91 (6), 1189-1207.
- Campbell, D.T. & Fiske, W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 85-105.
- Cannon-Bowers, J.A., Tannenbaum, S.I., Salas, E., & Volpe, C.E. (1995). Defining competencies and establishing team training requirements. In R.A. Guzzo, & E. Salas (Eds.), *Team effectiveness and decision making in organizations* (pp. 333-380). San Francisco: Jossey-Bass Publishers.
- Cannon-Bowers, J.A., Salas, E., & Blicksanderfer, E. (1999). Toward an understanding of shared cognition. *Unpublished manuscript*, Naval Air Warfare Center Training Systems Division, Orlando, Florida.
- Cannon-Bowers, J.A., & Salas, E. (2001). Reflections on shared cognition. *Journal of Organizational Behavior*, 22, 195 – 202.
- Cohen, S.G., & Bailey, D.E. (1997). What makes teams work? Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23 (3), 239-290.
- Cohen, A. & Doveh, E. (2005). Significance tests for differences between dependent intraclass correlation coefficients. *Research in multilevel issues*, 4, 375 – 420.
- Comfort, L. K. (2007). Crisis management in hindsight: Cognition, communication, coordination, and control. *Public Administration Review*, 67(s1), 189-197.

- Commission Research Firework Disaster (Commissie Onderzoek Vuurwerkramp). (2001, February). *The Firework Disaster. Final Report* (De Vuurwerkramp. Eindrapport). Enschede / Den Haag.
- Cooke, N.J., Stout, R., & Salas, E. (1997). Expanding the measurement of situation awareness through cognitive engineering methods. *Proceedings of the Human Factors and Ergonomics Society 41st Annual Meeting*, 1, 215-219.
- Cooke, N.J., Salas, E., Cannon-Bowers, J.A., & Stout, R. (2000). Measuring team knowledge. *Human Factors*, 42, 151-173.
- Cooke, N. J., Stout, R.J., & Salas, E. (2001). A knowledge elicitation approach to the measurement of team situation awareness. In M. McNeese, M. Endsley, & E. Salas, (Eds.), *New Trends in Cooperative Activities: System Dynamics in Complex Settings*, (pp.114-139). Santa Monica, CA: Human Factors.
- Cooke, N.J., Salas, E., Cannon-Bowers, J.A., & Stout, R. (2000). Measuring team knowledge. *Human Factors*, 42, 151-173.
- Cooke, N.J., Kiekel, P.A., & Helm, E.E. (2001). Measuring team knowledge during skill acquisition of a complex task. *International Journal of Cognitive Ergonomics*, 5, 297-315.
- Cooke, N.J., Kiekel, P.A., Salas, E., & Stout, R. (2003). Measuring team knowledge: A window to the cognitive underpinnings of team performance. *Group Dynamics: Theory, Research, and Practice*, 7 (3), 179-199.
- Cooke, N.J., Salas, E., Kiekel, P.A., & Bell, B. (2004). Advances in measuring team cognition. In E. Salas & S.M. Fiore (Eds.), *Team cognition: Understanding the factors that drive process and performance* (pp. 83-106). Washington, DC: American Psychological Association.
- Cooke, N.J., Gorman, J.C., Duran, J.L., & Taylor, A.R. (2007). Team cognition in experienced command-and-control teams. *Journal of Experimental Psychology: Applied*, 13 (3), 146 – 157.
- Cope, C. (2004). Ensuring validity and reliability in phenomenographic research using the analytical framework of a structure of awareness. *Qualitative Research Journal*, 4 (1), 5–18
- Costello, A.B. & Osborne, J.W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analyses. *Practical Assessment, Research & Evaluation*, 10 (7). Available online: <http://pareonline.net/pdf/v10n7.pdf>
- Crichton, M., McGeorge, P., & Flin, R. (2007). Decision making by operational incident commanders in a nuclear emergency response organization: Decision strategy selection. In M. Cook, J. Noyes & Y. Masakowski (Eds.), *Decision making in complex environments* (pp. 153-161). Aldershot: Ashgate Publishing Company.
- Cronin, M.A., Weingart, L.R., & Todorova, G. (2011). Dynamics in groups: Are we there yet? *The Academy of Management Annals*, 5 (1), 571 – 612.
- DeChurch, L.A., & Mesmer-Magnus, J.R. (2010). Measuring shared team mental models: A meta-analysis. *Group Dynamics: Theory, Research, and Practice*, 14 (1), 1-14.
- DeChurch, L.A., Mesmer-Magnus, J.R. & Doty, D. (2013, June 3). Moving beyond relationship and task conflict: Toward a process-state perspective. *Journal of Applied Psychology*. Advanced online publication. doi: 10.1037/a0032896
- Decuyper, S., Dochy, F. & Van den Bossche, P. (2010). Grasping the dynamic complexity of team learning: An integrative model for effective team learning in organizations. *Educational Research Review*, 5 (2), 111 – 133.
- De Dreu, C.K.W. (2007). Cooperative outcome interdependence, task reflexivity and team effectiveness: A motivated information processing approach. *Journal of Applied Psychology*, 92, 628-638.
- Delgado Piña, M.I., Romero Martínez, A. M., & Gómez Martínez, L. (2007). Teams in organizations: A review on team effectiveness. *Team Performance Management*, 14 (1/2), 7-21.
- DeVellis, R.F. (2012). *Scale development. Theory and applications* (Vol. 26). Los Angeles, CA: Sage.
- Devine, D.J. (2002). A review and integration of classification systems relevant to teams in organizations. *Group Dynamics; Theory, Research, and Practice*, 6 (4), 291-310.
- Dunn, J.C., Lewandowsky, S., Kirsner, K. (2002). Dynamics of Communication in Emergency Management. *Applied Cognitive Psychology*, 16, N/A, 719-737.
- Edmondson, A.C. (1999) Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44, 350–383.

- Edmondson, A.C., Bohmer, R.M. and Pisano, G.P. (2001) Disrupted routines: team learning and new technology implementation in hospitals. *Administrative Science Quarterly*, 46, 685–716.
- Edmondson, A.C. (2003). Managing the risk of learning. In West, M., Tjosvold, & Smith (Eds.), *International handbook of organizational teamwork and cooperative working* (pp. 255–275). Chichester, UK: Wiley.
- Edmondson, A.C., Dillon, J.R., & Roloff, K.S. (2007). Three perspectives on team learning: Outcome improvement, task mastery, and group process. *The Academy of Management Annals*, 1 (1), 269–314.
- Edwards, B.D., Day, E.A., Arthur, W., & Bell, S.T. (2006). Relationships among team ability compositions, team mental models, and team performance. *Journal of Applied Psychology*, 91, 727 – 736.
- Ellis, A.P.J., Hollenbeck, J.R., Ilgen, D.R., Porter, C.O.H.L., West, B.J., & Moon, H. (2003). Team learning: Collectively connecting the dots. *Journal of Applied Psychology*, 88, 821–835.
- Ellis, A.P.J. (2006). System breakdown: The role of mental models and transactive memory in the relationship between acute stress and team performance. *Academy of Management Journal*, 49 (3), 576–589.
- Endsley, M. (1988). Design and evaluation for situation awareness enhancement. *Proceedings of the Human Factors Society's 32nd Annual Meeting*, 97–102.
- Endsley, M.R. (1995). Toward a theory of situation awareness in dynamic-systems. *Human Factors*, 37 (1), 32–64.
- Ericksen, J. & Dyer, L. (2004). Right from the start: exploring the effects of early team events on subsequent project team development and performance. *Administrative Science Quarterly*, 49 (3), 438 –471.
- Feldman, D. C. (1984). The development and enforcement of group norms. *Academy of Management Review*, 9, 47–53.
- Gersick, C.J.G. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31(1), 9–41.
- Gersick, C.J.G. (1989). Marking time: Predicable transitions in task groups. *Academy of Management Journal*, 32(2), 274–309.
- Gersick, C.J.G. (1991). Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm. *Academy of Management Review*, 16(1), 10–36.
- Geveke, H. Huizing, Y., Stijger, E., Sybrandi, F. & Temme, B. (2008). *Handboek voorbereiding rampenbestrijding. Structureren documentatie rampenbestrijding*. The Hague: Ministry of Interior and Kingdom Relations.
- Gibson, C. (2001) From knowledge accumulation to accommodation: cycles of collective cognitions in work groups. *Journal of Organizational Behavior*, 22, 121–134.
- Gibson, C., & Vermeulen, F. (2003). A healthy divide: Subgroups as a stimulus for team learning behavior. *Administrative Science Quarterly*, 48, 202–224.
- Gibson, C.B, Zellmer-Bruhn, M.E., & Schwab, D.P. (2003). Team effectiveness in multinational organizations. *Group & Organization Management*, 28, 444–474.
- Ginnett, R. C. (1987). The formation process of airline crews. In R. S. Jensen (Ed.), *Proceedings, Fourth International Symposium on Aviation Psychology* (pp. 399–405). Columbus, OH: Ohio State University Press.
- Gonzales, C. (2004). Learning to make decisions in dynamic environments: Effects of time constraints and cognitive abilities. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 46, 449 – 460.
- Gregorich, S. E. (2006). Do self-report instruments allow meaningful comparisons across diverse population groups? Testing measurement invariance using the confirmatory analysis framework. *Medical Care*, 44, S78–S94.
- Gruenfeld, D.H., Mannix, E.A., Williams, K.Y., & Neale, M.A. (1996). Group composition and decision making: How member familiarity and information distribution affect process and performance. *Organizational behavior and human decision processes*, 67 (1), 1 – 15.
- Gruenfeld, D. H., Martorana, P. V., & Fan, E. T. (2000). What do groups learn from their worldliest members? Direct and indirect influence in dynamic teams. *Organizational Behavior and Human Decision Processes*, 82, 45–59.
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18 (1), 59–82.

- Guest, G., MacQueen K.M., & Namey, E. (2012). *Applied thematic analysis*. Thousand Oaks, CA: Sage Publications.
- Gully, S.M., Incalcaterra, K.A., Joshi, A., & Beaubien, J.M. (2002). A meta-analysis of team-efficacy, potency, and performance: interdependence and level of analysis as moderators of observed relationships. *Journal of Applied Psychology*, 87 (5), 819-832.
- Guzzo, R.A., & Dickson, M.W. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual Review Psychology*, 47, 307-338.
- Hackmann, J.R. (1987) The design of work teams. In J. Lorsch (Ed.) *Handbook of Organizational Behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Hallgren, K.A. (2012). Computing inter-rater reliability for observational data: An overview and tutorial. *Tutorials in Quantitative Methods for Psychology*, 8 (1), 23-34.
- Harrison, D.A., & Klein, K.J. (2007). What's the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, 32 (4), 1199 – 1228.
- Hayes, A.F. (2013). *Introduction to mediation, moderation, and conditional process analysis: a regression based approach*. New York: The Guilford Press.
- He, J, Butler, B.S., & King, W.R. (2007). Team cognition: Development and evolution in software project teams. *Journal of Management Information Systems*, 24 (2), 261–292.
- Healey, M. P., Hodgkinson, G. P. & Teo, S. (2009). The role of transactive memory in the performance of multiteam systems. In: *Proceedings of the Ninth Bi-Annual International Conference on Naturalistic Decision Making* (pp. 53-59). London: British Computer Society.
- Helsloot, I., Martens, S., & Scholtens, A. (2010). *Basisboek regionale crisisbeheersing. Een praktische reader voor functionarissen in de regionale crisisorganisatie (Base book regional crisis management. A practical reader for officials in the regional crisis organization)*. Arnhem: Nederlands Instituut Fysieke Veiligheid Nibra.
- Holland, J.H. (1998). *Emergence: From chaos to order*. Reading: Addison-Wesley.
- Hollingshead, A.B. (2000) Perceptions of expertise and transactive memory in work relationships. *Group Processes & Intergroup Relations*, 3 (3), 257–267.
- Holmbeck, G. N. (1997). Toward terminological, conceptual, and statistical clarity in the study of mediators and moderators: Examples from the child-clinical and pediatric psychology literatures. *Journal of Consulting and Clinical Psychology*, 65 (4), 599-610.
- Houghton, S., Simon, M., Aquino, K., & Goldberg, C. (2000). No safety in numbers: persistence of biases and their effects on team risk perception and team decision making. *Group and Organization Management: An International Journal*, 25 (4), 325-353.
- Huber, G. P., & Lewis, K. (2010). Cross-understanding: implications for group cognition and performance. *Academy of Management Review*, 35 (1), 6 – 26.
- Ilgén, D., Hollenbeck, J.R., Johnson, M., & Jundt, D. (2005). Teams in organizations: from Input-Process-Output Models to IMOI models. *Annual Review of Psychology*, 56, 517-543.
- James, R. L., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 69, 85–98.
- James, R. L., Demaree, R. G., & Wolf, G. (1993). Rwg: An assessment of within-group interrater agreement. *Journal of Applied Psychology*, 78, 306–309.
- Janis, I.L. (1972). *Victims of group think*. Boston: Houghton, Mifflin, Company.
- Jehn, K.E. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly*, 42, 530-557.
- Jehn, K.A., & Rupert, J. (2007). Group faultlines and team learning: How to benefit from different perspectives? In V. Sessa & M. London (Eds.), *Work group learning: understanding, improving and assessing how groups learn in organizations* (pp. 119-147). Mahwah, NJ: Lawrence Erlbaum Associates.
- Jehn, K.E., Greer, L.L., & Rupert, J. (2008). Diversity, onflict, and its consequences. In A. Brief (Ed.) *Diversity at work* (pp. 127-174), Cambridge, UK: Cambridge University Press.
- Jehn, K.E., Greer, L, Levine, S, & Szulanski, G. (2008). The effects of conflict types, dimensions, and emergent states on group outcomes. *Group Decision and Negotiation*, 17, 465-495.

- Jehn, K.A., Rispens, S., & Thatcher, S.M.B. (2010). The effects of conflict asymmetry on work group and individual outcomes. *Academy of Management Journal*, 53 (3), 596–616.
- Kamphuis, W., Gailard, A.W.K., & Vogelaar, A.L.W. (2010). Armoring teams: The mitigating effects of transactive memory training on teams under threat. Manuscript submitted for publication. In W. Kamphuis, *Teams under threat. Uncovering and overcoming rigidity effects*. Unpublished PhD dissertation, Tilburg University, Tilburg, the Netherlands.
- Kasl, E., Marsick, V.J., & Dechant, K. (1997). Teams as learners: A research-based model of team learning. *Journal of Applied Behavioral Sciences*, 33, 227 – 246.
- Klein, K.J., Ziegert, J.C., Knight, A.P. & Xiao, Y. (2006). Dynamic delegation: Shared, hierarchical, and de-individualized leadership in extreme action teams. *Administrative Science Quarterly*, 51, 590-621.
- Klimoski, R.J., & Mohammed, S. (1994). *Team mental model: construct or metaphor?* *Journal of Management*, 20, 403-437.
- Knapp, R. (2010). Collective (team) learning process models: a conceptual review. *Human Resource Development Review*, 9, 285-299.
- Kozlowski, S.W.J., & Klein, K.J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In S.W.J. Kozlowski, & K.J. Klein (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3 – 90). San Francisco, CA: Jossey-Bass.
- Kozlowski, S.W.J. & Ilgen, D.R. (2006). Enhancing the effectiveness of work groups and teams. *Psychological science in the public interest*, 7 (3), 77-124.
- Kruglanski, A.W. (1989). The psychology of being “right”: the problem of accuracy in social perception and cognition. *Psychological Bulletin*, 106, 395-409.
- Kvale, S. (1989). To validate is to question. In S. Kvale (Ed.). *Issues of validity in qualitative research* (pp. 73-91). Lund, Sweden: Studentlitteratur.
- La Porte, T.R. (1996) High reliability organizations: unlikely, demanding and at risk. *Journal of Contingencies and Crisis Management*, 4 (2), 60–71.
- LeBreton, J., & Senter, J.L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11 (4), 815 – 852.
- Lewis, K. (2003) Measuring transactive memory systems in the field: scale development and validation. *Journal of Applied Psychology*, 88 (4), 587–604.
- Lewis, K. (2004) Knowledge and performance in knowledge-worker teams: a longitudinal study of transactive memory systems. *Management Science*, 50 (11), 1519–1533.
- Li, J. & Roe, R.A. (2012). Introducing an intra-team longitudinal approach to the study of team process dynamics. Forthcoming at *European Journal of Work and Organizational Psychology*.
- Liang, D.W., Moreland, R., & Argote, L. (1995). Group versus individual training and group performance: The mediating role of transactive memory. *Personality and Social Psychology Bulletin*, 21, 384-393.
- Lim, B., & Klein, K.J. (2006). Team mental models and team performance: A field study of the effects of team mental model similarity and accuracy. *Journal of Organizational Behavior*, 27, 403 – 418.
- London, M., Polzer, J. T. & Omoregie, H. (2005). Interpersonal Congruence, Transactive Memory, and Feedback Processes: An Integrative Model of Group Learning. *Human Development Resource Review*, 4 (2), 114-135.
- Marks, M. A., Zaccaro, S. J., & Mathieu, J. E. (2000). Performance implications of leader briefings and team-interaction training for team adaptation to novel environments. *Journal of Applied Psychology*, 85, 971–986.
- Marks, M.A., Mathieu J.E., & Zaccaro S.J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26, 356-376.
- Marks, M. A., Sabella, M. J., Burke, C. S., & Zaccaro, S. J. (2002). The impact of cross-training on team effectiveness. *Journal of Applied Psychology*, 87, 3–13.
- Marks, M.A., DeChurch, L., Mathieu, J.E., Panzer, F.J., & Alonso, A. (2005). Teamwork in Multiteam Systems. *Journal of Applied Psychology*, 90(5), 964–971.

- Marrone, J.A. (2010). Team boundary spanning: a multilevel review of past research and proposals for the future. *Journal of Management*, 36 (4), 911 – 940.
- Mathieu, J.E., Heffner, T.S., Goodwin, G.F., Salas, E., & Cannon-Bowers, J.A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology*, 85 (2), 273 – 283.
- Mathieu, J.E., Heffner, T.S., Goodwin, G.F., Cannon-Bowers, J.A. & Salas, E. (2005). Scaling the quality of teammates' mental models: equifinality and normative comparisons. *Journal of Organizational Behavior*, 26, 37 – 56.
- Mathieu, J., Maynard, M.T., Rapp, T., & Gilson, L. (2008). Team effectiveness 1997 – 2007: A review of recent advancements and a glimpse into the future. *Journal of Management*, 34 (3), 410 – 476.
- McGrath, J.E., Arrow, H., & Berdahl, J.L. (2000). The study of groups: past, present, and future. *Personality and Social Psychology Review*, 4, 95-105.
- McGuiness, B. (2007). Signal detection theory and the assessment of situation awareness. In: Cook, M., Noyes, J., & Masakowski, Y. (eds.). *Decision making in complex environments*. Hampshire UK / Burlington USA: Ashgate Publishing Limited.
- McLennan, J., Omodei, M., Holgate, A., & Wearing, A. (2007). Human information processing aspects of effective emergency incident management decision making. In M. Cook, J. Noyes & Y. Masakowski (Eds.). *Decision making in complex environments* (pp. 143-151). Aldershot: Ashgate Publishing Company.
- McLoughlin, D. (1985). A framework for integrated emergency management. *Public Administration Review*, 45, 165-172.
- Mesmer-Magnus, J.R., & DeChurch, L.A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology*, 94 (2), 535-546.
- Meyerson, D., Weick, K.E., & Kramer, R.M. (1996). Swift trust and temporary groups (pp. 166–195). In R.M. Kramer and T.R. Tyler (eds.), *Trust in Organizations: Frontiers of Theory and Research*. Thousand Oaks, CA: Sage.
- Michinov, E., Olivier-Chiron, E., Rusch, E. and Chiron, B. (2008) Influence of transactive memory on perceived performance, job satisfaction and identification in anaesthesia teams. *British Journal of Anaesthesia*, 100 (3), 327–332.
- Mohammed, S., & Dumville, B.C. (2001). Team mental models in a team knowledge framework: expanding theory and measurement across disciplinary boundaries. *Journal of Organizational Behavior*, 22, 89–106.
- Mohammed, S., Ferzandi, L., & Hamilton, K. (2010). Metaphor no more: A 15-year review of the team mental model construct. *Journal of Management*, 36 (4), 876-910.
- Moreland, R.L. & Myakovsky, L. (2000). Exploring the performance benefits of group training: Transactive memory or improved communication? *Organization Behavior and Human Decisions Processes*, 82 (1), 117-133.
- Morgeson, F. P., & Hofmann, D. A. (1999). The structure and function of collective constructs: Implications for multilevel research and theory development. *Academy of Management Review*, 24, 249-265.
- Moynihan, D.P. (2009). From intercrisis to intracrisis learning. *Journal of Contingencies and Crisis Management*, 17 (3), 189 – 198.
- Nickerson, R.S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology*, 2, 175 - 220.
- Palazzolo, E.T. (2005) *Organizing for information retrieval in transactive memory systems'*, *Communication Research*, 32 (6), 726–761.
- Peterson, E., Mitchell, T.R, Thompson, L., & Burr, R. (2000). Collective efficacy and aspects of shared mental models as predictors of performance over time in work groups. *Group Processes & Intergroup Relations*, 3 (3), 296-316.
- Perrin, B.M., Barnett, B.J., Walrath, L, & Grossman, J.D. (2001). Information order and outcome framing: An assessment of judgment bias in a naturalistic decision-making context. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 43 (2), 227-238.
- Preacher, K.J., Rucker, D.D., & Hayes, A.F. (2007). Addressing moderated mediation hypotheses: theory, methods, and prescriptions. *Multivariate behavioral research*, 42(1), 185-227.

- Prichard, J.S., & Ashleigh, M.J. (2007). The effects of team-skills training on transactive memory and performance. *Small Group Research*, 38, 696-726.
- Rasker, P.C., Post, W.M. & Schraagen, J.M.C. (2000). Effects of two types of intra-team feedback on developing a shared mental model in Command & Control teams. *Ergonomics*, 43 (8), 1167-1189.
- Rentsch, J., & Klimoski, R. (2001). Why do "great minds" think alike? Antecedents of team member schema agreement. *Journal of Organizational Behavior*, 22(2), 107-120.
- Resick, Ch.J., Dickson, M.W., Mitchelson, J.K., Allison, L.K., & Clark, M.A. (2010). Team composition, cognition, and effectiveness: Examining mental model similarity and accuracy. *Group Dynamics: Theory, Research, and Practice*, 14 (2), 174 – 191.
- Rentsch, J.R., Small, E.E., & Hanges, P.J. (2008). Cognitions in organizations and teams: What is the meaning of cognitive similarity? In: Smith, B. (Eds.). *The people make the place: Exploring dynamic linkages between individuals and organizations* (pp. 127 – 155). New York, NY: Psychology Press.
- Rico, R., Sánchez-Manzanares, M., Gil, F., & Gibson, C. (2008). Team implicit coordination processes: A team knowledge-based approach. *Academy of Management Review*, 33 (1), 163-184.
- Roberts, K.H. (1990). Some characteristics of one type of high reliability organization. *Organization Science*, 1 (2), 160–176.
- Rochlin, G.I. (1996). Reliable organizations: present research and future directions. *Journal of Contingencies and Crisis Management*, 4 (2), 55–59.
- Roe, R.A. (2008). Time in applied psychology: Studying what happens rather than what is. *The European Psychologist*, 13 (1), 37-52.
- Roe, R.A. (2009). Perspectives on time and the chronometric study of what happens in organizations. In: Roe, R.A., Waller, M.J. & Clegg, S. (Eds.) *Time in Organizational Research* (pp. 291-313). London, UK: Routledge.
- Salas, E., Dickinson, T.L., Converse, S.A., & Tannenbaum, S.I. (1992). Toward an understanding of team performance and training. In: Swezey, R.W., & Salas, E. (Eds.). *Teams: their training and performance* (pp. 3 – 29). Norwood, NJ: Ablex.
- Salas, E., Burke, C.S., & Samman, S.N. (2001). Understanding command and control teams operating in complex environments. *Information, Knowledge, Systems Management*, 2, 311-323.
- Salas, E., & Fiore, S.M. (2004). *Team cognition: Understanding the factors that drive process and performance*. Washington DC: American Psychological Association.
- Salas, E., Sims, D.E., & Burke, S (2005). Is there a "Big Five" in teamwork? *Small Group Research*, 36 (5), 555-599.
- Salas, E., Cooke, J.C., & Rosen, M.A. (2008). On teams, teamwork, and team performance: Discoveries and developments. *Human Factors*, 50 (3), 540-547.
- Salas, E., Wilson, K.A., Murphy, C.E., King, H., & Salisbury, M. (2008). Communicating, coordinating, and cooperating when lives depend on it: tips for team work. *Joint Commission Journal on Quality and Patient Safety*, 34 (6), 333-341.
- Sandberg, J. (2000). Understanding human competence at work: An interpretative approach. *Academy of Management Journal*, 43 (1), 9-25.
- Schraagen, J.M., & Van de Ven, J.G.M. (2008). Improving decision making in crisis response through critical thinking support. *Journal of Cognitive Engineering and Decision Making*, 2 (4), 311 – 327.
- Segers, M. & Van der Haar, S. (2011). The experiential learning theory: D. Kolb and D. Boud. In Dochy, F., Gijbels, D., Segers, M. & Van den Bossche, P. *Theories of learning for the workplace* (pp.52-65). London and New York: Routledge.
- Smith, W., & Dowell, J. (2000). A case study of co-ordinative decision-making in disaster management. *Ergonomics*, 43 (8), 1153-1166.
- Smith-Jentsch, K. A., Mathieu, J. E., & Kraiger, K. (2005). Investigating linear and interactive effects of shared mental models on safety and efficiency in a field setting. *Journal of Applied Psychology*, (90), 523-535.
- Spector, P.E. (1992). *Summated rating scale construction: An introduction* (Vol.82). Newbury Park, CA: Sage.
- Stanton, N.A., Chambers, & P.R.G., Piggott, J. (2001). Situational awareness and safety. *Safety Science*, 39(3), 189-204

- Stanton, N. A., Stewart, R., Harris, D., Houghton, R. J., Baber, C., McMaster, R., Salmon, P., Hoyle, G., Walker, G., Young, M. S., Linsell, M., Dymott, R., & Green, D. (2006). Distributed situation awareness in dynamic systems: theoretical development and application of an ergonomics methodology, *Ergonomics*, 49 (12-13), 1288-1311.
- Stanton, N.A., Salmon P.M., Walker, G.H., & Jenkins, D. (2009). Genotype and phenotype schemata as models of situation awareness in dynamic command and control teams. *International Journal of Industrial Ergonomics*, 39, 480 – 489.
- Stasser, G., Taylor, L.A., & Hanna, C. (1989). Information sampling in structured and unstructured discussion of three- and six-person groups. *Journal of Personality and Social Psychology*, 48, 1467 – 1478.
- Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48, 1467–1478.
- Stasser, G., Steward, D.D., & Wittenbaum, G.M. (1995). Expert roles and information exchange during discussion: The importance of knowing who knows what. *Journal of Experimental Social Psychology*, 31, 244-256.
- Stout, R. J., Cannon-Bowers, J. A., & Salas, E. (1996). The role of shared mental models in developing team situational awareness: Implications for training. *Training Research Journal*, 2, 85–116.
- Tabachnick, B.G., & Fidell, L.S. (2007). *Using Multivariate Statistics*, 5th edition. Boston: Allyn and Bacon.
- Tannenbaum, S.I., Beard, R.L., & Salas, E. (1992). Team building and its influence on team effectiveness: An examination of conceptual and empirical developments. In K. Kelly (ed.), *Issue, theory, and research in industrial / organizational psychology* (pp.117-153). Amsterdam: Elsevier.
- Thorstensson, M., Axelsson, M., Morin, M. & Jenvald, J. (2001). Monitoring and analysis of command post communication in rescue operations. *Safety Science*, 39, 51-60.
- Tuckman, B.W. (1965). Developmental sequences in small groups. *Psychological Bulletin*, 63, 384-399.
- Uhr, C., Johansson, H., & Fredholm, L. (2008). Analysing emergency response systems. *Journal of Contingencies and Crisis Management*, 16 (2), 80 – 90.
- Uitdewilligen, S., Waller, M.J., & Zijlstra, F.R.H. (2010). Team cognition and adaptability in dynamic settings: A review of pertinent work (pp. 293-353). In: Hodgkinson, G.P. & Ford, J.K. (Eds.). *International Review of Industrial and Organizational Psychology*. Chichester: John Wiley & Sons Ltd.
- Uitdewilligen, S. (2011). *Team adaptation: A cognitive perspective*. Unpublished doctoral dissertation, Maastricht University, the Netherlands.
- Van den Bossche, P., Gijssels, W., Segers, M., Woltjer, G., & Kirschner, P.A. (2005). Sharing expertise in management: A study of team learning and its effects on shared mental models. *Paper presented at The Academy of Management Annual Meeting*, 6 August 2005, Honolulu, Hawaii.
- Van den Bossche, P., Gijssels, W., Segers, M., & Kirschner, P.A. (2006). Social and cognitive factors driving teamwork in collaborative learning environments. Team learning beliefs & behaviors. *Small Group Research*, 37, 490-521.
- Van den Bossche, P., Gijssels, W., Segers, M., Woltjer, G., & Kirschner, P. A. (2011). Team learning: Building shared mental models. *Instructional Science*, (39), 283-301.
- Van der Haar, S., Segers, M., & Jehn, K.A. (in press). Measuring the effectiveness of emergency management teams: scale development and validation. *International Journal of Emergency Management*.
- Van der Vegt, G.S. & Bunderson, J.S. (2005). Learning and performance in multidisciplinary teams: the importance of collective team identification. *Academy of Management Journal*, 48 (3), 532-547.
- Van de Ven, A.H., & Poole, M.S. (2005). Alternative approaches for studying organizational change. *Organizational Studies*, 26 (9), 1377-1404.
- Van de Ven, A.H. (2007). *Engaged Scholarship: A Guide to Organizational and Social Research*. New York: Oxford University Press.
- Waller, M.J., Gupta, N., & Giambatista, R.C. (2004). Effects of adaptive behaviors and shared mental models on control crew performance. *Management Science*, 50, 1534-1545.
- Webber, S.S., Chen, G., Payne, S.C., Marsh, S.M., & Zaccaro, S.J. (2000). Enhancing team mental model measurement with performance appraisal practices. *Organizational Research Methods*, 3, 307-322.

- Wegner, D.M. (1986) Transactive memory: a contemporary analysis of the group mind. In B. Mullen and G.R. Goethals (Eds.). *Theories of Group Behavior* (pp. 185 - 208), New York: Springer-Verlag.
- Wildman, J.L., Thayer, A.L., Pavlas, D., Salas, E., Steward, J.E., & Howse, W.R. (2012). Team knowledge research: Emerging trends and critical needs. *Human Factors*, 54 (1), 84-111.
- Wilson, K.A., Burke, C.S., Priest, H.A., & Salas, E. (2005). Promoting health care safety through training high reliability teams. *Quality Safe Health Care*, 14, 303-309.
- Wilson, J.M., Goodman, P.S., & Cronin, M.A. (2007). Group learning. *Academy of Management Review*, 32 (4), 1041-1059.
- Wittenbaum, G.M., Stasser, G., & Merry, C.J. (1996). Tacit coordination in anticipation of small group task completion. *Journal of Experimental Social Psychology*, 32, 129-152.
- Wittenbaum, G.M., Hollingshead, A.B., & Botero, I.C. (2004). From Cooperative to motivated information sharing in groups: Moving beyond the hidden profile paradigm. *Communication Monographs*, 71 (3), 286-310.
- Woolley, A. W. (2009). Putting first things first: Outcome and process focus in knowledge work teams. *Journal of Organizational Behavior*, 30, 427-452.
- Zhang, Z.X., Han, Y.L., Hempel, P.S., & Tjosvold, D. (2007). Transactive memory system links work team characteristics and performance. *Journal of Applied Psychology*, 92 (6), 1722-1730.
- Zhou, Q., Huang, W., & Zhang, Y. (2011). Identifying critical success factors in emergency management using a fuzzy DEMATEL method. *Safety Science*, 49 (2), 243-252.
- Zijlstra, F.R.H., Waller, M.J., Phillips, S.I. (2012). Setting the tone: Early interaction patterns in swift-starting teams as a predictor of effectiveness. *European Journal of Work and Organizational Psychology*, 21(5), 749-777.

