COORDINATION PROCESSES
IN WORK TEAMS

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La coordinación en equipos de trabajo es un proceso que implica el uso de estrategias y patrones de comportamiento dirigidos a integrar acciones, conocimientos y objetivos de miembros interdependientes, con el objetivo de alcanzar unas metas comunes. La coordinación garantiza que un equipo funcione como un todo unitario y es identificado como un proceso clave para entender la efectividad de los equipos de trabajo.

Para explicar cómo se coordinan los equipos, la investigación se ha centrado tradicionalmente en la coordinación explícita, que incluye la planificación y la comunicación como mecanismos básicos. Trabajos recientes complementan nuestra comprensión del proceso con la noción de coordinación implícita, que tiene lugar cuando los miembros de un equipo anticipan acciones y necesidades tanto de sus compañeros como de la tarea que realizan, y adaptan su comportamiento dinámicamente sin necesidad de comunicarse entre sí o de planificar su actividad.

El objetivo del presente artículo es revisar de manera integradora y sintética los principales estudios de coordinación en equipos que analizan dicho proceso desde perspectivas explícitas e implícitas. Para ello, atenderemos a distintos antecedentes y procesos de equipo concurrentes que modulan los efectos de la coordinación sobre la efectividad de los equipos. Adicionalmente, discutiremos las contribuciones que el estudio de la coordinación arroja sobre el desarrollo de métodos de evaluación e intervención en equipos, así como sus implicaciones prácticas para el ejercicio profesional.

Palabras clave: coordinación explícita, coordinación implícita, procesos de equipo, efectividad, equipos de trabajo.

Team coordination is a process that involves the use of strategies and patterns of behavior aimed to integrate actions, knowledge and goals of interdependent members, in order to achieve common goals. Coordination ensures that a team functions as a unitary whole, and is identified as a key process to understanding work team effectiveness.

To explain how teams coordinate, research has traditionally focused on explicit coordination, including planning and communication as basic coordination mechanisms. Recent work complements our understanding of the process with the concept of implicit coordination that takes place when team members anticipate the actions and needs of their peers and task requirements, and dynamically adapt their behavior without having to communicate with each other or to plan ahead.

The objective of this paper is to review the main studies on both explicit and implicit team coordination in an integrative and synthetic way. To do so, we examine the role of different antecedents and concurrent team processes that modulate the effects of coordination on team effectiveness. Additionally, we discuss the contributions of team coordination research to the development of assessment methods and interventions in work teams, as well as their practical implications for professional practice.

Keywords: explicit coordination, implicit coordination, team processes, effectiveness, and work teams.

The success of the latest organ transplants performed in the Spanish National Health System and the lives of those patients who underwent them have depended on the coordination among the professionals who formed part of the surgical team. Likewise, hundreds of annual interventions conducted by firefighter teams (e.g., traffic accidents, fires) owe their success to the team´s ability to carry out their job in an integrated manner. Without referring to extreme situations, the truth is that the part of our daily activity that occurs in teams owes its effectiveness to a great extent to the degree in which the coordination among team members is adequate, from meetings where we are all on the same page, finishing at the planned time and with all agenda items dealt with appropriately to carrying out a project on short notice, where each one does what is convenient, even to that feeling of having played well when we play our weekly basketball, soccer or beach volley-ball game with our team of friends.

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Team coordination is an emergent phenomenon that implies the use of strategies and behavior patterns directed toward the integration and alignment of actions, knowledge and objectives of interdependent members with the aim of achieving common goals (Malone and Crowston, 1994). Most effectiveness models of work teams based on "Input-Process-Output" identify coordination as a key process for team effectiveness (e.g., Mathieu, Maynard, Rapp and Gilson, 2008). Coordination ensures the functioning of a team as a unitary whole (van de Ven, Delbecq and Koening, 1976). When a team achieves a high level of coordination, all its members´ work contributes to the results. However, when coordination is deficient, the consequent process losses worsen the outcomes.

The scientific literature offers different approaches to explain team coordination. Traditionally, research has focused on planning and communication as the basic coordination mechanisms. Both mechanisms represent examples of explicit coordination given that team members intentionally use these to handle their multiple interdependencies (Espinosa, Lerch and Kraut, 2004; Malone and Crowston, 1994).

Recently, it has been argued that explicit coordination offers a relatively static image of team coordination (Rico, Sánchez-Manzanares, Gil and Gibson, 2008). The necessity of understanding how team members coordinate their contributions while they develop their group task has led to the development of the concept of implicit coordination. Implicit coordination takes place when team members anticipate the actions and needs of their colleagues as well as the task demands and dynamically adapt their behavior without having to communicate directly among themselves or establish an explicit plan of action (Cannon-Bowers, Salas and Converse, 1993; Espinosa et al., 2004; Wittembaum, Stasser and Merry, 1996).

The objective of the present article is to offer a comprehensive review of the main studies on team work coordination from an explicit and an implicit perspective. With this aim, we have organized the article in three main sections. First, the implicit and explicit coordination processes are analyzed focusing on their joint consideration for the proper understanding of team effectiveness. We then review the latest research proposals in the field, identifying antecedents as well as

different concurrent team processes that modulate the effects of coordination on team effectiveness. Additionally, we highlight some contributions from the study of coordination for team evaluation and intervention. Finally, the implications of this research field for professional practice are discussed.

Focusing in this way on team coordination and its relationship with effectiveness, we intend to bring its study to all those people who work in teams, manage teams or are simply interested in them. Likewise, we will ultimately facilitate the transference of knowledge for professional application and offer opportunities to continue useful research in practice.

EXPLICIT AND IMPLICIT COORDINATION IN WORK TEAMS

Through coordination processes, teams seek to manage the multiple interdependencies that exist among their members when performing their task. As previously mentioned, the literature has distinguished between explicit and implicit coordination processes.

Explicit Coordination

Since the fifties, explicit coordination has been an object of interest for team and organizational researchers. Explicit coordination is defined as the explicit use of different processes that allow different team members to manage their multiple interdependencies (Espinosa et al., 2004). Studies to this respect have identified two basic processes: planning and certain types of communication.

Coordination based on planning, also known as programming (March and Simon, 1958), impersonal coordination or administrative coordination, makes reference to the group of practices and mechanisms that a team uses to manage the most stable and predictable aspects of its activity. Among the most popular mechanisms, we find process maps for the articulation of plans and the definition of responsibilities, agendas, manuals, bubble maps for meeting management and the negotiation of execution times.

On its part, coordination based on communication implies feedback (March and Simon, 1958) and personal coordination processes (van de Ven et al., 1976), and includes the exchange of information between two or more team members through formal, informal, oral, or written transactions, with the aim of integrating their

respective contributions (Kraut and Streeter, 1995). Explicit coordination based on communication (e.g., coordination by feedback) is present in situations that require the adjustment of plans or a response to unexpected aspects of the job (March and Simon, 1958). These communications can occur at an interpersonal or inter-group level (Espinosa et al., 2004), and be formal or informal. In fact, some studies show how teams coordinate through formal communications at work meetings and informally at rest areas, such as halls (Kraut and Streeter, 1995).

Implicit Coordination

Implicit coordination represents a team´s ability to act together by predicting the needs of the task and of their teammates and the consequent behavior adjustment without the need for direct communication among team members (Espinosa et al., 2004; MacMillan, Entin and Serfaty, 2004; Wittembaum et al., 1996).

Explicit and implicit coordination patterns differ in their underlying mechanisms. Implicit coordination is characterized by the following behaviors: 1) providing relevant information, knowledge or feedback to other team members without previous request; 2) sharing the work load or helping a coworker in a proactive manner; 3) monitoring activity progress and teammates´ performances; and 4) adapting one's behavior to the actions expected by others (e.g., Entin and Serfaty, 1999; MacMillan, Paley, Entin and Entin, 2004; Wittembaum et al., 1996).

In considering these behaviors jointly, Rico et al. (2008) have distinguished two basic components in implicit coordination: 1) the anticipation that is revealed in the expectancies and predictions formulated by team members relevant to the task, actions and needs of others; and 2) the dynamic adjustment observed in the actions that team members continuously adopt to mutually adapt their behavior. Let us consider a team of firefighters trying to extinguish a fire in a building, for example. When one of the firefighters unfurls the hose along the stairs, he/she observes that the couplings used to connect the lengths of fire hose could get stuck in the stair handrails or in the corners preventing the fire hose from being extended to the line of fire. In anticipation of this possible problem, the firefighter who prepares the fire hoses estimates the length of hose that his/her coworkers nearest to the fire will need

and connects the couplings in safe places that will avoid the problem. Although the firefighters do not explicitly discuss or request this action, it allows the fire to be controlled without risking their lives.

The literature on team cognition suggests that the two components that form the core of implicit coordination have their roots in team knowledge structures (e.g., shared mental models; Cannon-Bowers et al., 1993). Consequently, knowledge about the nature and role of these structures is required for the understanding of implicit coordination. We are specifically referring to team mental models and team situational models.

Most of the approaches to team knowledge have been based on the team mental models (TMMs) construct (Mohammed, Ferzandi and Hamilton, 2010). Team mental models are stable representations at the team level, which include key knowledge for work related to the team (e.g., member roles) as well as to the task (e.g., typical strategies). Team mental models are essential for effective coordination (Mohammed et al., 2010). However, to understand how the team generates explicit and implicit coordination patterns, the consideration of other knowledge structures of a dynamic character that emerge during team performance is needed.

The concept of team situation models (TSMs) has been proposed to distinguish stable from dynamic knowledge structures (MacMillan et al. 2004). A TSM is a mental representation associated with a dynamic understanding of the team's situation developed by its members in real time (e.g., the understanding of a financial problem affecting a business client by a consulting team during a meeting). Generating an appropriate TSM implies activating and using long-term knowledge (e.g., general knowledge about corporate affairs and finances; Cooke, Salas, Kiekel and Bell, 2004).

It is convenient to clarify that implicit coordination is the process by which team members´ behaviors are coordinated in the absence of open communication, whereas TMMs and TSMs are knowledge structures at the team level that facilitate said behaviors. For example, during a match, the players in a soccer team develop a TSM regarding the opponent´s playing strategy ("our opponent is using attacking strategy"), using for this, the knowledge accumulated in their team mental models (TMMs). This TSM leads the team to select a counterattack strategy that allows the defense and midfield players to

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predict the centered passes that the players need in the line of attack.

IMPLICIT AND EXPLICIT COORDINATION MECHANISMS INTERACTION

Implicit and explicit coordination patterns intervene jointly to align the multiple interdependencies of a team. Both types of coordination occur dynamically as a function of different antecedent and process variables (Rico, Gibson, Sánchez-Manzanares and Clark, 2009).

The growing interest for the interaction of explicit and implicit coordination is due to the necessity of a better understanding of how teams adapt to changing and complex situations (Burke, Stagl, Salas, Pierce and Kendall, 2006; LePine, 2005). Recent studies with teams of anesthesiologists and pilots indicate that coordination mechanisms adapt to situational demands (Manser, Howard and Gaba, 2008; Grote, Kolbe, Zala-Mezö, Bienefeld-Sealla and Künzle, 2009). The results show that explicit coordination increases in unexpected situations or with high interdependency levels, which increases group efficacy. Nevertheless, the analysis of coordination sequences in high-performance teams shows a clear balance between implicit and explicit processes, indicating that the shared representation of the situation on the part of the team is determinant for its successful coordination.

These results suggest the need of having theoretical models to explain the relationship between explicit and implicit coordination with a view to maximizing team performance in different circumstances. In this regard, Rico et al. (2009) have proposed a multiphasic model to understand how both types of coordination interact according to the different phases in which a team performs its activity. The model considers that work teams undergo transition and action phases across which they perform different tasks at the same time (Marks, Mathieu and Zaccaro, 2001). The transition phases previous to the action have a marked planning and communication component given that in these the basis for later execution are set, establishing plans and generating strategies that will allow the team to deal with the task. The action phases describe those moments when the team performs its task, whether it be designing a new computer program, extinguishing a fire, playing the European soccer championship final, performing a

surgical intervention or carrying out a selection process for a company. Finally, the post-action transition phases involve those moments when the team reviews its performance, identifying aspects that they wish to keep and those that should be eliminated to improve future effectiveness.

The multiphasic model of implicit and explicit coordination processes interaction formulates differential predictions for each one of the transition and action phases (Rico et al., 2009). In short, the previous transition phase would be favorable to greater explicit coordination as opposed to the action phase, where, if the task and context conditions do not vary and the plan is useful, there should be a greater degree of implicit coordination. Finally, the post-action transition phase would be more involved in explicit coordination processes as its objective is to review the team's previous performance. Nevertheless, a series of antecedent and process variables can affect these a priori estimated loads. As a result, there will be different combinations of explicit and implicit coordination processes that will affect team performance in the different transition and action phases as well as its global efficacy.

The model offers an important level of complexity and its detailed development exceeds the objective of this manuscript. However, its synthesis allows us to enlighten the reader about the ways in which different antecedents (e.g., team composition, task characteristics) and concurrent team processes (e.g., knowledge structures, crossed understanding, trust) shape the relationship between explicit and implicit coordination patterns and team effectiveness.

Antecedents

Antecedents refer to the different external (e.g., organizational culture) or internal team variables (e.g., team composition) that constitute part of the team´s resources to allow efficient functioning. Of all possible antecedents, we will focus on team longevity, knowledge diversity, team members' dispositional characteristics, team structure and the characteristics of the task to be performed.

Team longevity. Defined as the amount of time that team members have been working together, it is a variable that determines to a great extent the convergence and precision of the TMMs (Mathieu, Heffner, Goodwing,

Salas and Cannon-Bowers, 2000; Rentsch and Woehr, 2004). It can be expected that as team longevity increases, implicit workload coordination during previous transition phases and the action itself will be higher due to the coworkers' greater experience together and the team work. This would liberate attentional resources in the team that would help improve its effectiveness. It is predictable that this effect would extend to the after-action transition phase. However, in this case, it would reduce team members' efforts in reviewing the actions performed, whether this is because of self-complacency or because of reinforcing old prejudices about team members´ contributions.

Knowledge diversity refers to task-relevant knowledge distribution among team members (Jackson, Joshi and Erhardt, 2003). These differences in knowledge can affect team capacity to develop a shared model of the task or problem (Rico, Molleman, Sánchez-Manzanares and van der Vegt, 2007). Research indicates that diverse teams find more difficulties in integrating their distinct knowledge when trying to reach a consensus and solve problems (Gruenfeld, Mannix, Williams and Neale, 1996; Jackson et al., 2003). This is due to problems of mutual understanding, erroneous perceptions and difficulties in sharing information. Therefore, it can be expected that in both the transition and action phases cognitively diverse teams would use more mechanisms of explicit coordination to reach agreements about the process to follow, the performance of the task and the later review of its performance.

Dispositional characteristics. Among team members' dispositional characteristics, the level of conscientiousness stands out, which can cause explicit coordination in the transition phases to increase as it demands more details about team plans. Moreover, personal orientation toward collective objectives can have a differential influence on the explicit/implicit coordination workloads: orientation toward objectives as a learning process will increase the explicit workload especially during the action and post-action phases as it increases the disposition to request and use feedback to improve working skills (Hirst, van Knippenberg and Zhou, 2009). This effect is also predictable in the action phase, given that when faced with obstacles during the task, persons oriented toward the process tend to solve it by increasing their efforts to develop new skills (Dweck, 1999).

Task characteristics. One of the antecedents considered to be fundamental in the alternation of explicit/implicit coordination patterns is the routinary or novel character of the task. In those phases previous to the action that are routines, a greater implicit coordination load is expected. During the action phase, the presence of uncertain and changing conditions will force the team to modify established plans, increasing explicit coordination. Thus, studies conducted with action teams (emergency, police, pilots) indicate that implicit coordination allows performance without scares most of the time, except for when unexpected situations occur. In these circumstances, teams that increase explicit coordination are more effective than those who continue relying on implicit coordination (Edmonson, 2003; Xiao, Seagull, Mackenzie, Ziegart and Klein, 2003). Hence, the reduction of implict coordination in favor of greater explicit coordination will improve team performance when it is faced with unexpected situations in action phases.

Concurrent team processes

Team processes are a set of psychosocial mechanisms that allow team members to combine available resources to carry out their group task. There are many distinct team processes that interact with coordination. Here, we highlight team knowledge structures, crossed understanding, reflexivity and trust.

Knowledge structures. There is ample research relating shared and accurate TMMs with team coordination and effectiveness (for a recent review, see Mohammed et al., 2010). Therefore, as previously suggested, the emergence of shared and accurate knowledge structures (TMMs and TSAs) among team members will promote especially implicit coordination processes which will facilitate team performance (Rico et al., 2008).

Team mental models become more refined with time through feedback processes that associate coordination patterns with results. Thus, team members find it increasingly easier to predict and adapt to their teammates´ behavior, both in the transition and action phases.

In addition, the relationship between TMMs and TSAs in the action phases allows the understanding of the team adaptation process to the ensuing changes. The application of the knowledge structure approach and the

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attribution theory (Durso, Rawson and Girotto, 2007; Leddo, Abelson and Gross, 1984) leads us to hypothesize that if there is an imbalance between the TMMs (our representation of what should be expected) generated during the previous transition phase and the TSAs (our representation of what is occurring) generated to understand what is happening during the action phase, the team levels of explicit coordination will increase (Rico et al., 2009). A recent field study clearly illustrates this phenomenon in firefighter and pilot teams (Rico and Sánchez-Manzanares, 2010).

Cross understanding, related with the emergence of TMMs, makes reference to the degree in which team members have an adequate understanding of the mental models of their teammates (Huber and Lewis, 2010). Cross understanding reduces the workload of explicit coordination, especially in the previous transition phase, given that with a better understanding of what colleagues know, believe or prefer, team members can predict the actions of others and coordinate efficiently (Sánchez-Manzanares, Lewis, Rico and Huber, 2010).

Team reflexivity. Defined as the degree to which teams reflect upon and modify their functioning (Schippers, Den Hartog and Koopman, 2007). It can be expected that greater reflexivity will increase the workload of explicit coordination in the transition phases, especially after the action (Rico, Schippers and Sánchez-Manzanares, 2010). The growing research on learning from experience (Ellis, Mendel and Nir, 2006) reveals the tendency of teams to quickly interpret their results as successes or failures. A greater reflexivity will intensify the necessity for interpretation, increasing team members´ efforts to review and discuss unlikely aspects of their performance, and therefore explicit coordination, in this phase (Rico et al., 2009).

Trust, defined as the propensity for being vulnerable to the actions of team mates (Mayer, Davis and Schoorman, 1995), is critical in collective tasks that involve risk, mutual dependence, and continuous adaptation. When team members trust each other, they perceive their interactions as safe. This increases motivation to participate in the team (Edmonson, 2003) and exchange relevant information regarding social and task-related aspects (Alper, Tjosvold and Law, 1998). This increased communication provides the team with a common information base, which will facilitate the emergence of shared and accurate TMMs (Rau, 2005).

From a longitudinal perspective it can be expected that in the first stages of team training, the development of trust will be associated to a greater workload of explicit coordination in the different transition and action phases. This will allow the generation of shared knowledge structures that will increase implicit coordination in the stages of greater team development.

IMPLICATIONS OF THE STUDY OF COORDINATION FOR THE EVALUATION OF WORK TEAMS

The conceptualizations revealed in this article provide some useful guidelines for the design of appropriate explicit and implicit coordination measures. The development of reliable and valid measures for these processes is essential for the advancement in the theoretical and applied approaches in this research field.

Measures based on team behavior constitute a good starting point for the evaluation of coordination patterns. Several indicators have been proposed based on prediction ratios that capture the degree to which team members predict their teammates needs (e.g., technical assistance, information; Levine and Choi, 2004). An alternative is to design scales with behavioral anchors that include descriptions of specific actions involved in explicit and implicit coordination (e.g., offer relevant information for the task to a colleague without previous request). These scales can be completed both by team members and by external raters (MacMillan, et al., 2004) and is the path being followed by the most recent studies (Sánchez-Manzanares, Rico, Gibson and Kearney, in press).

With respect to the measure of knowledge structures, so intimately linked to the differential emergence of explicit and implicit coordination patterns, it is convenient to highlight two aspects. First, the measures must capture the differential nature of TMMs and TSMs, which requires the evaluation of both the team's stable knowledge and the activated knowledge in a specific situation to adaptively respond to problems. Team cognition researchers have begun to develop some promising alternatives to capture the most dynamic aspects of TSMs, such as the content analysis of communication protocols (Cooke et al., 2004) or the generation of conceptual matrices about situational elements (Hamilton, 2010). Second, the assessment of team cognitive structures must capture its convergent and accuracy dimensions. This will allow us to explore the

main and interactive effects of the different forms of team knowledge on coordination and performance. Recent studies approach this issue from a multidimensional perspective, offering useful guidelines for the development of convergent and reliable measures (Lim and Klein, 2006; Mathieu, Heffner, Goodwin, Cannon-Bowers and Salas, 2005).

PRACTICAL IMPLICATIONS FOR PROFESSIONAL PRACTICE

Despite the fact that the approach portrayed in this paper is at its initial stages of development, we can point out some relevant practical implications. A conclusion derived from our argumentation is that increasing work team effectiveness requires the development of adequate team knowledge structures. The question is which interventions may generate such knowledge structures.

An alternative is to design adequate team work structures to facilitate the creation of effective SMMs (Harris and Beyerlein, 2003). For instance, forming teams with highly diverse levels of knowledge can produce coordination problems, considering the members´ difficulties in aligning their different mental models. A plan for the gradual construction of compatible knowledge structures among team members may help prevent the risks associated with knowledge diversity. This recommendation becomes particularly useful for organizations that require teams with highly specialized and diverse knowledge, such as technological companies or professional services.

Moreover, cross-training (team members learn the roles played by their teammates), regular team debriefing sessions (e.g., the manager offers feedback to team members about their performance) and the use of certain collaborative technologies (e.g., repository of shared knowledge) could facilitate the formation of effective team knowledge structures (Cooke et al., 2004; Day, Gronn and Salas, 2004).

Also, ensuring a certain degree of continuity in team composition or in the group work experience will help team members to build and maintain shared mental models so as to use implicit coordination mechanisms more effectively (Levine and Choi, 2004).

Finally, this work contains some implications for team adaptability and flexibility. The model by Rico et al.

(2009) suggests that explicit and implicit coordination patterns emerge under different conditions. Specifically, implicit coordination would benefit team performance in circumstances in which explicit coordination mechanisms (e.g., planning) would slow down team performance, such as in tasks with high levels of interdependence, virtuality or temporal pressure (Rico et al., 2008). If teams were trained in the identification of the task conditions surrounding their work, they would be better prepared for the strategic use of different types of coordination. For example, adaptability training (aimed at teams detecting the characteristics in a situation that require changes in their coping strategies, facilitating a dynamic adjustment when faced with unexpected changes), metacognitive training (aimed at increasing the awareness, comprehension and self-regulation of their own cognitive processes) and performance feedback are useful strategies to reinforce cognitive flexibility and the adaptability of teams (Day et al., 2004; Entin and Serfaty, 1999; Burke, et al., 2006).

CONCLUSION

This manuscript joins the renewed attention paid to coordination processes in the scope of work teams. We have argued how the joint analysis of implicit and explicit coordination mechanisms offers a more complete view of this key process in group effectiveness. It is likely that some of our reflections about interactions among the different coordination mechanisms and their relationships with different antecedent variables and other group processes have evoked more questions than answers. With this, we hope to stimulate the debate among researchers and professionals in the field. In any case, the joint and longitudinal analysis of the coordination processes that considers their antecedents as well as the cognitive and emotional processes they interact with represents a promising path to improving our understanding of the key mechanisms involved in team work effectiveness.

REFERENCES

Alper, S., Tjosvold, D. and Law, K. S. (1998). Interdependence and controversy in group decision making: Antecedents to effective self-managing teams. *Organizational Behavior and Human Decision Processes, 74*, 33-52.

Burke, C. S., Stagl, K. C., Salas, E., Pierce, L. and Kendall, D. (2006). Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology, 91*, 1189-1207.

Cannon-Bowers, J. A., Salas, E. and Converse, S. A. (1993). Shared mental models in expert decision-making teams. In N. J. Castellan, Jr. (Ed.), *Current issues in individual and group decision making:* 221–246. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Cooke, N. J., Salas, E., Kiekel, P. A. and Bell, B. (2004). Advances in measuring team cognition. En E. Salas y S. Fiore (Eds.), *Team cognition: Understanding the factors that drive process and performance:* 83-107. Washington, DC: APA Books.

Day, D. V., Gronn, P., and Salas, E. (2004). Leadership capacity in teams. *The Leadership Quarterly, 15*, 857-880.

Durso, F. T., Rawson, K. A. and Girotto, S. (2007). Comprehension and situation awareness. In F. T. Durso (Ed.). Handbook of Applied Cognition: 163-193. Chichester, UK: John Wiley and Sons.

Dweck, C. S. (1999). *Self-theories: their role in motivation, personality, and development.* Ann Arbor, MI: Psychology Press.

Edmondson, A. C. (2003). Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. *Journal of Management Studies, 40,* 1419-1452.

Ellis, S., Mendel, R. and Nir, M. (2006). Learning from successful and failed experience: the moderating role of kind of after-event review. *Journal of Applied Psychology, 91*, 669-680.

Entin, E. E. and Serfaty, D. (1999). Adaptive team coordination. *Human Factors, 41,* 312-325.

Espinosa, J. A., Lerch, J. and Kraut, R. (2004). Explicit vs. implicit coordination mechanisms and task dependencies: One size does not fit all. En E. Salas y S. M. Fiore (Eds.), *Team cognition. Understanding the factors that drive process and performance*: 107-129. Washington, DC: APA.

Grote, G., Kolbe, M., Zala-Mezö, E., Bienefeld-Sealla, N. and Künzle, B. (2009). Adaptive coordination and heedfulness make better cockpit crews. *Ergonomics, 53*, 211 – 228.

Gruenfeld, D., Mannix, E., Williams, K. and Neale, M. (1996). Group composition and decision making: How member familiarity and information distribution affect process and performance. *Organizational Behavior and Human Decision Processes, 67*, 1-15.

Hamilton, K. (2010). *The effect of team training strategies on team mental model formation and team performance under routine and non-routine environmental conditions.* (Doctoral dissertation, The Pennsylvania State University).

Harris, C. L., and Beyerlein, M. M. (2003). Navigating the team-based organizing journey. In M. M. Beyerlein, D. A. Johnson and S. T. Beyerlein (Eds.), *Advances in interdisciplinary studies of work teams*: 1-29. Oxford, UK: Elsevier.

Hirst, G., van Knippenberg, D. and Zhou, J. (2009). A cross-level perspective on employee creativity: goal orientation, team learning behavior, and individual creativity. *Academy of Management Journal, 52*, 280-293.

Huber, G. and Lewis, K. (2010). Cross understanding: Implications for group cognition and performance. *Academy of Management Review, 35*, 6-26.

Jackson, S. E., Joshi, A. and Erhardt, N. L. (2003). Recent research on teams and organizational diversity: SWOT analysis and implications. *Journal of Management*, 29, 801-830.

Kraut, R. and Streeter, L. (1995). Coordination in large scale software development. *Communications of the ACM, 38* (3): 69-81.

Leddo, J., Abelson, R. P. and Gross, P. H. (1984). Conjunctive explanations: when two reasons are better than one. *Journal of Personality and Social Psychology, 47*, 933-943.

LePine, J. A. (2005). Team adaptation and post-change performance: Effects of team composition in terms of members' cognitive ability and personality. *Journal of Applied Psychology*, 88, 27-39.

Levine, J. M., and Choi, H. S. (2004). Impact of personnel turnover on team performance and cognition. In E. Salas and S. M. Fiore (Eds.), *Team cognition: Understanding the factors that drive process and performance:* 153-177. Washington: APA.

Lim, B. and 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 Behaviour, 27*, 403-418.

MacMillan, J., Entin, E. E. and Serfaty, D. (2004).

Communication overhead: The hidden cost of team cognition. En E. Salas y S. Fiore (Eds.), *Team cognition: Understanding the factors that drive process and performance:* 61-83. Washington: APA.

MacMillan, J., Paley, M. J., Entin, E. B. and Entin, E. E. (2004). Questionnaires for distributed assessment of team mutual awareness. In Stanton, N. A, Hedge, A., Salas, E., Hendrick, H. and Brookhaus, K. (eds.) *Handbook of Human Factors and Ergonomic Methods.* London: Taylor and Francis.

Malone, T. W. and Crowston, K. (1994). The interdisciplinary study of coordination. *ACM Computing Surveys, 26*, 87-119.

Manser, T., Howard, S. K. and Gaba, D. (2008). Adaptative coordination in cardiac anaesthesia: a study of situational changes in coordination patterns using a new observation system. *Ergonomics, 51*, 1153-1178.

March, J. and Simon, H. A. (1958). *Organizations.* New York: Wiley.

Marks, M. A., Mathieu, J. E., and Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26, 356-376.

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E. and Cannon-Bowers, J. A. (2000). The influence of shared mental models on team process and performance. *Journal of Applied Psychology, 85*, 273-283.

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Cannon-Bowers, J. A. and 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. and Gilson, L. (2008). Team effectiveness 1997-2007: a review of recent advancements and a glimpse into the future. *Journal of Management, 34*, 410-476.

Mayer, R. C., Davis, J. H. and Schoorman, F. D. (1995). An integrative model of organizational trust. *Academy of Management Review, 20*, 709-734.

Mohammed, S., Ferzandi, L. and Hamilton, K. (2010). Metaphor No More: A 15-Year Review of the Team Mental Model Construct. *Journal of Management, 36*, 876-910.

Rau, D. (2005). The influence of relationship conflict and trust on the transactive memory: performance relation in top management teams. *Small Group Research, 36*, 746-771.

Rentsch, J. R. and Woehr, D. J. (2004). Quantifying congruence in cognition: Social relations modeling and team member schema similarity. In E. Salas and S. Fiore (Eds.), *Team cognition: Understanding the factors that drive process and performance:* 11-33. Washington: APA.

Rico, R., Gibson, C., Sánchez-Manzanares, M. and Clark, M. (2009). On the interplay between team explicit and implicit coordination processes. Paper presented to the 4th INGRoup conference, Colorado Springs: EE.UU.

Rico, R., Molleman, E., Sánchez-Manzanares, M. and van der Vegt, G. (2007). The effects of diversity faultlines and team task autonomy on decision quality and social integration. *Journal of Management, 33*, 111-132.

Rico, R., Sánchez-Manzanares, M., Gil, F. and Gibson, C. (2008). Team implicit coordination processes: A team knowledge based approach. *Academy of Management Review, 33*, 163-184.

Rico, R. and Sánchez-Manzanares, M. (2010). *Un análisis cualitativo de la interacción de procesos de coordinación explícita e implícita en equipos de acción [A qualitative analysis of the interaction of explicit and implicit coordination processes in action teams].* (Working Paper 2010-3), Madrid, España: Universidad Autónoma de Madrid, Departamento de Psicología Social y Metodología.

Rico, R., Schippers, M. and Sánchez-Manzanares, M. (2010). *The interactive effects of reflexivity and shared mental models on team performance: exploring the mediating role of implicit coordination.* (Working Paper 2010-5), Madrid, España: Universidad Autónoma de Madrid, Departamento de Psicología Social y Metodología.

Sánchez-Manzanares, M., Lewis, K., Rico, R. and Huber, G. (2010). *Are you sure you know what I am going to do? Team mental model accuracy, cross understanding, implicit coordination and performance in project teams.* (Working Paper 2010-2), Madrid, España: Universidad Carlos III de Madrid, Departamento de Economía de la Empresa.

Sánchez-Manzanares, M., Rico, R., Gibson, C. and

Kearney, E. (En revisión). Shared mental models and performance in project teams: assessing the role of implicit coordination and task interdependence. *Organization Science.*

Schippers, M. C., Den Hartog, D. N. and Koopman, P. L. (2007). Reflexivity in teams: A measure and correlates. *Applied Psychology: An International Review, 56*, 189-211.

van de Ven, A. H., Delbecq, L. A. and Koening, R. J. (1976). Determinants of coordination modes within organizations. *American Sociological Review, 41*, 322-338.

Wittembaum, G. M., Stasser, G. and Merry, C. J. (1996). Tacit coordination in anticipation of small group task completion. *Journal of Experimental Social Psychology, 32*, 129 – 152.

Xiao, Y., Seagull, F. J., Mackenzie, C., Ziegart, J. and Klein, K. J. (2003). Team communication patterns as measures of team processes: Exploring the effects of task urgency and shared team experience. *Proceedings of the Human Factors and Ergonomics Society*, 47th Annual Meeting, 1502-1506.