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What Makes Creative Teams Tick? Cohesion, Engagement, and Performance Across Creativity Tasks: A Three-Wave Study

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Abstract

The present study examines the mediational role of collective engagement in the relationship between team cohesion and team creative performance. A reciprocal process was expected to unfold across creativity task episodes: (a) team cohesion leads to collective task engagement, which in turn has a positive effect on team creative performance (perceived team performance and independently rated creativity), and (b) perceived team creative performance predicts the development of future team cohesion. The study relied on a longitudinal three-wave research design through an organizational simulation exercise, in which 118 project teams (605 individuals) were charged with three creativity tasks. This study advances collective task engagement as an important mediational process explaining team performance in creative activities.

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team cohesion, collective task engagement, team creative performance, reciprocal processes

Organizations strive to keep their position in a global and competitive market. They are under constant pressure to make the right decisions to expand their business and to come up with new and exciting products and services. Consequently, such organizations are greatly in need of effective working strategies that may help them to cope with the extremely demanding environment in which they have to operate. A key response to the pressures exerted by this dramatically changing environment is creativity, which has been advanced as a central element for organizational effectiveness (Amabile, 1988; Baer & Oldham, 2006; George, 1990). Not surprisingly, Google, which has become the gold standard for organizational success, advocates for the importance of hiring creative people and facilitating a creative atmosphere at work. According to Ed Catmull (2008), president of Pixar Animation Studios, success is not a matter of luck but a combination of practices for managing talent and creating collective creativity. What these kinds of successful organizations have in common is their reliance on practices that trigger and develop creativity among both their employees and their teams. In fact, teams are increasingly being used as the basic unit of work accomplishment (Hirschfeld & Bernerth, 2008) and, therefore, the basis for organizational success. Thus, understanding how to enhance team creativity is a key issue both for business and for research.

Over the past few decades, creativity research has grown exponentially and provides numerous insights on how individual employee creativity can be fostered (Amabile, Conti, Coon, Laznby, & Herron, 1996) and, more recently, how team creativity can be enhanced (Joo, Song, Lim, & Yoon, 2012). Team creativity has become an issue of utmost importance, given the increasing reliance of organizations on project-based teams (i.e., temporary teams charged with a specific task during short duration of time) to rapidly produce creative outcomes (Gersick, 1988). In this regard, research has taken important steps toward a better understanding of the psychosocial processes leading to team-level creativity (Eisenbeiss, Van Knippenberg, & Boerner, 2008). A meta-analytic study summarizing 30 years of creativity and innovation research (Hülsheger, Anderson, & Salgado, 2009) revealed that team processes (e.g., internal communication, team cohesion and vision) (a) displayed stronger links with creativity than team input variables (e.g., team size, team longevity, and background diversity) and (b) better predicted team creativity than individual creativity. Given their proven impact on creativity

and innovation, research focusing on the role of team process variables has burgeoned in the last 5 years (Choi, Sung, Lee, & Cho, 2011; Hu & Randel, 2014; Jia, Shaw, Tsui, & Park, 2014; Sung & Choi, 2012). Particularly, recent research highlights the idea that social integration processes within teams (such as team cohesion) are important for creative and innovative activities as they stimulate positive team member interactions (Hülsheger et al., 2009; Taggar, 2002). Hence, understanding the dynamics of social processes in team creativity is crucial for research and practice.

Specifically, current insights into the link between cohesion and creative performance seem to suggest an indirect relationship (Hülsheger et al., 2009; Taggar, 2002). However, the precise dynamics of this relationship remain unclear, thereby calling for more research attention to three key questions that have remained underexplored. First, which intermediate factors can explain the relationship between team cohesion and team creative performance? The second question is related to innovation process over time. A recent review of the innovation literature concluded that only a few studies have examined team innovation processes over time (Anderson, Potocnik, & Zhou, 2014). This is particularly relevant for project teams that have few references on working together in past moments or episodes. In line with Mathieu and Button (1992), we define episodes as distinguishable periods of time over which performance accrues. Task episodes are most easily identified by goals and goal accomplishment periods, and teams pursue just one of them at a time (Marks, Mathieu, & Zaccaro, 2001). Therefore, how long does team cohesion and team performance take to develop over time? Little is known regarding this question, particularly in project teams (Nakata & Im, 2010). Therefore, research is needed to provide further empirical evidence to better understand how the relationship between team engagement and team performance takes shape over time, especially in newly formed teams. Finally, the third question is related to the second one exploring the relationship between team cohesion and performance over time. Therefore, we wonder which is the effect of past team performance on cohesion in the next task episode?

In addressing these three questions, we propose a three-wave study to first analyze the mediating role of team engagement (i.e., vigor, dedication, and absorption) as a key motivational mechanism that transmits the effects of team cohesion to team creative performance; and second, to test a reciprocal cycle of cohesion and team creative performance across subsequent task episodes, to understand the dynamics of this relationship over time.

In doing so, this study contributes to what we know about team creativity in several ways. First, we uncover the mechanisms that explain the team cohesion–team creative performance relationship by studying the mediating

role of team engagement. Second, by adopting a longitudinal research model, we provide much-needed insight on how team creativity develops over time (see, for instance, the call of Anderson et al., 2014, and call of Shin & Zhou, 2007). Finally, a better theoretical understanding of these dynamics should help practitioners in designing interventions to foster team creativity.

Theoretical Background and Hypotheses

In accordance with previous research, we conceptualize team creativity as the team production of ideas concerning products or services that are novel and useful (Amabile, 1996; Shalley, 1991). Team creativity emerges from cohesive team characteristics that support open interactions, diverse viewpoints, and playful surroundings (Amabile, 1988). Team creativity should be differentiated from team innovation in the sense that creativity refers to the idea generation stage, while innovation also implies the introduction and application within a team of ideas, processes, products, or procedures that are new to the team and are designed to be useful (West & Farr, 1990).

Team Cohesion, Team Engagement, and Team Creative Performance

Creativity and innovation research has advanced team cohesion as an important team process variable (Hülsheger et al., 2009; Joo et al., 2012). Team cohesion refers to the extent to which team members are committed to their team, and how well the team is integrated as it pursues its goals (Kozlowski & Ilgen, 2006). It has been argued that team members who have strong feelings of belongingness and feel attached to other team members are more likely to cooperate (Taggar, 2002). This notion of cooperative interdependence among team members has been argued to be crucial not only for team performance in general (Mathieu, Kukenberger, D'Innocenzo, & Reilly, 2015) but also, more specifically, for the production of creative output as a group. Teams with strong cooperative norms make team members more motivated to contribute to the team's collective goal and creative success (instead of pursuing individual goals), for example, by constructively discussing and building on each other's ideas (Nijstad & De Dreu, 2012). In their meta-analysis, Hülsheger and colleagues (2009) demonstrated that various indicators of cooperation, such as team cohesion and participative safety, are important for creative and innovative activities as they stimulate team members to interact with each other and facilitate the exchange of ideas within a supportive and nonthreatening team atmosphere. Similar results

have been reported by Taggar (2002), who showed that aggregated individual-level creativity was positively related to team-level creativity when groups displayed cooperative behavior. Hence, team cohesion can be expected to be particularly important for creative tasks as they rely heavily on knowledge sharing and collaborative behaviors between team members (Nijstad & De Dreu, 2012). Thus, we hypothesize the following:

Hypothesis 1: Throughout the course of a creativity task episode, team cohesion positively relates to team creative performance.

The positive effects of team cohesion on team performance seem to be partially explained by their impact on team motivation to engage in creative activities (Hülsheger et al., 2009). However, the mechanisms through which the relationship between team cohesion and creative team performance occurs remain unclear. On one hand, cohesive teams have been shown to be more likely to experience a higher sense of coherence and more cognitive conflict and discussion, which promote effective group processes, decision making, and performance over time (Ensley, Pearson, & Amason, 2002; Greer, 2012; Mathieu et al., 2015). On the other hand, it has also been argued that strong levels of team cohesion lead to groupthink and conformity pressure, which are considered to impede creative processes (Paskevich, Estabrooks, Brawley, & Carron, 2001). Hence, to understand how team cohesion may affect team creativity, we propose and test an intermediate mechanism that should reflect the persistence of the team to accomplish the task at hand considering the energy, and feelings of inspiration and concentration of team members needed to achieve creative goals.

Collective task engagement is defined as a positive, fulfilling, work-related shared motivational state that is characterized by team vigor, team dedication, and team absorption, which emerges from the interaction and shared experiences of members of a work group (Costa, Passos, & Bakker, 2014; Salanova, Llorens, Cifre, Martínez, & Schaufeli, 2003). Team vigor refers to the energetic component of task engagement that implies strong levels of energy and mental resilience while working, putting a great deal of effort into a team task and persisting, even when difficulties might occur. Team dedication means the involvement in a team task by experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Team absorption refers to full immersion in the team's work. Team members who feel absorbed in their activities or tasks feel that time passes more quickly and find it hard to detach themselves from their work (Schaufeli, Bakker, & Salanova, 2006).

Collective task engagement should play a key role in the relationship between team cohesion and team performance due to its motivational nature. Our theoretical explanation of the relationship between team cohesion and team creativity is in part inspired by the motivational theories of the Job Demands–Resources model (JD-R model; Bakker & Demerouti, 2007; Crawford, LePine, & Rich, 2010; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Schaufeli & Bakker, 2004) and intrinsic motivation theory (Deci & Ryan, 1987; Gagné & Deci, 2005). We are very aware that psychological constructs do not simply translate from an individual level of analysis to a team level of analysis (Chan, 1998). However, we consider that the underlying rationale of these models allows us to describe the processes that may be at work at the team level more easily and will help to conceptually explain the development of team task engagement and its role in team creative performance.

The JD-R model posits that employees' psychological states and consequently their work performance (in our case, team creative performance) are determined by the extent to which individuals have work- and social-related resources (in our case, team cohesion) at their disposal. We believe that collective task engagement as a shared positive aspect of collective well-being in work groups should similarly be influenced by the shared team social resources that team members may draw upon. Team social resources refer to several aspects of team functioning that emerge from interpersonal dynamics between team members and from which teams can benefit in terms of overall performance and behavioral action (Oh, Chung, & Labianca, 2004). As members of teams high in cohesion experience a set of similar positive interpersonal events (e.g., sharing of positive emotions, encouraging all team members toward a common purpose, expressing team pride, continuous reciprocal support in the face of challenges), we believe that over time this will result in a common motivational state characterized by absorption, vigor, and dedication oriented toward the team ("We're in this together so let's do it!"). Indeed, team cohesion has been found to increase the connectedness between team members and to facilitate smooth group interaction and open communication (Ensley et al., 2002), which in turn should establish stable group structures and the promotion of functional group processes (Hackman, 2012). In the end, these will lead to a heightened team motivational state, collective task engagement, as these positive team exchanges act as a motivating psychological resource where the team can replenish its energy when confronted with adversity or challenging experiences. Evidence for the emergence of common positive psychological states comes from research on mood convergence and emotional contagion in work groups (Hatfield, Cacioppo, & Rapson, 1994). While research on the development of collective

task engagement in teams is relatively new, initial results bring support for our argument that social resources such as group cohesion are instrumental in attaining a shared positive motivational state (Costa et al., 2014; Salanova et al., 2003).

In turn, we posit that this collective task engagement will be the motivational driver for the team, propelling them toward increased team creative performance. This notion is based on the logic of intrinsic motivation theory (Deci & Ryan, 1987). The intrinsic motivation perspective has been one of the most influential theoretical frameworks guiding employee creativity research (Amabile, 1988; Amabile et al., 1996). This perspective has received ample empirical support for its depiction of the role of intrinsic motivation as a psychological mechanism explaining the influences from the work environment on employees' creativity (Anderson et al., 2014). In this regard, intrinsically motivated people are said to engage in activities for the sake of the task itself, which is perceived as pleasant and interesting (Deci & Ryan, 1987). As they are absorbed and engaged in the task itself, intrinsically motivated individuals are found to be more creative.

Adopting the same logic at the team level, collective engagement may be considered as a type of team-level manifestation of intrinsic motivation in the sense that it may increase the tendency of the team to be curious and cognitively flexible, to put in effort, and to be persistent when confronted by barriers, which should result in creative outcomes (Grant & Berry, 2011; Zhou, 1998). Indeed, as new approaches have to be explored to find an adequate solution for a specific problem, the shared experience of vigor, absorption, and dedication will lead engaged teams to collectively persist in the task, work toward their creativity goals, have feelings of enthusiasm and inspiration, and become cognitively immersed in the task, which in turn will lead to creative outcomes. When engaging in creative tasks, drawbacks or difficulties are likely to be encountered and, thus, the success of creative teams strongly depends on their ability to surmount these obstacles. Persistent team vigor, dedication, and absorption should be crucial characteristics of teams to stay focused on their efforts to cope with obstacles (Zhou, 1998). In addition, as task engagement refers to the experience of a positive state of motivational fulfillment at work, this should facilitate experimenting, trying out new behavioral strategies, and thus stimulate creativity. There is some preliminary evidence supporting the role of collective task engagement as a psychological mechanism affecting team performance. Salanova, Agut, and Peiró (2005) demonstrated that work units' work engagement mediated the relationship between organizational resources and service climate, which in turn influenced collective employee performance and customer loyalty in the service sector. Therefore, we propose the following hypothesis:

Hypothesis 2: Throughout the course of a creativity task episode, team task engagement positively mediates the relationship between team cohesion and team creative performance.

Thus far, we have proposed an indirect effect of cohesion on team creative performance by integrating collective task engagement as an underlying motivational mechanism throughout the course of a specific creativity task episode. However, social and work-related resources (e.g., cognitive, motivational, or behavioral) do not exist in isolation but are dynamic and evolve as teams engage in various tasks or activities over time (Marks et al., 2001). Previous research has raised some ambiguity regarding the direction of the relationship between social resources (i.e., team cohesion) and team performance. On one hand, results of several meta-analyses show a positive relationship between team cohesion and performance (e.g., Beal, Cohen, Burke, & McLendon, 2003; Evans & Dion, 1991). On the other hand, it seems these constructs might be reciprocally related to each other (Kozlowski & Ilgen, 2006; Mullen & Copper, 1994). Specifically, Mathieu et al. (2015) found meta-analytical support for the reciprocal influence between cohesion and performance over time in management teams. These authors ran additional longitudinal analyses, indicating that although team cohesion and performance are reciprocally related, the model worked best when cohesion predicts performance over time and not the other way around. Hence, the dialogue is open, specifically regarding the role of team cohesion and team performance during creativity tasks over time. In fact, there is a lack of empirical evidence on the longitudinal relationship between team performance and cohesion in creative contexts (Mathieu et al., 2015). Research findings are especially scarce on project or temporary teams that have few references of past experiences as a team. Hence, in the absence of common experiences, the perceived immediate success in previous tasks may be one of the main predictors of future team social resources development. In addition, creative tasks are typically characterized by a high degree of uncertainty (Mueller, Melwani, & Goncalo, 2012), making it difficult for team members to gauge the future success of their creative task performance. As uncertainty is an aversive state, the impact of team members being successful in a creative task (and thus avoiding uncertainty) might potentially have a stronger impact on subsequent group cohesion rather than successful performance in a traditional task.

Accordingly, in the present study we expect to find a reciprocal effect of team creative performance on future team cohesion. It is our contention that collective perceptions of having successfully performed a creative task will influence the development of future team cohesion. Team members perceiving that they performed well as a team in a previous creativity task will gain

confidence and will increase the social ties with their other team members. This should be beneficial for the social integration of team members, and thus enhance the development of future team cohesion, as team members will be more likely to collaborate and help each other during subsequent task episodes. In other words, cohesive teams should be able to use their teams' resources more efficiently because they know their other team members better and are motivated to complete the task successfully (Beal et al., 2003).

The foregoing reasoning is grounded on different theoretical principles. First, the input–mediator–output–input framework (IMOI; Ilgen, Hollenbeck, Johnson, & Jundt, 2005) considers team processes and emergent states as mediating mechanisms between team inputs and team outputs. In this sense, teams go through a series of IMOI iterative episodes over time, where the outputs of one episode may become inputs of subsequent ones. Second, and connected with the previous idea, lies the principle of team regulation. This principle describes team performance as a dynamic and cyclic process where team actions are directed toward the accomplishment of specific goals, and perceptions of progress lead to the revision of subsequent effort investment and the adaptation of working strategies to resolve the discrepancy between goals and performance (Kozlowski & Ilgen, 2006). In this regard, perceptions of success (i.e., mastery experiences) are said to affect subsequent task performance as they shape the development of resources (Bandura, 1997). Third, and consistently with the conservation of resources (COR; Hobfoll, 2001) theory, we acknowledge that in addition to protecting their current resources (i.e., personal, social, or environmental), people constantly strive to accumulate and develop new resources resulting in resource caravans (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). In other words, perceived team past success will act as a resource builder increasing future team social resources (i.e., cohesion).

Hence, we expect teams perceiving high performance during a former creativity task episode to be more likely to further develop their cohesion levels, which will benefit team creative performance during a subsequent task episode.

Hypothesis 3: Perceived team performance in a creativity task positively relates to the development of future team cohesion at a subsequent task episode.

Method

Sample and Procedure

The present study adopted a three-wave design, involving 605 Spanish individuals participating in an organizational simulation exercise that

consisted of three different team creativity tasks. Participants were recruited through a website built for this purpose and also through advertising posted on panels at the Universitat Jaume I (Castellón, Spain). Each participant received a financial reward (€20) for taking part in the three tasks. A heterogeneous sample was composed of university students (71.6%) from different degree courses (psychology, languages, economics, law, design, engineering, etc.), full-time workers (16.8%) from a wide range of occupations, and unemployed people (11.6%). Participants were randomly assigned to the final 118 teams, which were similar in size (i.e., four to six members each; $M = 5.13$, $SD = 0.89$) and structure (i.e., similar combinations of students, employed and unemployed people). In all, 35.7% of the participants were men, and the average age was 25.3 years. Participants were told that the purpose of this study was to investigate team performance by handling a creativity project.

Each team was brought together during three laboratory sessions, one session per week during 3 consecutive weeks, to work on a creativity task. All teams were told that the goal of the task was to achieve creative outcomes. Although all three tasks involved a creativity assignment, the specific content of each task varied to avoid learning effects (Ziessler & Nattkemper, 2001). At Time 1 (T1), teams were instructed that they were a team working for an organization that sold toys. Specifically, during the subsequent three sessions they would have to perform three different creative tasks (i.e., in the sense that their output had to be novel and adequate) during 40 min. The first session (T1) involved an idea generation task, as teams had to come up with a creative slogan that promoted their organization. One week later (T2), teams came together to work on a second creativity task. Teams were instructed to develop a prototype of a "toy" made out of recyclable materials (equal for all teams). One week later (T3), teams performed a final task and had to design a poster to promote their toy. After each task, participants were asked to complete a questionnaire assessing the variables under study.

Measures

We used validated scales, and the reliability information (Cronbach's alpha) of the scales is presented in Table 1.

Team cohesion was assessed by three items adopted from the scale of J. L. Price and Mueller (1986; for example, *the task has been realized in an amicable and pleasant atmosphere*). Items were answered on a 7-point Likert-type scale (0 = *never* to 6 = *always*).

Collective task engagement was assessed following Salanova et al. (2003) by using three items of each dimension of the short version of the Utrecht

Table 1. Descriptive Statistics and Correlations Among Study Variables (N = 118).

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Team Cohesion T1	5.54	0.34	(.83)										
2. Team Cohesion T2	5.45	0.53	.38**	(.90)									
3. Team Cohesion T3	5.34	0.54	.33**	.58**	(.92)								
4. Collective Task Engagement T1	5.00	0.48	.61**	.34**	.27**	(.91)							
5. Collective Task Engagement T2	5.24	0.50	.43**	.75**	.48**	.56**	(.93)						
6. Collective Task Engagement T3	5.10	0.56	.32**	.46**	.73**	.43**	.57**	(.87)					
7. Perceived Team Performance T1	5.22	0.39	.55**	.38**	.41**	.67**	.49**	.43**	(.88)				
8. Perceived Team Performance T2	5.02	0.60	.34**	.68**	.47**	.48**	.78**	.58**	.59**	(.90)			
9. Perceived Team Performance T3	5.04	0.58	.41**	.59**	.75**	.42**	.67**	.86**	.57**	.72**	NA		
10. Task Output Creativity T1	3.11	1.08	.11	.12	.11	.10	.12	.09	.07	.13	.12	NA	
11. Task Output Creativity T2	2.98	0.84	.13	.15	.09	.25**	.33**	.23*	.09	.22*	.18*	−.03	NA
12. Task Output Creativity T3	3.27	1.08	.08	.31**	.18†	.10	.47**	.25**	.10	.31**	.27**	.06	.14

Note. Internal correlations are presented at the team level. Internal consistency values (Cronbach's alpha coefficients) appear across the diagonal in parentheses. NA = not applicable; T1 = Creativity Task 1; T2 = Creativity Task 2; T3 = Creativity Task 3.
†$p < .10$. *$p < .05$. **$p < .01$.

Work Engagement Scale (see Schaufeli et al., 2006): Vigor (three items, for example, *during the realization of the task, my team felt full of energy*), Dedication (three items, for example, *my team was enthusiastic about the task*), and Absorption (three items, for example, *time flew when my team was working on the task*). Items were answered on a 7-point Likert-type scale (0 = *never* to 6 = *always*).

To overcome limitations of past research (Tekleab, Quigley, & Tesluk, 2009) and answering the need to incorporate objective outcome measures into the creativity domain (Anderson et al., 2014), we measured *creative team performance* by means of two different measures: *perceived team performance* and *task output creativity*.

Perceived team performance was assessed by three items from Goodman and Svyantek's (1999) scale (e.g., *in my team, we achieved the goals of the task*). Items were answered on a 7-point Likert-type scale (0 = *totally disagree* to 6 = *totally agree*).

Task output creativity was assessed for each task output based on the creativity assessment procedure of Baer, Leenders, Oldham, and Vadera (2010). Specifically, three external coders evaluated the team outputs in all the creativity tasks: an expert (i.e., somebody with professional expertise concerning the particular creativity task) and two researchers (not involved in the study), who received creativity assessment training. Creativity was defined in terms of ideas that are both original and useful (Amabile, 1988). During the assessment training, the raters were instructed to individually assess the creativity of three randomly selected team task outputs (0 = *not at all creative* to 6 = *highly creative*). After completing their individual evaluations, the raters compared their scores and discussed possible disagreements. In a second step, all three raters were instructed to independently score the creativity of each team task output. This procedure was repeated for each creativity task (i.e., T1: slogan, T2: toy, T3: poster). To construct the creativity score for the task output of each team, creativity ratings were averaged across the three coders. To examine whether aggregation across raters was justified (to obtain an aggregated score for task output creativity), the intraclass correlation coefficient (ICC1 and ICC2; Bliese, 2000) and R_{wg} values (James, Demaree, & Wolf, 1993) were calculated.

In the present study, the average ICC1 value was .37, ranging from .29 (i.e., T2 creativity) to .44 (i.e., T3 creativity). The average ICC2 value was .63, ranging from .55 (i.e., T2 creativity) to .70 (i.e., T3 creativity). The average R_{wg} value was .71, ranging from .64 (i.e., T1 creativity) to .80 (i.e., T3 creativity). Taken together, all measures were acceptable, suggesting adequate levels of agreement, thereby justifying aggregation across the three raters (Bliese, 2000; LeBreton & Senter, 2007).

It should be noted that we do not hypothesize a cross-lagged association between the independently rated creativity scores and subsequent team social resources because task output creativity was assessed after having completed all three creativity tasks. Consequently, teams were not aware of their externally rated creativity scores during the simulation exercise, and therefore, they could not have had an impact on their team cohesion in subsequent creativity task episodes.

Data Analyses

We computed the means, standard deviations, Cronbach's alpha coefficients, and bivariate correlations for all scales. First, as a preliminary step, we tested the measurement model. A series of confirmatory factor analyses (CFAs) were conducted to differentiate the constructs of team cohesion, collective task engagement, and perceived team performance. Following the procedure of R. H. Price, Choi, and Vinokur (2002), in each time period (T1, T2, T3) we

used the same set of indicators to specify the corresponding latent variables in this measurement model. Furthermore, we calculated (a) covariances between the measurement errors of the respective indicators across the three time periods, (b) constraints setting the factor loadings as being equal across the three time periods, and (c) covariances between each latent variable and every other latent variable in the model.

Second, to statistically justify the aggregation of the team members' survey responses to the team level (i.e., team cohesion, collective task engagement, and perceived team performance), we calculated ICCs (i.e., ICC1 and ICC2) and also within-group interrater agreement (i.e., R_{wg}; James et al., 1993).

Finally, structural equation modeling (SEM; using AMOS 19) was employed to test our hypothesized research models. Moreover, following R. H. Price et al. (2002), we tested an alternative theoretical model regarding the reciprocal role of team cohesion and performance. First, the *Stability Model* (M1) was tested without cross-lagged structural paths but with temporal stabilities and synchronous correlations (i.e., including paths going from team cohesion to collective task engagement, from collective task engagement to perceived team performance, and from collective task engagement to task output creativity). Temporal stabilities were specified as correlations between the corresponding constructs at T1, T2, and T3. Second, we tested Hypothesis 1 (M2), which included direct paths between T1 team cohesion to T2 perceived team performance and T2 task output creativity, as well as T2 team cohesion to T3 perceived team performance and T3 task output creativity. In other words, this model was tested without including team engagement as a mediator. Third, we tested Hypothesis 2 (M3), regarding the mediating role of team engagement between team cohesion and team performance. Finally, we tested the complete hypothesized model regarding Hypothesis 3 (M4; see Figure 1), which includes reciprocal relationships between team cohesion and perceived team performance at the three waves, namely, a cross-lagged structural path going from T1 perceived team performance to T2 team cohesion, as well as a path going from T2 perceived team performance to T3 team cohesion.

We also tested a theoretically plausible alternative model (M5, Figure 2). Therefore, in line with Mathieu et al. (2015), we included cross-lagged paths between team cohesion and performance over time, so that team cohesion was related to future perceived team cohesion and also output creativity.

Model fit. Maximum likelihood estimation methods were used to test the different models. The goodness-of-fit of the models was evaluated, using absolute and relative indices. The absolute goodness-of-fit indices calculated were as follows: the χ^2 goodness-of-fit statistic, the relative χ^2 test, root mean square error of approximation (RMSEA), and goodness-of-fit index (GFI).

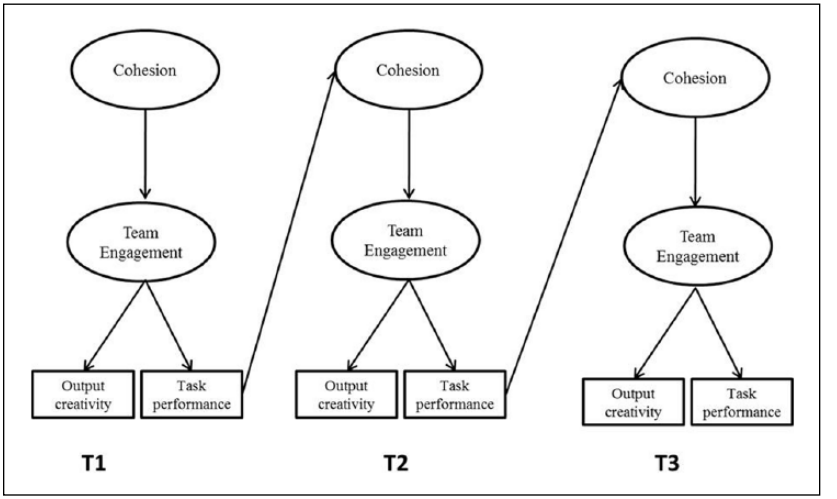

Figure 1. Hypothesized model (M4): T1 = Creativity Task 1, T2 = Creativity Task 2, T3 = Creativity Task 3.

Moreover, the computation of relative goodness-of-fit indices is strongly recommended (Bentler, 1990). Following Marsh, Balla, and Hau (1996), we computed the comparative fit index (CFI). Finally, we computed the Akaike information criterion index (AIC; Akaike, 1987).

Split-sample test. The theoretically plausible alternative model (final model; M5) was retested using a split-sample approach to reduce problems related to common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In line with Ostroff, Kinicki, and Clark (2002) and Chun, Shin, Choi, and Kim (2013), we split each team into two subgroups with a minimum of two members in each. Participants in Subgroup A provided data on team cohesion and collective task engagement, and participants in Subgroup B provided data on team perceived performance.

Results

Descriptives and Aggregation Analysis

Table 1 presents the means, standard deviations, internal consistencies (Cronbach's alpha), and bivariate correlations of all the variables in the study. All Cronbach's alpha coefficients meet the criterion value of .70 (i.e., they ranged from .83 to .93).

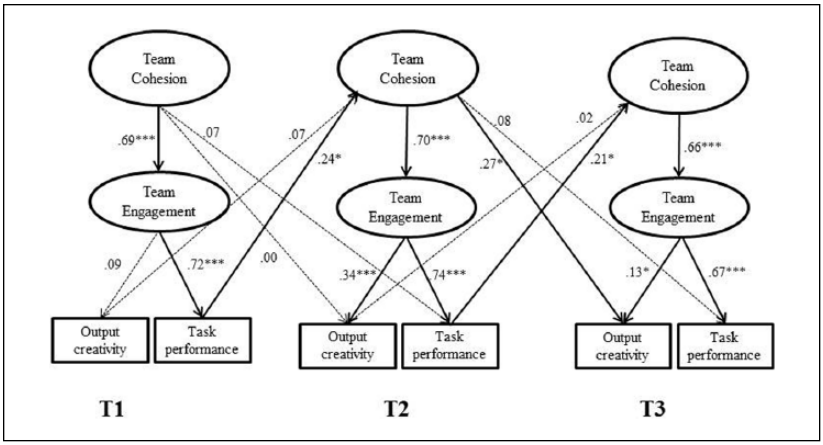

Figure 2. Structural path coefficients of the alternative final model (M5).
Note. The model controls for the temporal stability between all measures. T1 = Creativity Task 1, T2 = Creativity Task 2, T3 = Creativity Task 3.
*p < .05. **p < .01. ***p < .001.

Across all the survey variables in the present study, the average ICC1 value was .22, ranging from .11 (i.e., T1 perceived team performance) to .31 (i.e., T2 perceived team performance). The average ICC2 value was .58, ranging from .39 (i.e., T1 perceived team performance) to .70 (i.e., T2 perceived team performance), and the average R_{wg} value was .86, ranging from .85 (i.e., T1 collective task engagement) to .91 (i.e., T1 team cohesion). Although ICC1 and R_{wg} values are in line with past research concerning data aggregation (e.g., James et al., 1993), the ICC2 values are low. However, Bliese (1998) stated that ICC2 values are a function of ICC1 values and group size. Due to the relatively modest group size in the present study (i.e., only four to six members per group), ICC2 indices were somewhat lower in magnitude. Bliese argues that such lower reliability scores might weaken the relationships that are observed at the group level. Hence, given the satisfactory ICC1 and R_{wg} values and taking the less than optimal ICC2 values into account, we proceeded to aggregate the survey variables of the present study.

Measurement Model

The estimated measurement model showed a good fit to the data: $\chi^2(918, N = 605) = 3{,}074.316$, $p < .000$; normed fit index (NFI) = .87, nonnormed fit index (NNFI) = .89, CFI = .90, and RMSEA = .062. Therefore, we used it to calculate the following structural models.

Table 2. Fit of the Alternative Research Models (N = 118).

Models	χ^2	*df*	χ^2 / *df*	RMSEA	GFI	CFI	AIC
M1. Stability	458.89	241	1.90	.09	.76	.93	576.89
M2. Hypothesis 1	163.17	86	1.90	.09	.85	.94	231.17
M3. Hypothesis 2	373.65	235	1.59	.07	.80	.95	503.65
M4. Hypothesis 3	364.73	231	1.58	.07	.80	.95	502.73
M5. Alternative model (final model)	355.82	227	1.57	.07	.81	.96	501.82

Note. χ^2 = chi-square; *df* = degrees of freedom; RMSEA = root mean square error of approximation; GFI = goodness-of-fit Index; CFI = comparative fit index; AIC= Akaike information criterion.

Testing the Hypothesized Structural Models

Table 2 shows the overall fit indices of the models in our study. Structural path coefficients of the theoretically plausible alternative model (final model; M5) are presented in Figure 2.

First, M2 structural relationships reveal a positive relationship between team cohesion and team performance, only for perceived team performance (T1 $\beta = .60, p < .001$; T2 $\beta = .58, p < .001$; T3 $\beta = .56, p < .001$). The relationship between team cohesion and output creativity was not significant at T1 (T1 $\beta = .12$, *ns*), and significant at T2 ($\beta = .18, p < .05$) and T3 ($\beta = .20, p < .05$). Thus, Hypothesis 1 was only partially supported.

Second, the hypothesized model regarding Hypothesis 2 (M3) shows that team cohesion is positively related with team performance (both output creativity and perceived task performance) through team task engagement at all three waves. More specifically, T1 team cohesion is positively related to T1 collective task engagement ($\beta = .70, p < .001$), which in turn leads to T1 perceived performance ($\beta = .72, p < .001$), but not to T1 output creativity ($\beta = .09$, *ns*). T2 team cohesion is positively related to T2 collective task engagement ($\beta = .71, p < .001$), which is positively related to T2 perceived performance ($\beta = .75, p < .001$) and T2 output creativity ($\beta = .33, p < .001$). Finally T3 team cohesion is positively related to T3 collective task engagement ($\beta = .67, p < .001$), which in turn is positively related to T3 perceived performance ($\beta = .70, p < .001$) and T3 output creativity ($\beta = .26, p < .01$). Thus, Hypothesis 2 was supported.

Partial support was provided for Hypothesis 3 (M4), as we found a positive relationship between performance and future team cohesion. However, significant relationships were only found for perceived team performance from T1 to T2 cohesion ($\beta = .24, p < .05$) and from T2 perceived performance

to T3 team cohesion ($\beta = .20$, $p < .05$), but not for the output creativity measure T1 to T2 ($\beta = .07$, *ns*) and T2 to T3 ($\beta = .02$, *ns*).

Furthermore, an alternative model was tested including the direct paths from team cohesion to future team performance (both output creativity and perceived performance). Results showed that no significant direct relationships were found for team cohesion to future performance over time, with the exception of T2 team cohesion to T3 output creativity ($\beta = .27$, $p < .05$). Finally, to verify the robustness of our findings, we retested the theoretically plausible alternative model (final model; M5) by adopting a split-sample approach. More specifically, we relied on survey data from two different sources: Subgroup A for team cohesion and collective task engagement, and Subgroup B for perceived team performance. This split-sample test of the final model provided satisfactory fit indices: $\chi^2(227) = 340.99$, $p < .001$, RMSEA = .07, GFI = .81, CFI = .95, AIC = 486.99. The structural relationships of this model were in line with the results of the hypothesized model tested using the entire sample. The only difference that could be observed when adopting a split-sample approach is the cross-lagged relationship between T2 perceived task performance and T3 team cohesion. Contrary to what we found when using the entire sample, in this case the second cross-lagged relationship was not significant ($\beta = .55$, *ns*).

Discussion

In the present study, we sought to uncover the role of team engagement as an explanatory mechanism in the team cohesion–team creativity performance relationship. In addition, we aimed to model the dynamics of team cohesion development, team engagement, and team creativity performance over time. In doing so, we answered recent calls regarding the need to understand the longitudinal functioning of team creativity (i.e., Anderson et al., 2014; Shin & Zhou, 2007).

Generally, our hypotheses were supported, as our findings indicate that team cohesion leads to performance, but only for perceived team performance. Cohesive teams were more likely to perform well (in our case both types of performance: output creativity and perceived performance) on creativity tasks through the teams' increased engagement with the task at hand. Moreover, we found a cross-lagged reciprocal relationship between perceived team performance and team cohesion. Specifically, teams with better performance perceptions on a creativity task reported stronger team cohesion in subsequent task episodes. In sum, these results provide supporting evidence for the central role of engagement in team motivational processes.

Theoretical Implications

The present study extends existing theory on team cohesion, team engagement, and team creativity in a number of ways. First, we address the ambiguous relationship between team cohesion and team creative performance existing in the literature (Hülsheger et al., 2009; Joo et al., 2012; Taggar, 2002). In this sense, we have shown that team engagement plays a relevant role in the link between team cohesion and team creative performance. This finding reinforces the idea that affective motivational states (in our case team engagement) act as a hinge between team resources (i.e., team cohesion) and performance (i.e., team creative performance). This also tentatively suggests that motivational mechanisms, such as intrinsic motivation (Deci & Ryan, 1987), which have been found to be conducive to individual creativity may also be at play on a team level. Moreover, the present study further develops extant knowledge of engagement and creativity at the collective level, by providing empirical evidence on the mediating role of engagement in the team creative process. In doing so, we have addressed recent calls for additional empirical studies accounting for team-level antecedents and the consequences of team engagement (Costa et al., 2014).

Second, our findings regarding how team creativity is fostered over time also address the call for additional research on longitudinal team creativity and innovation (Anderson et al., 2014). By adopting a three-wave design, we further extend current theory on the dynamic development of team social resources over a series of creativity task experiences. Specifically, across three subsequent task episodes, we observed cross-lagged effects of positive perceptions of team creative performance on future team resource development (team cohesion), and hence found that reciprocal gains arose between team cohesion and perceived team creative performance. This finding is also in line with the IMOI framework (Ilgen et al., 2005).

Third, our findings clarify the relationship between team cohesion and performance. The mediating role of engagement in explaining the link between cohesion and creative performance adds new insights to the growing research on teams' creativity dynamics. In line with Mathieu et al.'s (2015) results, we found support for the relationship between team performance and team cohesion. However, these authors found stronger support for the effect of team cohesion on team performance over time than vice versa. Our study suggests that, at least in creative tasks in temporary project teams, perceived past performance is a stronger predictor (consistently over time) of subsequent team cohesion, rather than the other way around. However, additional analyses revealed that T2 team cohesion strongly predicted T3 output creativity. This suggests that team cohesion may account for subsequent objectively

measured creative team performance, while team perceptions of past performance enhance future team cohesion. Thus, how performance is measured might be an important issue to consider in the team cohesion–performance relationship.

A strength of our study relative to previous team cohesion and performance outcomes research is, therefore, the way performance was measured (Beal et al., 2003). In our study, apart from team members' perceptions of the team's performance in each creativity task, we incorporated independently rated creativity scores of the team's task output. In doing so, we addressed an existing concern in research on creativity, which has mainly relied on self-reports of both predictor and outcome variables and which is a limitation of past research (Tekleab et al., 2009). Hülsheger and colleagues (2009) demonstrated that if respondents rate both team-level processes and their own performance, this might lead to overestimated effect sizes. Although it may usually be recommended to rely exclusively on independent performance ratings because of the likelihood of method bias (e.g., Gully, Incalcaterra, Joshi, & Beaubien, 2002), these different rating sources were theoretically relevant for our research model. We found that shared perceptions of team performance on a creativity task fuel the development of subsequent team social resources, instead of the independently rated task output creativity. Independently rated task output creativity was obtained only after the sessions had finished, so teams did not receive any kind of feedback about their objective performance during their participation in the study. Furthermore, both types of team performance were positively related to collective task engagement. However, contrary to what was expected, collective task engagement was not related to output creativity at T1. An explanation for this nonsignificant relationship could be that collective task engagement did not immediately lead to actual creative output (i.e., rated by the external coders) as it was the first time that team members had to work together on a creativity task. This may have affected only their perceptions of creative performance, as "new" teams that are involved in a creative activity experiencing collective task engagement for the first time may perceive high performance; however, this does not necessarily result in immediate creative output.

Finally, although substantial evidence has been found regarding the benefits that engagement may have for organizations (see Harter, Schmidt, & Hayes, 2002, for a meta-analysis), and the link between work engagement and task performance has been empirically validated (Christian, Garza, & Slaughter, 2011), these studies are mostly based on the individual level. Therefore, our study covers this gap on teams' research because we test the relationship between engagement and performance at the collective level.

Practical Implications

Our results may be particularly interesting for organizations aiming to foster team and organizational creativity. Our findings suggest that team creativity benefits from team cohesion through its effect on collective task engagement. Hence, team-level interventions to stimulate team creativity may focus on the enhancement of team cohesion and team engagement (Schaufeli & Bakker, 2004). Promoting team-oriented policies and highlighting team social resources will be efficient management behavior when team creative outcomes are required in an organization. In fact, as our results show, such interventions may also induce reciprocal gains between team cohesion and creative performance. Furthermore, organizations may consider working with self-managed teams and build interdependence into job design as they require greater collaborative interaction, which leads to greater team cohesion (Seers, Petty, & Cashman, 1995).

Our results also indicate that teams that perceive themselves as having performed well on a creativity task are more likely to develop team cohesion over time. This implies that tasks could be strategically composed and adapted to trigger and reinforce these reciprocal dynamics. Teams charged with creative activities could start to work on a relatively simple creativity task, which makes successful performance more likely, thereby boosting social resources. As team social resources grow and take shape across subsequent task cycles, teams could then gradually move on to more complex creativity assignments.

Limitations and Future Avenues for Research

Due to the relative complexity of our design, this study is not without its limitations. First, we did not hypothesize a cross-lagged association between the independently rated creativity scores and subsequent team cohesion because objective task output creativity was assessed after having completed all three creativity tasks. Consequently, teams were not aware of their externally rated creativity scores during the simulation exercise, and they could therefore not have had an impact on their team cohesion in subsequent creativity task episodes. Hence, a question arises regarding whether having real feedback from each task will influence future team cohesion levels. Although developmental feedback is positively related to team creativity (Joo et al., 2012), further research should address the role of feedback in team cohesion and team engagement over time.

Second, we focused on team engagement and how it affects the relationship between team cohesion and creativity during specific task episodes. In

this way, we aimed to establish a better understanding of team-level antecedents of collective task engagement and team creativity. However, there are other possible and relevant antecedents related to social resources in teams such as collective efficacy. Collective efficacy influences what team members choose to do as a team, the amount of effort they exert, and their perseverance in the face of challenges or failure to produce results (Bandura, 2000). In our study, we did not include this antecedent due to design limitations, but further research should include it to know its role in creativity over time.

Future research may also introduce moderators to further explore the development of team cohesion over time. For example, environmental factors (e.g., creativity support) or leadership styles (Zaccaro, Rittman, & Marks, 2001; for example, directive vs. participative) may moderate the effects of creative performance on team cohesion and vice versa.

Furthermore, we used three different creativity tasks to avoid learning effects among participants. Although all three tasks concerned a creative activity, team output differed across them, which may have had implications on how the team output was evaluated across the tasks. However, given the fact that we found similar effects across the three tasks, the study attests to the robustness of our hypothesized model. Beyond analyzing only the creative process, future research could test whether the causal chain of team cohesion–team engagement–team performance also holds in the implementation stage, thereby covering the entire innovation process and complementing recent research on innovation (Somech & Drach-Zahavy, 2013). Regarding the outcome measures of creative team performance, it is important to note that they were different not only according who was rating them (member perceptions vs. expert ratings) but also the "object" or content measured. In this sense, the members' perception referred to perceived team performance assessing the general accomplishment of the goals in each session, whereas the expert ratings measured the specific task output creativity. In other words, we can say that the first measure referred to general performance and the second one to specific outcome creativity (which was also different across the three episodes). Therefore, the differences regarding the behavior of the outcome measures over time may also be due to the different ways of measuring them. Further research should take into account the different ways in which team performance and specifically team creativity is measured to design future studies.

Finally, the present study relied on an organizational simulation exercise conducted in a controlled setting, which yields some benefits but also pitfalls. Our study allowed us to compose relatively similar teams and enabled independent raters to assess the creativity level of each team output. Although we

tried to develop a realistic simulation task, the measures were obtained from lab teams mostly consisting of students without previous working experience. In addition to this, the teams did not have any informal contact between the sessions, because they did not have any link beyond the laboratory study, which may limit the generalizability to field teams. While we are convinced of the relevance of our findings for newly formed project-based teams in organizations, future research might evidently benefit from conducting longitudinal studies on consolidated teams in the field to ensure the external validity of our findings.

Conclusion

What makes creative teams successful in the long run? While the relationship between team social processes and team creativity is complicated, the present study advances collective task engagement as one of the key motivational processes underlying team performance in creative tasks. Through increased collective task engagement, highly cohesive teams may increase their performance in creative tasks, which in turn may lead to higher cohesion. Thus, organizations that are looking to spur creative performance cycles in teams may want to focus on team social resources such as team cohesion and collective task engagement.

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