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# Interactions in engaged work teams: a qualitative study

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## Abstract

**Purpose** – The aim of this study is to describe work-engaged teams in terms of interpersonal interaction.

**Design/methodology/approach** – Six teams (N = 31 individuals) were videotaped during a decision-making task, for one hour. Based on *a priori* defined categories, the authors coded the videos in terms of the degree of interaction between team members, the physical distance between members, the degree of team's activation and the valence of their interaction. The videos were also coded in terms of motivational and affective processes. Team work engagement was assessed using questionnaires.

**Findings** – Highly engaged team members work physically close and have an increment on their interactions up until the task's temporal midpoint. They have an initial peak of activation and show more positive emotional valence in the first and the last moments of the task. The most interpersonal processes used are affective. The worst performing team had the highest initial interaction levels followed by an abrupt decrease both in their levels of interaction and in their levels of activation. Simultaneously, they present higher peaks of positive emotional valence.

**Practical implications** – Although engaged teams are essentially characterized by the presence of positive interactions, it is fundamental to alternate more “exited” and fun moments with more task focused ones and collective interaction moments with individual work.

**Originality/value** – This study answers to Kozlowski and Chao's (2012) call for studying emergence in a more direct way, using qualitative analysis of video data.

**Keywords** Team interaction, Team work engagement

**Paper type** Research paper

## 1. Introduction

Recent research shows that engaged teams outperform teams with low levels of engagement (Tims *et al.*, 2013; Torrente *et al.*, 2012). These teams are full with energy and are very enthusiastic about their work – team members persist when facing difficulties or drawbacks and share a positive affective environment. Costa *et al.* (2014a, 2014b) proposed a theoretical model in which team work engagement (TWE) emerges in teams that are able to successfully manage conflict, affect and motivational levels of team members. However, what are the specific activities and interactions that take place in engaged teams? How exactly do teams “manage affect” or “build motivation”? In the present study, we analyze the verbal and



non-verbal interactions of members of highly engaged teams. Our aim is to describe engaged work teams' interaction and how it relates to team performance. This study aims at describing the types of behaviors that are characteristic of highly work engaged teams, based on video records of these teams' interaction during a decision-making task. To do so, we conducted an exploratory study examining both the frequency and temporal patterns of interaction patterns and behaviors. Specific hypotheses are not offered.

Our contribution to the literature is two-fold. First, we contribute to the literature on TWE, by exploring the interpersonal processes that characterize highly engaged teams. Second, we take an in-depth look at team interactions and explore what really happens in teams during teamwork. This answers [Kozlowski and Chao's \(2012\)](#) call for studying the dynamics of emergence in a more direct way.

### Work engagement's emergence

TWE is a shared emergent state of work-related well-being that mediates the relationship between a set of individual and team variables, on the one hand, and team effectiveness, on the other ([Costa et al., 2014a, 2014b](#)). Engaged teams are able to maintain their motivational levels high, and this results in a greater commitment with collective goals and on actions' focused on goal achievement ([Chen and Kanfer, 2006](#)). Additionally, engaged teams create a positive and activated affective climate that is characterized by feelings of pleasure while working and by high levels of energy. This positive and activated affective climate has been linked to performance outcomes such as innovation and creativity ([Madrid et al., 2013](#)), as well as prosocial work behavior ([George and Brief, 1992](#)). In engaged teams, members are inclined to help co-workers in need. Acknowledging the relevance of affect for employees' engagement, [Bakker and Oerlemans \(2011\)](#) have suggested that work engagement can be positioned in the circumplex model of affective well-being. [Russell \(1980\)](#) proposed this model originally. Its basic premise is that affective states depend on two different neurophysiological systems that determine each emotion. Contrary to the perspective of discrete emotions ([Ekman, 1973](#)), Russell's two systems are best represented as two continua (low – high): a pleasure – displeasure axis and an arousal axis. For example, feeling irritated results from a combination of a high activation and unpleasant emotions, whereas feeling content results from the opposite combination: low activation and pleasant emotions. Work engagement is represented in the upper-right quadrant of the circumplex model – a highly active and pleasant state. Recently, this model has been used as the basis for the development of a new, single-item work engagement measure ([Costa et al., 2016](#)).

According to the theoretical TWE model, the emergence of work engagement within teams is dependent on the existence of successful interpersonal processes, namely, conflict management, motivation building and affect management. These processes have been proposed by [Marks et al. \(2001\)](#). According to these authors, interpersonal processes are the foundations of the teams' success in both planning and executing their tasks. Teams that are successful in managing interpersonal relationships are able to prevent or control team conflict and, when conflict does occur, to work through task, process or interpersonal disagreements among members. Successful teams can also generate and preserve a sense of collective confidence and task-based cohesion, while regulating members' emotions during tasks. However, the exact interactions that correspond to the theoretically established interpersonal processes are still unknown.

### *Specific interactions and behaviors in teams*

Scholars have proposed various team processes as fundamental for team effectiveness ([Marks et al., 2001](#); [Kozlowski and Ilgen, 2006](#)). However, these proposals are essentially abstract and theoretical, in the sense that they do not specify the actual behaviors and interactions of team

members that lead to successful performance. For example, [Kozlowski and Ilgen \(2006\)](#) reviewed a set of team processes and grouped these processes in three categories:

- (1) cognitive processes and structures, such as transactive memory systems and shared mental models;
- (2) emergent affective and motivational states and processes, such as cohesion, team efficacy, team affect and team conflict; and
- (3) team action and behavioral processes, such as coordination, communication and adaptation.

For each category, they review relevant empirical research, aiming at providing concrete advice in how to leverage team effectiveness. In what affective and motivational processes are concerned, the authors argue that, despite prevailing evidence that links certain “processes” with team effectiveness, “the research base to help identify techniques for enhancing group cohesion is as yet not sufficiently developed to warrant specific recommendations for how to develop these desirable emergent states” (p. 89). They conclude “[...] the research base is not sufficiently well developed to provide guidance for application recommendations” (p. 93).

Therefore, organizational behavior researchers still have the challenge to answer to some specific questions:

*RQ1:* What do team members actually do? What do they say? How do they say it? when do they do it?

One of the first proposals on categorizing team members’ interaction behaviors was suggested by [Bales \(1950\)](#). The author proposed what he named “interaction process analysis”, an interaction coding system composed of 12 categories.

More recent studies on what team members actually do are scarce. For example, [Stachowski et al. \(2009\)](#) qualitatively studied the interaction of nuclear power plant control room crews during crisis, looking for patterns in the form of regular sets of verbalizations and nonverbal actions intended for collective action ([Zellmer-Bruhn et al., 2004](#)). They recoded the behaviors of 14 teams doing a simulation task, coding discrete verbal and non-verbal behaviors involving communication between two or more team members (e.g. providing information, offering opinion, expressing warning, etc.). Data analysis of interaction patterns with a pattern recognition software program showed that, during crisis, teams with recurrent patterns of interaction (i.e. with a tendency to respond to one interaction almost always in the same way) performed less well than the more “chaotic” teams.

Therefore, a more descriptive approach to studying team processes may bring new insights into the work of teams. Additionally, studying what actually happens in teams implies considering the temporal dynamics of teams’ interaction. Adopting a temporalist approach ([Roe, 2008](#); [Roe and Inceoglu, 2016](#)) entails looking at human behavior as a phenomenon, “or observable series of events happening to particular objects during a certain time interval” (p. 41). This requires adopting specific techniques such as recording video and audio tracks and analytically describing them in terms of a specific variable of interest.

Videotaping interactions commonly results in an overabundance of data, which leads to complicated data analysis, especially when the recorded interactions are complex. Therefore, we opted for defining *a priori* categories ([Ghiglione and Malton, 2005](#)) that we describe next.

#### *Activation and valence*

As work engagement can be described within the circumplex model of affect as a highly activated and positive state ([Bakker and Oerlemans, 2011](#)), for the present study we are interested in non-verbal behavioral communication signaling activation and emotional valence.

Bartel and Saavedra (2000) conducted an observational study focused on work group mood, in which they constructed an observation instrument also theoretically based in the representation of the individual affective state within the circumplex model of affect (Russell, 1980). The authors defined three types of behavioral indicators for both dimensions: facial indicators, vocal indicators and postural indicators. High activation was defined, for example, by a lot of eye contact (facial), rapid pace of speech (vocal) and restlessness (postural). In contrast, low activation was inferred, for example, by expressionless and little eye contact (facial), monotone speech (vocal) and by slow movement (postural). Positive valence, or pleasure, is operationalized by, for example, smiling (facial), a clearly audible volume of speech (vocal) and a body position that includes group members (postural). Finally, eyes avoiding stimuli (facial), slow speech (vocal) and head tilted downward (postural) signal negative valence, or unpleasant mood. This work was the basis for our analysis of the activation and valence behavior indicators.

#### *Affective and motivational processes*

Marks *et al.* (2001) operationalize motivational processes as “encouraging team members to perform better [...] communicating their beliefs about team ability, competence on particular tasks, and feedback on team successes” (p. 368). However, the description of interpersonal processes is many times rather abstract. The same authors describe affective processes as “attempting to calm members down, control frustration levels, boost team morale and cohesiveness among members” (p. 369), which does not have a behavioral referent. Kozlowski and Ilgen (2006) mention team cohesion, team efficacy, team affect and team conflict as interpersonal processes, with no specific behaviors associated. Therefore, and to define the categories for video analysis, we relied on Costa *et al.*'s (2014a, 2014b) theoretical proposition. The latter describes actual behaviors and is specific for TWE. The authors propose different specific behaviors that account for both affective and motivational interpersonal processes.

In what motivational interactions are concerned, team members may highlight the successes of the team so far. This is in line with Amabile and Kramer's (2011) proposal of the progress principle that states that experiencing progress is the most important booster of motivation and creativity. Team members may also validate each other's competences or their teams' qualities, and provide positive feedback to team members, promoting a sense of collective efficacy (Bandura, 1997). Finally, and in line with Locke and Latham's (1984) goal-setting theory by which difficult goals enhance motivation, team members may establish difficult goals for their team, or exhort colleagues to work hard to get where they want to be. Affective processes include regulating affect. According to Niven *et al.* (2009), interpersonal affect regulation strategies include what they have named as positive engagement and acceptance. In the context of teamwork, positive engagement implies trying to change the way others think about that situation, suggesting that they will be able to succeed and give advice on possible courses of action; pointing out the positive characteristics of the team or of specific members, following negative feedback and being available to listen to what is bothering a coworker, allowing him or her to vent his or her emotions. Acceptance includes communicating validation to the other person or using humor and jokes (Costa *et al.*, 2014a, 2014b). Also, teams may engage in defining norms about the emotions that should be displayed or avoided (Rafaeli and Sutton, 1987) – display rules. For example, team members may remind others that they should not show low morale. The categories used in this study to analyze the teams' interpersonal processes were based on this proposal and are outlined in Table I.

Dimension	Categories and behavioral description of interaction	Examples and source	
Motivational Processes	Highlighting small wins Team members tell others about things in which they have been successful or more successful in comparison to other groups. This applies to tasks that have been finished (e.g., the position in the last decision, the relative position concerning specific areas, etc.)	“We got the first place! [in the last round]” (Team C) “We got 5 stars on our website!” (Team B)	
	Establishing difficult goals Team members talk about difficult goals, either about the results of the competition (e.g., being first) or about the current decision (e.g., increase the sells, decrease the stock, etc.)	“Goals for the next decision? First place!” (Team D)	
	Validating competences Team members mention characteristics of their team that may allow them to get good results, such as being fast, each one being good at a specific thing, etc. If they mention something positive that happened to the team, than it should be coded “highlight small wins”	“This is very well thought, very well. We are very efficient!” (Team A)	
	Positive/constructive feedback Team members talk about what they did right (e.g., a good idea of someone) or could improve. It refers to tasks that do cannot be measured (if so, it should be coded “highlight small wins”)	“The marked had a good answer to our decision, that’s what we expected” (Team E)	
	Exhort to work hard Members incite others to work, to get things done, to be fast	“Ok, gentleman, let’s play!” (Team E) “We have 16 minutes!” (Team A)	
	Affective Processes	Positive engagement Try to change what others think about what they should do (e.g., suggesting they will be able to succeed) give advice. Point out positive characteristics of the team, following negative feedback. Team members show availability to listen to others, for example by being quiet while others speak and looking at them	“Look, what we could have improved, we did improve! The problem in our first moves was that we ha always too much production, and that we could already fix [trying to convince others they are doing everything they can to have a better result in this decision]” (Team B)
		Acceptance Communication validation (saying that the other person is right, demonstrating agreement)	“Yes, yes, that’s it.” (Team C) “Guys, you have all my support, weather we end up in first or last!” (Team D)
		Express care/ try to make members feel special Humor and jokes	
		Display rules Team members mention how they should feel or what kind of emotions they should display	“Guys, let’s do our yelling, like we always do! [they hold hands and scream “WO-WO”] (Team D)

**Table I.**  
Categories used to analyze team interpersonal processes

## Method

### Participants

The participants of this study were divided into six teams ( $N = 31$  individuals) enrolled in a two-year Executive MBA program. This Executive program consists of regular classes, and involves participation in a management simulation activity. In the beginning of the first year, students are randomly assigned to teams; they work with their team during the two subsequent years. Participants of this MBA tend to be very motivated to succeed. This particular MBA is highly recommended, and, therefore, these participants were selected on the basis of the researchers’ expectation that they will present high levels of engagement.

The average age of team members was 38.06 (SD = 4.18), 77 per cent of participants were male and average size was 5.19 members (SD = 0.40). Most of the participants had a degree in engineering (25.8 per cent) or management (19.4 per cent), followed by economics (12.9 per cent), pharmacy and marketing (6.5 per cent each) and other (29 per cent). They were working in different activity sectors (e.g. bank/finances – 22.6 per cent; pharmaceutical – 22.6 per cent) and most of them had either a managerial role (51 per cent) or a director/president role (32.2 per cent).

### *Management simulation task*

During the last semester of the MBA program, the teams manage a virtual company within the business simulation. This mandatory activity is provided by a company specialized in developing management simulations. All teams start with the same stock market share value. During the competition, they need to make five major strategic and management decisions, at specific dates. Each of these decisions comprises 66 micro decisions in issues such as prices of products, marketing channels, production volume and human resources practices. The five major decisions are uploaded online by the team leader, and the simulation gives each team feedback. This feedback on their stock market value, their relative position within the remaining teams and on more practical results (e.g. number of products in stock, turnover rate, etc.) is available sometime after the deadline for uploading the decision. Each team has the autonomy to work as they wish, to meet when, where and for as many times as they choose to, and this is neither controlled by the MBA's staff, nor by the management simulation company. However, their last decision (fifth) is the only one that they must take at the university. After arriving at the university, each team chooses the room in which they will meet. At a specific time, the results from the fourth decision are available to all. Afterwards, they have one hour to discuss and submit their final (fifth) decision. At the end of the day, the winner is announced at a ceremony that marks the end of their MBA. The winner is invited to participate in the national management simulation competition based on the same simulation, whose winner will represent the country in an international competition.

### *Procedure*

For this study, we videotaped the teams during the latter hour, while discussing their decision choices, and after informed consent from every team member. Each team chose the classroom in which they would meet, as well as their sitting arrangements. The teams were left alone when deciding, and the researcher was not present in the room. We opted for a mid-shot perspective of the camera (Luff and Heath, 2012), which is a static shot with an open angle adequate to capture the activities of a small group of people, especially when they are seated. This option had a few advantages: a stable shot, with the cameras left in the tripod, provides access to the participants' shifting orientation and participation in social actions and supports the analysis of organization of conduct and interactions and is as less intrusive as possible (Luff and Heath, 2012).

### *Measures and data analysis*

Videos were coded twice, based on those *a priori* defined categories, and we conducted two distinct and closed (Ghiglione and Malton, 2005) content analyzes.

*Analysis 1.* First, we coded the videos in terms of the degree of interaction between team members, the physical distance between members, the degree of team's activation and the valence of their interaction. Each 30 seconds of each video were coded in all of these aspects, using a four-point scale (1-minimum degree, 4-maximum degree), by three autonomous coders, after three sessions of training with the categories. Codes were based on the

evaluation of the whole team and not on the evaluation of single members. Therefore, when members differed in their degree of activation, for example, the rule “more than half of the members” was used to define the coding.

Interaction was coded using a four-point scale ranging from 1: (“During the last 30 seconds each member was working alone, silently and with no gesturing towards others – e.g. reading documents or using the computer”) to 4: (“During the last 30 seconds all team members were simultaneously focused on the same task, all contributing to the discussion either verbally – e.g. expressing ideas, questioning – or non-verbally – e.g. nodding, looking in the eyes”). Distance was coded using a four-point scale ranging from 1: (“During the last 30 seconds all team members were apart, with no physical contact”) to 4: (“During the last 30 seconds all team members were so close that physical contact was unavoidable”). Furthermore, activation and valence behavior indicators were also coded with a four-point scale, as described in Table II.

Coders met once a week to discuss together the units in which they had doubts, until an agreed-upon solution was found. This process led to around 120 coded units per video, and to around 700 coded units in total. Subsequent analysis of these data were made by dividing each video in 10-minute blocks (from 0 to 10 minutes, from 10 to 20 minutes and so on) and by adding the number of times each variable was coded at its maximum (4), therefore signaling moments of high activation and high valence, congruent with the theoretical model of TWE. Inter-rater reliability was assessed with a stratified sample[1] of around 20 per cent of the total corpus, using Krippendorff’s *alpha* (Hayes and Krippendorff, 2007; Krippendorff, 2011) that allows for testing reliability with more than two coders. The analysis showed good reliability (Krippendorff’s  $\alpha = 0.74$ ).

*Analysis 2.* The first author coded the videos with the categories created for the operationalization of motivational and affective processes. As more than one discrete behavior pertaining to the categories dictionary could be present in a 30-second block, each relevant discrete behavior was the unit of analysis. Only one category was allowed for each coded segment to account for their exclusivity. This process led to 269 coded segments. A

Indicators	Examples on both scale ends	
	Minimum degree	Maximum degree
<i>Facial activation</i> [Degree of visual contact with colleagues; Degree of expression, regardless of the valence]	(1) No visual contact and expressionless	(4) Visual contact with others and presenting expression more than half of the time
<i>Vocal activation</i> [Volume and rhythm of speech]	(1) No speech	(4) Fast pace and clearly audible volume of speech
<i>Postural activation</i> [Frequency and pace of body movements]	(1) Immobility	(4) Frequent rapid movements (more than half of the time)
<i>Facial valence</i>	(1) Frown, blank stare	(4) Grin or laughing
<i>Vocal valence</i>	(1) Monotone, slow pace speech or uneven pitch and volume	(4) Varied inflection, regular pace audible volume
<i>Postural valence</i>	(1) head tilted down or body poised to excludes other members	(4) body poised to include group members, active hands during speech, or head tilted toward stimuli

**Table II.**  
Activation and valence codes



second researcher then coded a randomly selected sample of 20 per cent of the total segments and inter-rater reliability was calculated (Krippendorff's  $\alpha = 0.73$ ). The total number of occurrences for each category was used for reporting the results.

*Team work engagement.* TWE was measured by means of an electronic questionnaire at the beginning and end of the competition with nine items (Costa *et al.*, 2014b). This scale was filled out by all team members. Examples of the items are "When we are working on the project we feel strong and vigorous" and "We are excited about this project" (1 = never to 7 = always), Cronbach's  $\alpha = .96$ .

## Results

Table III details the team composition, and presents the means and standard deviations for TWE's values. To statistically justify the existence of the team level construct, we calculated the index of within-group interrater agreement ( $\text{rwg}_{(j)}$ , James *et al.*, 1984). Considering our low sample size ( $N = 6$  teams), we did not calculate intraclass correlations.

The mean level of TWE of these teams (6.1 on a seven-point scale) is very high, and, therefore, supporting our assumption that the participants in this MBA program were all highly engaged with the competition, allowed for pursuing the aim of the study.

In Figure 1, we present the temporal evolution of the teams' ranked position in the competition. Teams A and C were the ones that, from the start, competed for the first place, whereas team B had a long period of being last. Team D is the one that showed a major fall, going from third to last in two decisions.

### *Interaction and distance between team members*

Most of the teams worked close together during the whole hour (Figure 2), except teams D and C, whose members progressively moved apart until around 40 minutes. These are the teams who had moved down the rank in the previous (fourth decision).

In what interaction is concerned, there is clearly a transition moment for all the teams. Members tend to show increasingly more interaction between them, until around the midpoint of the task (around 30/35 minutes). Also, team members tend to diminish their interaction around 50 minutes, when they have to insert the decision in the computer simulator and work alone on their management report (Figure 3). Team D shows the higher initial levels of interaction and also the most abrupt decrease from which it does not recover. All the others show ups and downs in their members' levels of interaction.

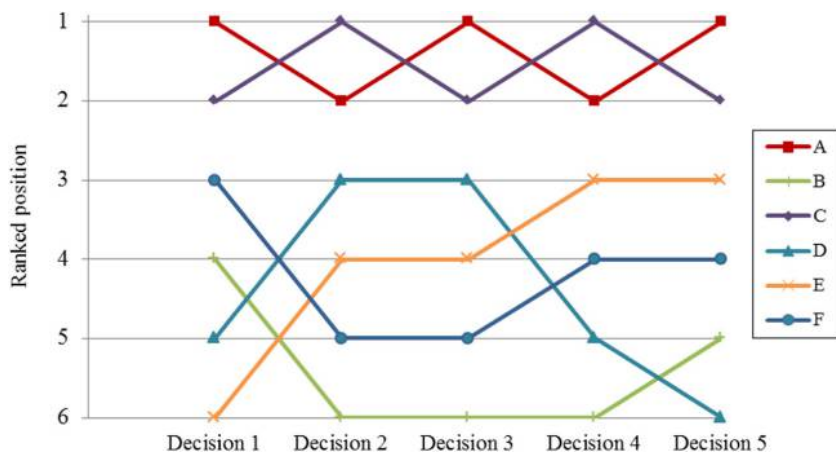
### *Activation and valence*

In general, teams tend to show an initial peak of activation, followed by ups and downs that tentatively increase overtime, with the exception of team D, which shows the highest fall, from as early as 20 minutes onward (Figure 4). Team A (first final place) stands out with higher values in the second half of the time (from around 30 minutes until the end), closely followed by team C (second final place).

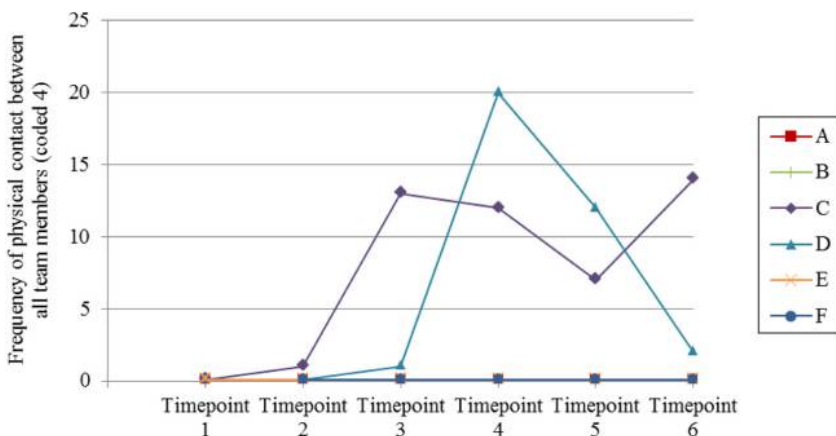
There is no clear pattern of valence among all teams during the first 50 minutes of the decision-making task, but we can globally perceive a tendency for a U-shaped evolution (Figure 5). Around the 50th minute, all teams show an exponential increase in their positive valence, which coincides with the time where they have submitted their decision, and, therefore, their task is done. Similar to what happens with the activation values, Team A, the winner, shows the higher increase of positive valence after midpoint. Team D always shows the higher peaks throughout the whole hour, particularly in the first half of the task.

**Table III.**  
Team composition,  
mean and standard  
deviations for TWE's  
values and  
aggregation index

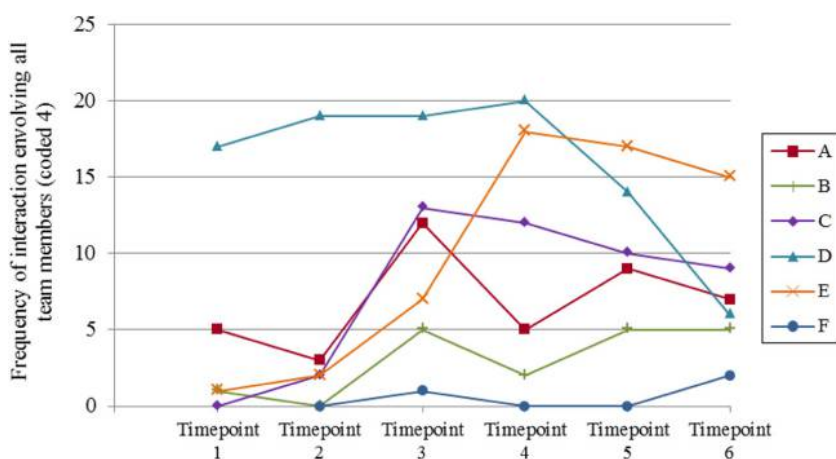
Team	N	Mean age	Sex	TWE <sub>TIME2</sub>	TWE <sub>TIME5</sub>	Rwg <sub>0 TIME5</sub>
A	5	M = 36.8 (SD = 4.9)	FMMMM	5.29 (SD = 1.1)	5.71 (SD = 1.21)	0.63
B	5	M = 38.2 (SD = 4.1)	FFMMM	4.89 (SD = 1.9)	5.49 (SD = 1.16)	0.67
C	5	M = 38.8 (SD = 2.9)	FMMMM	6.53 (SD = 0.35)	6.84 (SD = 0.23)	0.99
D	5	M = 38.6 (SD = 4.9)	FMMMM	6.09 (SD = 0.65)	6.76 (SD = 0.43)	0.95
E	6	M = 39.4 (SD = 2.9)	FMMMMM	5.09 (SD = 0.96)	5.36 (SD = 0.75)	0.86
F	5	M = 38.4 (SD = 4.8)	FMMMM	5.98 (SD = 0.56)	6.31 (SD = 0.43)	0.95
Mean	5.19	M = 38.6 (SD = 4.1)	M = 77% F = 23%	5.6 (SD = 0.65)	6.1 (SD = 0.94)	M = 0.84 (SD = 0.16)



**Figure 1.**  
Ranked position of  
each team over time

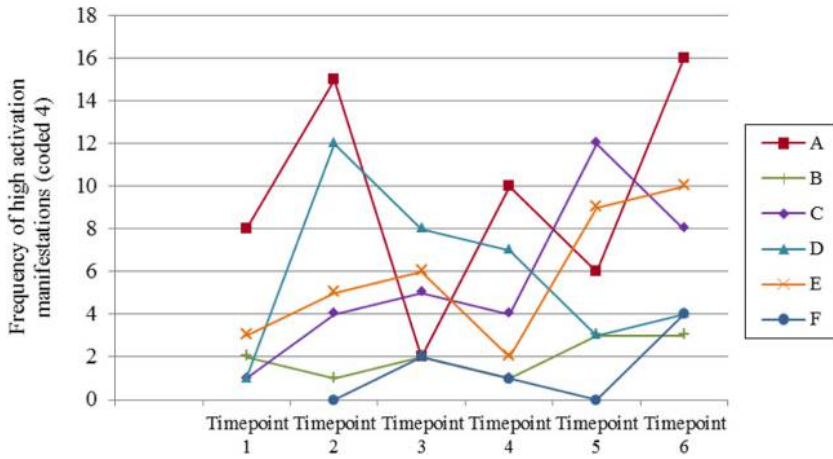


**Figure 2.**  
Team members'  
distance

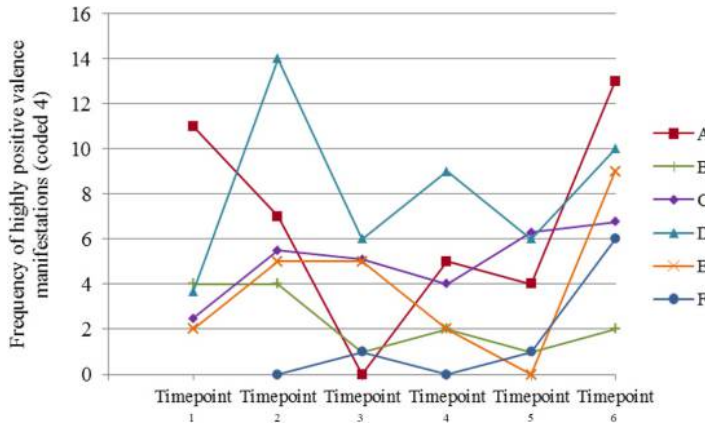


**Figure 3.**  
Team members' levels  
of interaction

**Figure 4.**  
Levels of activation of each team over time



**Figure 5.**  
Levels of valence of each team over time



*Motivational and affective team processes*

In Table IV, we present the absolute frequencies of each process, for each team and in total. Taken together, affective processes are generally more present in these teams than in motivational ones (Figure 6), except in teams B and E, where the prevalence of both is similar. From the previously defined processes, four of them were clearly salient in all six teams. Two of them were affective: positive engagement (e.g. “We have enough stock, we will be able to do it” Team C) and acceptance (e.g. Member A: “Some people take this very seriously”, Member B “Like us, people like us!” [laughs] Team B; “you are right, I’m sorry” Team E); and two were motivational: highlighting small wins (e.g. “We went up a little bit, we now have 30” Team F) and positive/constructive feedback (“[...] or maybe we can put it here” Team E) (Figure 7).

Acceptance is the process that is most observed in all teams, except in one (Team E), and generally is followed by positive engagement, with the exception of Team E and Team B. The two teams that consistently had the best results throughout the competition (A and C) present a similar pattern: high levels of acceptance, followed by high levels of positive engagement, both of these processes clearly departed from others. Team A’s values on the

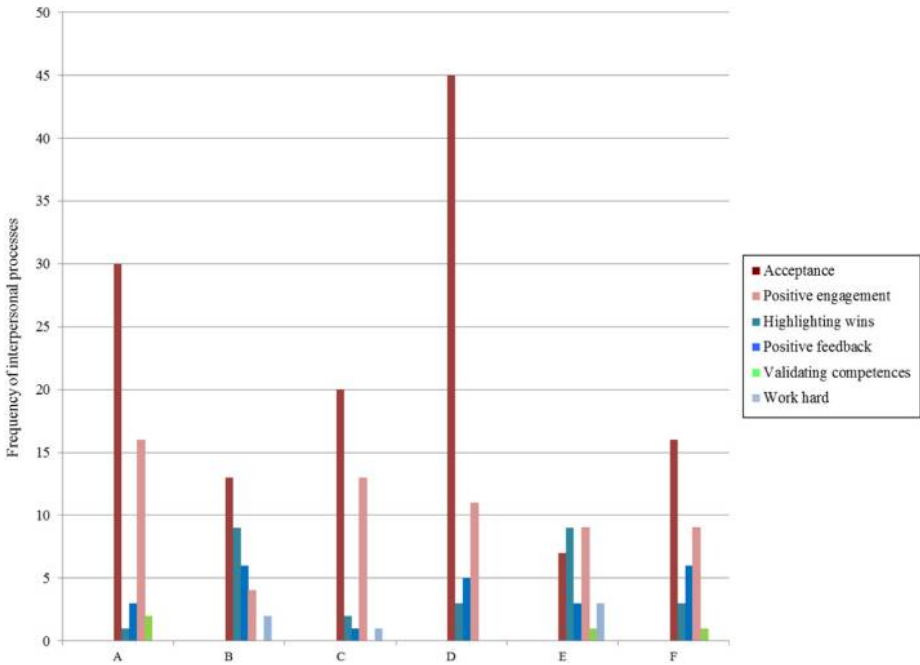
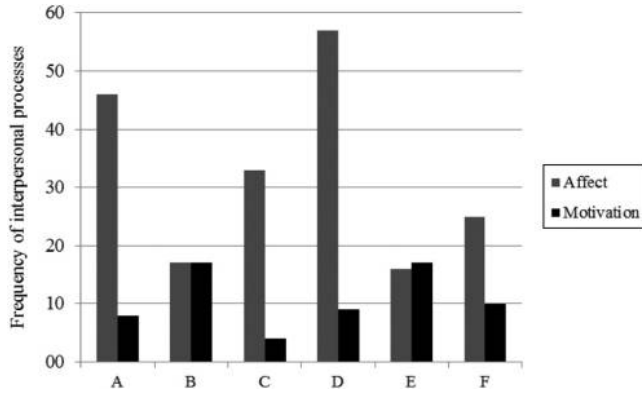
Team	Motivational										Affective					
	Highlighting wins	(%) team	Difficult goals	(%) team	Validating competences	(%) team	Positive feedback	(%) team	Inciting to work hard	(%) team	Positive engagement	(%) team	Acceptance	(%) team	Display rules	(%) team
A	1	1.9	.	.	2	3.7	5	9.3	.	16	30	30	56	.	.	54
B	11	25	.	.	.	.	8	18.2	2	8	18.2	15	34.1	.	.	44
C	2	5.3	.	.	.	.	1	2.6	1	13	34.2	21	55.3	.	.	38
D	3	4.5	1	1.5	.	.	5	7.6	.	11	16.7	45	68.2	1	1.5	66
E	9	28.1	1	3.1	1	3.1	2	6.3	2	6	18.8	11	34.4	.	.	32
F	3	8.6	.	.	1	2.9	6	17.1	.	9	25.7	16	45.7	.	.	35
Total	29	.	2	.	4	.	27	.	5	63	.	138	.	1	.	269
(%) Total	10.78	.	0.74	.	1.48	.	10.03	.	1.85	23.42	.	51.30	.	0.37	.	100

Team work  
engagement

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**Table IV.**  
Absolute and relative  
frequency of each  
team interpersonal  
process, within each  
team

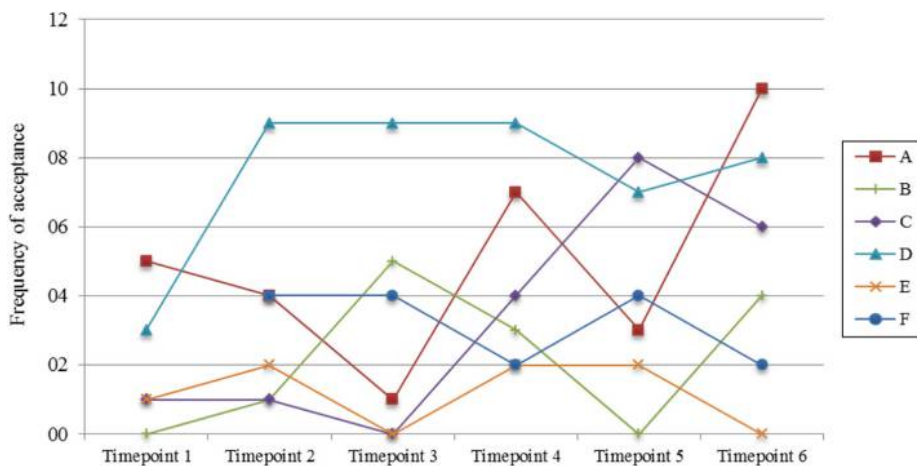
**Figure 6.**  
Frequency of affective and motivational interpersonal processes in each team



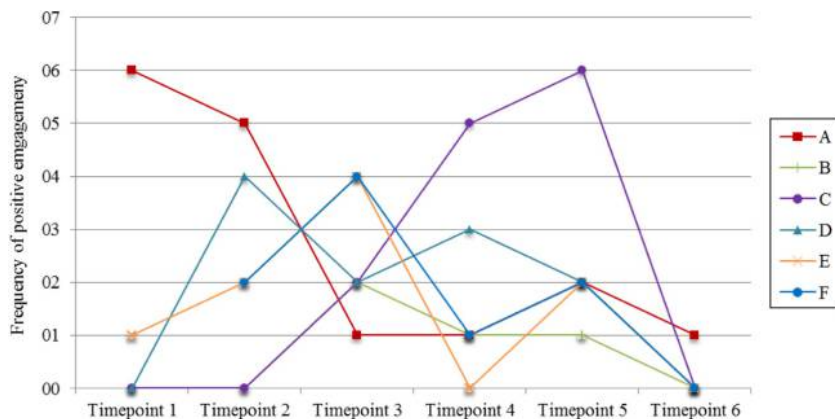
**Figure 7.**  
Frequency of each type of interpersonal process for each team

affective processes are higher than those of any other team, with exception of Team D's distinctively high level of acceptance. Team D was the one who eventually lost the competition and is characterized by a lot of humorous comments and jokes throughout the whole hour.

We then looked for a temporal pattern in terms of the frequency of the most observed processes over time (Figures 8-11). Highlighting small wins tend to occur more during the first minutes of the task and positive feedback presents an iterative pattern – with peaks every 20 minutes. Affective processes appear to have a less-defined trajectory over time, with



**Figure 8.**  
Frequency of acceptance in each team over time



**Figure 9.**  
Frequency of positive engagement processes in each team over time

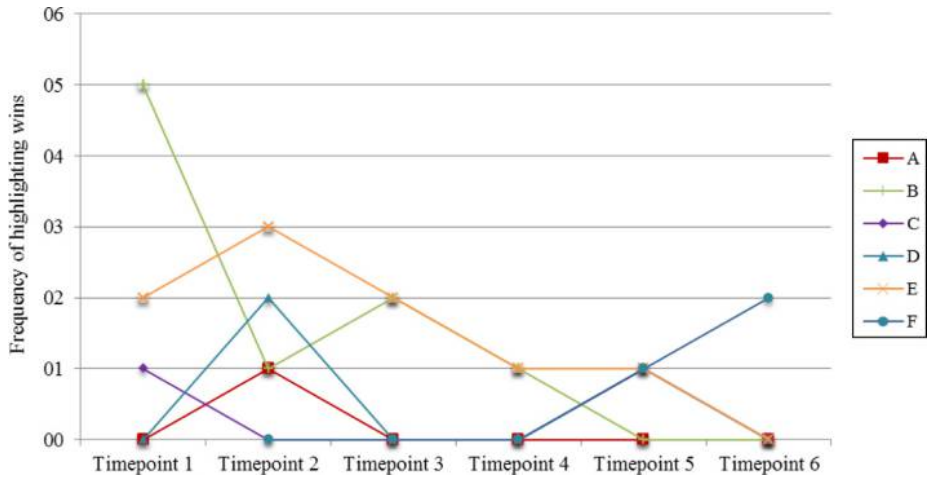
positive engagement tendentially decreasing, except for Team C, which presents a peak at around 50 minutes.

Table V presents a summary of the main results, per team.

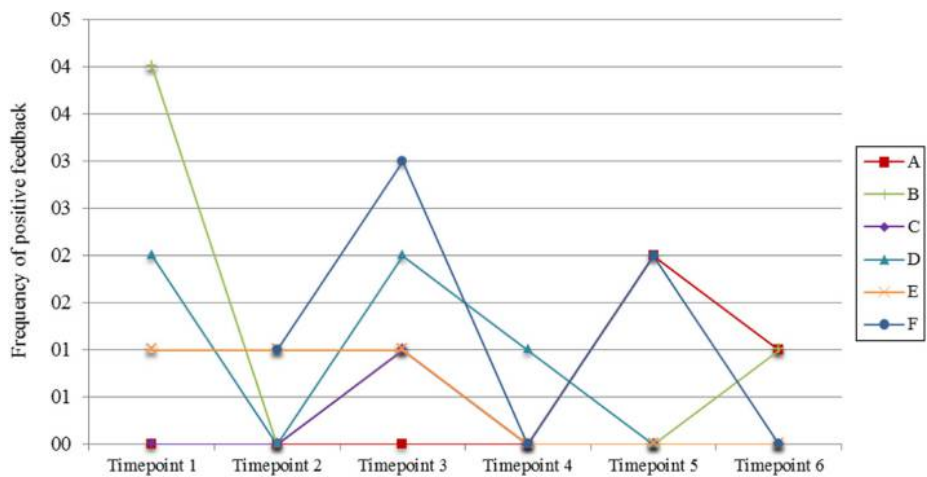
## Discussion

One of the major goals of this study was to describe the types of interaction (both verbal and non-verbal) that are present in highly engaged teams. This ambitious goal is still open for further developments and a definitive description cannot be put forward at the moment with our results. The results seem to indicate that highly engaged teams work physically close to each other and show an increment in their interactions up until the task's temporal midpoint. Overall, teams have an initial peak/increase of activation followed by irregular ups and downs in activation and a U-shaped temporal evolution of their emotional valence (with more positive emotional valence in the first and last moments). The most interpersonal processes used are affective, namely, acceptance and positive engagement, and the most motivational processes include recursive positive feedback and highlighting the teams' wins in the first moments of the task.

**Figure 10.**  
Frequency of highlighting wins in each team over time



**Figure 11.**  
Frequency positive feedback in each team over time



This study also allows for an exploratory description of the relationship between TWE and team performance. High-performing teams show higher activation levels in the second half of the teams' task and higher levels of affective processes over motivational ones. The worst performing team in the group has the highest initial interaction levels followed by an abrupt decrease both in their levels of interaction and in their levels of activation. Simultaneously, this particular team presents higher peaks of positive emotional valence and an outstanding frequency of "acceptance". These results suggest that although engaged teams are essentially characterized by the presence of positive interactions, it is fundamental to alternate more "excited" and fun moments with more task focused ones and collective interaction moments with individual work. This dynamic change from one mode to the other seems to allow keeping a functional balance between socio-emotional and task areas (Bales, 1950; Bales and Cohen, 1979).



Final rank	Team A First	Team B Fifth	Team C Second	Team D Sixth	Team E Third	Team F Fourth
Interaction pattern	Increasing interaction until the midpoint, followed by slow steady decrease Always close	Increasing interaction until the midpoint, followed by a decrease Always close	Increasing interaction until the midpoint, followed by slow steady decrease Progressively apart	Very high initial level, flowed by abrupt continuous decrease Progressively apart until the midpoint, and progressively approaching each other	Increasing interaction until the midpoint, followed by slow decrease Always close	More stable pattern with small increase in the final time point Always close
Members distance						
Activation pattern	Early initial peak followed by ups and downs High values in the second half Tendentially U-shaped	Late initial peak followed by ups and downs Tendentially U-shaped	Initial increase followed by ups and downs High values in the second half Tendentially U-shaped	Early initial peak followed steady decrease Tendentially U-shaped, but always within high values; high peaks	Initial increase followed by ups and downs Tendentially U-shaped	Late initial peak followed by ups and downs Tendentially U-shaped
Valence pattern						
Motivational and affective processes	Clear prevalence of affective over motivational processes	No clear salience of particular types of processes	Clear prevalence of affective over motivational processes	Extremely high frequency of "acceptance"	No clear salience of particular types of processes	Slight prevalence of affective over motivational processes

**Table V.**  
Summary of the main results per team

Our results also echo the work of [Gersick and Hackman \(1990\)](#) and, more recently, of [Knight \(2013\)](#). According to [Gersick and Hackman \(1990\)](#), temporal milestones are very important moments for teams, as it is during these moments that teams can break free of inertial patterns and change their amount of focus in exploratory search, such as experimenting with new ideas or approach to their tasks. Building on these ideas, [Knight \(2013\)](#) suggests that performance will be higher when this exploratory search is done at the initial stages, declining in the second half of the task. This is precisely what happens with our teams in what their levels of interaction and the initial activation peak is concerned. Plus, the authors argue that positive mood in the beginning of the teams' life stimulates this exploratory search (the start of the U-shaped "valence" curve), as a task-focused motivational frame is likely to be salient: individuals are still unconcerned about evaluation or performance and want to enjoy and to make the most to improve their work. However, at the midpoint, when teams must heighten their focus on performance to comply with the deadline, the existence of team's positive mood signals that there is no need for further exploratory search and that they have reached a desirable level of performance (e.g. mood-as-information theory) ([Schwarz's, 2012](#)). Simultaneously, the existence of negative mood signals distance from their goals leads teams to persist in that exploratory search. In our specific case, the high peaks of positive affective interactions in Team D overlap with this teams' abrupt decrease in interaction and activation in the second half of its life – therefore, not allowing for further exploring of possible courses of action and, possibly, preventing them from reaching better solutions. Other teams, with their U-shaped valence pattern, reach a kind of an affective "valley", signaling that they should increase their activity to reach their goals. Indeed, the first- and second-placed teams are the ones who exhibit a higher increase in activation after their midpoint.

Another perspective to look at these results is emotional regulation in teams. The ability to regulate members' emotions is related to positive team outcomes, such as lower levels of relationship conflict and to a lower chance to develop relationship conflict following task conflict ([Curseu and Oerlemans, 2012](#)). Indeed, [Elfenbein and Ambady \(2002\)](#), cit. in [Elfenbein \(2006\)](#) found that up to 40 per cent of variance in team performance was dependent on the ability of team members to understand the emotional expressions of their colleagues, particularly when accurate in identifying positive (and not negative) emotions. Their study further suggests that teams that lack the ability to use negative emotions productively (e.g. reflecting on how they are working, changing strategy, etc.), i.e. teams that lack the capacity for emotional regulation are more prone to translate that negative energy into team performance. It might be possible to draw a parallel conclusion for positive emotions perception: when perceiving a lot of positive emotions in teammates is not paired with emotional regulation ability, teams might engage in overconfidence bias ([Peterson, 2015](#)). Regulating members' emotions can, therefore, be relevant not only from recovering from negatively charged interactions, but also for detecting and breaking free from patterns characterized exclusively by positive emotional expression, namely, at the midpoint.

The empirical work by [Bledow et al. \(2011\)](#) may bring another useful input to this discussion, as it focuses in the engagement construct. With a sample of 55 software developers, the authors found support for their affective shift model of work engagement, which states that work engagement (in their study, at the individual level) results from a dynamic interplay of positive and negative affect. More specifically, they found that work engagement in the afternoon was positively related to negative mood and events experienced earlier in the day as long as there had been high positive mood in the interval between morning and afternoon. Their findings highlight the relevance of affect management for engagement, particularly the motivating potential of negative affect that subsequently led to

a shift to positive affect (the final end of our U-shaped valence curve). Teams who fail to convert TWE into objective performance gains can be missing the importance of the existence of less positive moments, and, therefore, can be “too happy” while lacking the necessary task-focused energy. Hence, teams who are unable to “walk without rhythm”, alternating the valence and activation of their interactions and of their work, may “attract the worm” (Herbert, 1965) of low performance. Therefore, the theoretical model of TWE (Costa *et al.*, 2014a, 2014b) is supported, in what the relevance of interpersonal processes for the emergence of TWE is concerned. However, the relevance of each specific process is likely to be different, considering the phase of teamwork at stake.

A final note is needed at this point. Notwithstanding the potential of this study, considering the small sample size and its exploratory nature, these considerations must be perceived with caution and further research is needed to support their adequacy.

### *Contributions and limitations*

The major contribution of the paper is its descriptive nature in the study of team interpersonal processes. Although our results are in line with previous literature proposals, we build beyond these works in four ways. First, we empirically study some proposals that, until now, were only theoretically (Costa *et al.*, 2014a, 2014b) proposed operationalization of affective and motivational processes. Second, we merge both verbal and non-verbal interactions into a single study, allowing for a parallel view of these two possible ways of interaction between team members. Third, we offer a temporal picture of team interaction in these two dimensions, highlighting their evolution over time, during one performance episode. And fourth, we studied teams that were all highly engaged, therefore describing similar patterns of behavior that may lead to (or reinforce) highly collective engagement. This may offer more practical insight for managers and practitioners.

From another perspective, this study has an exploratory nature, proposing a design and materials that may be used by other researchers for replicating or building on the design. The quality of the study is first addressed by the inter-rater reliability indexes (Krippendorff, 1980). Plus, and following Gaskell and Bauer's (2000) guidelines, we provide the complete categories list with definitions and examples (with the respective source, as well as its context, when necessary), as well as the detailed description of the data collection and analysis processes. This answers to concerns about the transparency and sistematicity criteria of quality of qualitative studies, as argued by Meyerick (2006). This being said, we believe that using video/audio materials is an excellent, although time consuming and challenging, way of studying team interaction dynamics, which we would like to see in further studies or replications. Having a clear objective performance assessment also contributes for inter-team comparisons. Nevertheless, we acknowledge that our methodology can be further improved. Our category system for the verbal interactions was not intended to be exhaustive, but instead to focus on a previous theoretical proposal. A more detailed analysis of all the interactions could provide additional useful information to complete the picture we started to describe.

Another limitation of this study is that it leaves out another interpersonal process from the taxonomy of Marks *et al.* (2001): conflict management. The reason for this is that analyzing which type of conflict management strategy is used, e.g. avoidance, compromise, accommodation, competition and collaboration (Blake and Mouton, 1964; Rahim and Bonoma, 1979) would imply defining different temporal limits for each unit of analysis, as those strategies are not comprised in a single sentence. Therefore, and considering we already had two distinct code systems, we opted to leave conflict management out of the present study. However, it is a relevant process that should also be qualitatively analyzed, to

better understand how it can be operationalized in terms of concrete behavior and interactions.

Finally, we did not analyze the degree of homogeneity of team members' behavior. Our analysis concerns the team as a whole, and left behind the possibility of considering eventual dominant members or subgroups. This is an interesting line for future research.

Looking into the black box of team processes is still at an embryonic stage. We look forward to seeing it grow and for the implications it can bring to our understanding of team effectiveness.

#### Note

1. A stratified sample, with a similar percentage of each scale point (1 to 4), was used to counter the effects of the existence of rare values (in this case, 1).

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