



Understanding team coordination in doubles table tennis: Joint analysis of first- and third-person data

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ABSTRACT

Objectives: This study sought to determine whether combining first- and third-person methodologies would provide insight into team coordination.

Design and methods: We studied the activity of a table tennis doubles team during an official match. We collected and processed the verbal data according to a procedure defined for course-of-experience analysis, but we also included a video-based field study of the partners' interactions during the breaks between points. We then conducted a joint analysis of the two players' lived experience and behaviors during these short breaks.

Results: The results showed both the difficulties and the empirical richness of this approach. For example, the joint analysis of first- and third-person data on doubles table tennis revealed how the players' behaviors during the short breaks between points had a key role in shaping the understanding shared by the two partners.

Conclusions: The combination of first- and third-person data seems to be a promising approach for improving our understanding of the coordination processes in sports teams. In our study, the joint analysis of these data enabled us to describe in great detail how the respective behaviors of the partners contributed to the dynamics of constructing/deconstructing shared understanding between them.

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Over the past several years, the field of cognitive sports psychology has increasingly focused on team functioning, particularly team coordination (e.g., Blickensderfer, Reynolds, Salas, & Cannon-Bowers, 2010; Eccles, 2010; Lausic, Tenenbaum, Eccles, Jeong, & Johnson, 2009; Reimer, Park, & Hinsz, 2006; Ward & Eccles, 2006). The main objectives have been to understand why "an expert team" cannot be reduced to "a team of experts" and how team performance differs from the sum of the individual performances of the team members. In 2004, Eccles and colleagues noted the weaknesses in the current approaches and began to examine some of the studies carried out in the field of I/O psychology (e.g., Salas & Fiore, 2002). They then proposed a social-cognitive conceptual framework for the study of team functioning in sports (Eccles & Tenenbaum, 2004, 2007) that was inspired by information processing theory (e.g., Hinsz, Tindale, & Vollrath, 1997) and distributed cognition (e.g., Hutchins, 1995). The authors' objective was to explore the cognitive properties and processes that enable members of a team to coordinate, while taking into account the

social processes that affect the team's cognitive processes (e.g., Eccles & Johnson, 2009; Eccles & Tenenbaum, 2007). From a methodological point of view, the few empirical studies that have been conducted (e.g., Lausic et al., 2009) have essentially relied on "third-person" data (e.g., Overgaard, Gallagher, & Ramsøy, 2008; Varela & Shear, 1999), i.e., they have focused on data that can be observed and recorded from the outside. As an illustration, Lausic et al. (2009) studied the communications of tennis doubles partners that occurred during the breaks between points. They coded each communication unit with a specific typology and used sequential analysis to examine first-order chains of communication. They were thus able to determine the communication patterns that distinguished high- and low-performing tennis doubles teams and the differences in communication patterns that preceded winning versus losing points. A major finding was that the communication patterns of the winning teams were more consistent than were the patterns of the losing teams.

Several empirical studies conducted within the *course-of-action* theoretical framework (Theureau, 2003) have also investigated the cognitive properties and processes required to achieve team coordination during actual competition (Bourbousson, Poizat, Saury, & Sève, 2010, 2011, 2012; Poizat, Bourbousson, Saury, & Sève, 2009;

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Poizat, Sève, Serres, & Saury, 2008). These studies have contributed to team cognition research but can nevertheless be distinguished on some important points. First, studies of this type are not based on information processing theory but instead are conducted with reference to the enactive paradigm and in accordance with the phenomenological reduction proposed within this framework (e.g., Depraz, Varela, & Vermersch, 2003; Husserl, 1925/1977; Merleau-Ponty, 1945/1962; Sartre, 1943/2003; Varela, Thompson, & Rosch, 1991). From a methodological point of view, these studies take into account the lived experience of athletes *in situ*, particularly by focusing on the verbalizations from self-confrontation interviews. They thus analyze first-person data (i.e., data that express the participants' personal viewpoints), even though these data have been gathered by an observer-listener using a "second-person" method (e.g., Petitmengin, 2006). The analysis and comparison of the lived experience of all team members provides a means to characterize the coordination that is operating in a given team. For example, Bourbousson et al. (2011) showed that basketball players were able to coordinate without necessarily continuing to share knowledge about the game. These results highlight that coordination is based not only on the sharing of relatively stable knowledge that was built prior to the team's current activity, but also on the sharing of a "here-and-now" situation. Similarly, Poizat et al. (2009) investigated team coordination by analyzing contextual information sharing between doubles partners during a table tennis match. This study showed that the sharing of contextual information fluctuated over the course of the match in relation to the players' interpretations. It also underlined that efficient coordination does not necessarily depend on the systematic sharing of contextual information. During the matches, the instances of no information sharing were more numerous than the moments of symmetric or asymmetric sharing, with no discernable effect on performance. It thus seemed that discrete points of connection were enough to ensure coordination. Yet, although these studies have yielded interesting and even significant results, we must nevertheless grant that they are limited in that they only describe the part of activity that is meaningful from the actor's point of view.

This exploratory study of a table tennis doubles team is a methodological investigation that jointly analyzes first- and third-person data (e.g., Chalmers, 2004; Overgaard et al., 2008; Varela & Shear, 1999) in order to better identify the processes underlying the coordination of sports teams. Along with other researchers, we assumed that the combination of first- and third-person data would provide greater insight into team coordination (e.g., De Jaegher, Di Paolo, & Gallagher, 2010; Fuchs & De Jaegher, 2009). The aim of this study was to demonstrate the potential richness of this approach by mapping a description of the two partners' lived experience *via* the course-of-action framework (e.g., Theureau, 2003) to a detailed description of their interactions *via* a video-based field study (e.g., Heath & Hindmarch, 2002). Ethnomethodology and conversation analysis were the sources on how to use video recordings to conduct a rigorous empirical analysis of naturally occurring interactions (e.g., Heath & Luff, 1992a). Researchers initially introduced video recordings to examine talk-in-interaction and the way turn-at-talk production is inextricably embedded in the material environment and the participants' bodily conduct (e.g., Goodwin, 1979, 1980, 1981; Heath, 1986; Mondada, 2007, 2008). For example, Goodwin (1979, 1980, 1981) explored how the production of an utterance is coordinated with the recipient's gaze. Since these beginnings, the use of video recordings has become a favored methodology of researchers from a range of disciplines, most of whom are not solely or even primarily concerned with the analysis of talk. Video-based field studies are now used to analyze situated conduct and interaction (Goodwin, 1986, 1994, 2000a, 2003; Goodwin & Goodwin, 1996; Heath & Luff, 2000; Hindmarsh &

Heath, 2000; LeBaron & Streeck, 2000; Mondada, 2008). The study of LeCouteur and Feo (2011) illustrated the interest of this methodology for understanding team coordination in sports. The authors provided empirical evidence of the importance of such behaviors as gaze, gesture, and body orientation during netball matches.

We chose table tennis doubles matches for our methodological exploration of team coordination for several reasons. These matches require in-process coordination between the two partners. However, the game characteristics considerably reduce the opportunities for coordinating during a point, as the speed of the match and the chaining of actions impose very high time pressure on the partners. The breaks between points (a 15- to 20-s break follows each point) provide the opportunities for coordination (Cannon-Bowers & Bowers, 2006). These breaks are moments to ensure that their concerns are convergent and/or to construct similar expectations and interpretations about the game (e.g., Poizat et al., 2009). Although the players speak very little during these moments of interruption, they display numerous behaviors that their partner is likely to observe. Two studies provided preliminary evidence of the importance of these behaviors during breaks for team coordination. Lausic et al. (2009) showed that tennis partners' behaviors during breaks differed, depending on the team's effectiveness. Greenlees, Bradley, Holder, and Thelwell (2005) pointed out the impact of body language (i.e., standing and walking with erect posture, head up, chin level with the ground with eyes looking directly at the opponent for prolonged periods) on the first impressions and outcome expectations of table tennis players. In the present study, we were interested in jointly analyzing the lived experiences and behaviors of doubles partners during point breaks. The goal was to better understand how these behaviors contribute to team coordination, and more specifically to shared understanding, by facilitating a convergence of the partners' concerns and/or the construction of similar expectations and interpretations.

Method

Participants

Two national table tennis players agreed to participate in the study. We requested their consent when the competition was over. Although the players did not ask to remain anonymous, we gave them pseudonyms to guarantee some degree of confidentiality: Chris and Jules. At the time of the study, Chris was 37 years old, was 89th in France, and had been playing for 27 years. Jules was 29 years old, was 65th in France, and had been playing for 17 years. They had been doubles partners on a regular basis for the past three years.

The players' activity was studied during a doubles match held in February 2005 during the French National Team Championship. The match was held on the ninth day of the championship for that season, and Jules and Chris had been doubles partners for the past eight days. This match lasted 25 min. Their opponents ranked 38th and 57th in France. The match comprised three winning sets of 11 points, and Chris and Jules lost two sets to three.

Data collection

We gathered two types of data: (a) continuous audio-video recordings of the players' actions during the match and (b) verbalizations during the post-match interviews.

Audio-visual data

A video camera was positioned above and behind the table to record the match. It was set for a wide-angle, fixed, overhead view that framed the table, the four players, the scoreboard, and the umpire.

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