



Performance and affects in group problem-solving



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ABSTRACT

This experimental study compared college students' performance (individual vs. group) in a virtual game of bridge building for a train passage. We tested the superiority of group performance and power activation of affective states in the quality of task performance and conflict perception. The study ($N = 114$) evaluated performance in groups ($n = 60$) and individuals ($n = 54$) by two criteria: an overall score (score and advancement in the game stages) and the problem-solving process. In both conditions, before and after the game, conflict perception was low, with positive affective states predominating. Groups performed better and reported greater use of problem-solving stages. There was no evidence of affective states as a mediator between experimental condition and the variables performance and conflict perception.

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Desempeño y afectos en la solución de problemas en grupo

RESUMEN

Este estudio experimental comparó el desempeño de individuos y grupos en un juego virtual de construcción de puentes para el pasaje de un tren. Se puso a prueba la superioridad del desempeño grupal y el poder de activación de los estados afectivos en la calidad de la ejecución de la tarea y de la percepción de conflictos. El estudio ($N = 114$) evaluó el desempeño en la condición de grupo ($n = 60$) e individual ($n = 54$) mediante dos criterios: una puntuación general (puntuación y avance en las fases del juego) y un proceso de resolución de problemas. En ambas condiciones antes y después del juego, la percepción de conflictos fue baja, predominando los estados afectivos positivos. Los grupos presentaron mejor desempeño y relataron que había una mayor utilización de etapas en la resolución de problemas. No se encontró un papel mediador de los estados afectivos entre la condición experimental y el desempeño y la percepción de conflictos.

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Groups are considered more effective in decision making and task performance than isolated individuals, the argument being that the former leverage material resources and make better use of individuals' skills and knowledge. However, in group interaction situations, conflict, frustration, and stress cannot be completely avoided, which can hinder group performance (Hackman, 1987).

In the organizational context, work teams are widely used, which has promoted studies to better understand how they function (Guzzo & Shea, 1992). However, many questions still remain open, such as the effectiveness of team performance, increasing the demand for studies involving more variables (Puente-Palacios & Borba, 2009).

The affective states experienced in the interactions and the conflict perception related to working in groups contribute to understanding the functioning and performance of teams. Nair (2008) stressed the prominence of studies on the structure, causes, and consequences of affective experiences arising from work situations, but the role of the emotions in conflicts remains undefined. Thus, this study aimed to examine, in an experimental design, the

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effect of undertaking a task (problem-solving) as a group¹, in terms of its performance and its impact on affective states and on conflict perception. The questions guiding the study were: (1) Does working on the task in a group lead to better performance than if done individually? (2) Does the problem-solving process explain the better performance? (3) Does conflict perception affect performance in the game when played by a group? (4) Does the affective experience (positive or negative) in accomplishing the task have an impact on performance and conflict perception when working in a group?

Groups and Performance

A group is differentiated from an aggregate of people by the existence of interaction, interdependence, and mutual influence among its members, governed by a set of shared norms of conduct (Forsyth, 1990; Mead, 2008). Furthermore, a group has a reason to exist, which can be instrumental – to perform a task or achieve a goal – common in organizational contexts, or affiliative, which involves identification with the values and ideals of the group, providing pleasure, prestige, and self-esteem in various social contexts.

In Delamater's (1974) perspective, groups are characterized by the performance of individual roles (formal or informal) and by the existence of emotional ties, which unite members through identification and adherence to internal norms and through mutual attractiveness. Once the group is formed, there must be a compelling reason for people to desire to remain in it – group cohesion. Some factors contributing to increasing this cohesion are: (1) intra-group attractiveness; (2) regular physical proximity among group members, creating a sense of belonging; (3) adherence to group norms, which increases in-group identification; and (4) satisfaction with the group. Identification with the group, therefore, indicates that there is a social identity that promotes loyalty and works as a social glue that makes the group more attractive and stable (Van Vugt & Hart, 2004).

When considering a task carried out by a group, two aspects are very important: performance and effectiveness. Though related, they are different, because performance is related to the quality and quantity of work accomplished, the cost and time spent in its execution, including efficiency (means or processes) and efficacy (actual result) factors within the organization (Grote, 2003). Effectiveness concerns the impact of the performance results at the micro level – improving the quality of individuals' work – and at the macro level – improving the products and results in the organization (Coelho Jr., 2009).

Studies on group performance often explain the gains and losses by the situation and by the processes that differentially affect motivation and resource coordination (Kerr & Tindale, 2004). Increased motivation provides better results for the group when compared to individual performance. For example, individuals can increase their efforts in a task to make up for a supposed poor performance by others – the effect of social compensation (Karau & Williams, 1997). This can occur because members individually consider their performance crucial to the outcome, perceive themselves in competition with others, and respond to feedback from their own performance. Furthermore, loss of motivation can trigger social loafing (a decrease in individual effort due to the social presence of other persons), which has deleterious effects on performance (Latané, Williams, & Harkins, 1979). The nature of the task (routine and tiring) seems to have an important role in the emergence of this phenomenon.

¹ Although there are differences between the concepts of group and team regarding aspects such as autonomy, responsibility for the goals, and type of efforts targeted (Greenberg & Baron, 1995), the terms team and group will be used interchangeably.

Team performance can be evaluated by results and also by the way the group members cope with the challenges of solving the task. To solve a problem, Sternberg (2000) suggests that the individual initiates a mental process with seven stages: (1) identification of the problem, the goal being to lay out the obstacles, objectives, and available resources; (2) representation of the problem, which entails defining the problem in a manner that makes it possible to understand and solve it; (3) identification of problem-solving strategy: analysis, convergent and divergent thinking; (4) strategic organization of information toward implementing the chosen alternative; (5) resource allocation to get the solution; (6) process monitoring, assessing the proximity to the task objective; and (7) evaluation of the solution taken. The cyclical nature of this model predicts that whenever there are changes in the problem resolution, the process is restarted with a new configuration until a permanent solution is found. Rarely, we solve problems by following an optimal solution sequence, with the possibility of steps coming and going, changing their order, or even skipping or adding steps.

Affective States

The apparent ease in understanding what an emotion is contrasts with the difficulty in defining it conceptually. Such difficulties have led scholars either to consider it a broader process that involves different aspects: physiological (bodily reactions and neurophysiologic pathways), social and interpersonal (learned through social and cultural norms), cognitive (subjective experience of perception and evaluation), and behavioral (action tendencies, emotional, facial, and gestural expressions), or to define it through a differentiation from other emotional events, such as affect, feeling, mood, and temperament.

The framework of affect proposed by Gray and Watson (2001) is based on the analysis of three characteristics: duration, object, and state. Emotion would be a state of short duration (a few seconds) and focused on a specific object. Mood would be a diffuse affective state, that is, not directed toward a specific object and lasting from minutes to days, thus of long duration. Temperament would be tied to personal characteristics manifested in various situations, lasting months to years, and thus being a more permanent state. Affect would be a broader category, encompassing emotion, mood, and temperament.

Affects have a valence (positive or negative) and an activation level (intensity) in which they are expressed. This characterization is tied to the explanatory model of affects and their possible dimensions, the circumplex model (Russell, 1980), which postulates that affective state descriptors can be systematically arranged around the perimeter of a circle where the horizontal (pleasure – displeasure) and the vertical (excitation – lethargy) dimensions would represent, respectively, the affective valence and its activation levels. Therefore, understanding affect dynamics involves the examination of the different classes of emotions resulting from the combinations between possible valences and activation levels of emotions.

Several studies were able to report affective influences on the processes and results of teams (e.g., Bodtker & Jameson, 2001; Jones & Bodtker, 2001; Nair, 2008; Sy, Côté, & Saavedra, 2005). Staw and Barsade (1993) found that people with a high activation of positive dispositional affects achieved better performance in tasks related to decision-making and interpersonal relationships. Tanghe, Wisse and Van der Flier (2010), in studying trust and cooperation in teams, concluded that the display of affective states (high activation) provoked cooperative behavior in individuals who had low trust in the other members.

By using the term emotion with distinct meanings, this study will employ the term *affective states* to refer to the emotions

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