

# Time pressure and team member creativity within R&D projects: The role of learning orientation and knowledge sourcing



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## Abstract

This paper examines team member creativity within R&D projects and the influence of perceived time pressure on the creative process. A model based on the componential and knowledge sourcing perspectives is proposed to examine the effects of learning orientation, knowledge sourcing and perceived time pressure on team member creativity. The model is validated using a sample of 341 R&D project teams from 53 companies. Perceived time pressure has two effects on team member creativity: (1) a positive effect mediated by learning orientation and knowledge sourcing, where *moderate levels of time pressure* act as a *trigger* of the motivational and cognitive processes (*i.e.*, *challenging effect*); and (2) a negative effect moderating the relationship between team member knowledge sourcing and creativity, where *high levels of time pressure* act as a *constraint* of cognitive processes (*i.e.*, *constraining effect*). Findings show that learning orientation and knowledge sourcing behaviors play a central role in reducing team members' experience of time pressure and in fostering their creativity. There are important theoretical and practical implications relating to how team leaders may manage knowledge sourcing and time pressure within R&D projects to enhance team member creativity.

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## 1. Introduction

R&D project teams are widely recognized as the building blocks of modern-day organizations (Alder et al., 2016; Chen et al., 2016; Tang and Ye, 2015). R&D refers to team members' ability to conduct research activities within a project and use shared knowledge for generating, developing and implementing creative solutions (Tang and Ye, 2015: 123). Indeed, R&D project teams are meant to stimulate the creativity of their members in order to develop innovations (Tang and Ye, 2015). Nevertheless, R&D project team members are usually under time pressure (Kach

et al., 2012; Nordqvist et al., 2004). Some scholars suggest that high levels of time pressure limit creativity by preventing team members from engaging in knowledge sourcing activities and by tempting them to fall back on familiar routines and algorithms rather than looking for and applying new knowledge (Andrews and Smith, 1996). Other scholars suggest that low levels of time pressure tempt team members into inactivity, thereby reducing their creativity (Freedman and Edwards, 1988).

Empirically, prior research on time pressure and creativity shows somewhat contradictory results and a full range of possible time pressure effects, including negative (Andrews and Smith, 1996; Antes and Mumford, 2009), positive (Andrews and Farris, 1972; Ekvall and Ryhammar, 1999; Ohly and Fritz, 2010), nonlinear (Baer and Oldham, 2006; Ohly et al., 2006), and non-significant effects (Amabile et al., 1996). Amabile et

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al. (2002) are the first who proposed a conceptual model based on the componential theory to overcome this inconsistency in the literature. According to Amabile et al. (2002), inconsistent results can be explained by the fact that studies have mostly focused on the direct effect of time pressure on creative outcomes, neglecting the motivational and cognitive processes to which time pressure is linked and that underlie workplace creativity. Indeed, the componential theory suggests that creativity is influenced by two core processes (Amabile, 1983): a *motivational process*, through which individuals are most creative when they feel motivated primarily by the interest and challenge of the task itself; and a *cognitive process*, through which individuals are most creative when they are able to gain, evaluate and then apply the required knowledge.

Given the importance of team member creativity within R&D projects and the above mentioned issues related to inconsistencies regarding the effect of perceived time pressure on creativity, in the present study, we combine Amabile's (1983) componential theory with a knowledge sourcing perspective (Gray and Meister, 2004) to answer the following research question: *How can R&D project team members enhance their creativity under perceived time pressure?* Departing from these frameworks, on the one hand, we posit that moderate levels of time pressure enhance team member creativity by sequentially triggering team members' learning orientation (*motivational process*) and knowledge sourcing initiatives (*cognitive process*) (Amabile et al., 2002; Baer and Oldham, 2006). On the other hand, we contend that high levels of time pressure slow down team member creativity by limiting the time needed to source knowledge (Kelly and Loving, 2004).

Our model is tested using a sample of 341 R&D project teams from 53 French companies and partial least squares (PLS). Our results show that perceived time pressure has two effects on team member creativity: (1) a positive effect mediated by learning orientation and knowledge sourcing, where *moderate levels of time pressure* act as a *trigger* of the motivational and cognitive processes (*i.e., challenging effect*); and (2) a negative effect moderating the relationship between team member knowledge sourcing and creativity, where *high levels of time pressure* act as a *constraint* of cognitive processes (*i.e., constraining effect*). Findings show that learning orientation and knowledge sourcing behaviors play a central role in reducing team members' experience of time pressure and in fostering their creativity.

Our research has important implications for theory and practice. First, our study provides a more nuanced understanding of the effects of time pressure on team member creativity than previous studies and addresses inconsistent results in previous research. Second, our study provides researchers a better understanding of the role that learning orientation and knowledge sourcing behaviors can play in reducing team members' experience of time pressure and in enhancing their creativity. Third, our study proposes for the first time an integrative model to clarify how learning orientation, knowledge sourcing, and time pressure influence team member creativity.

## 2. Theoretical background and hypotheses

### 2.1. Team member creativity and time pressure effects

Team member creativity involves the generation of ideas about products, services, practices, processes, or procedures that are novel and useful to an R&D project (Tang and Ye, 2015). Team member creativity is an inherently social process that builds on and incorporates individual knowledge and skills at the project level (Kratzer et al., 2010).

Although the terms creativity and innovation are sometimes used as synonyms in the management literature, they name fundamentally different aspects of R&D (Gilson and Shalley, 2004). Indeed, creativity is focused on the generation of novel ideas (Amabile, 1988), whereas innovation represents the successful implementation of creative ideas within R&D team projects (West, 2002).

Sternberg (1999) expanded the concept of creativity by taking into account that novelty also arises if an existing idea is placed in a new context. Sternberg identified eight different types of creative contributions for problem solving that can be divided into three categories (Khedhaouria and Jamal, 2015): (1) the creation of completely original solutions leading to radical innovations, *i.e., knowledge creation*; (2) the duplication and application of existing solutions to new problems and in new contexts, *i.e., knowledge replication*; and (3) the adaptation of existing solutions to new problems and in new contexts, *i.e., knowledge adaptation*. This typology emphasizes that creativity is not limited to the generation of completely new ideas but captures the replication and adaptation of existing ideas to new contexts (Majchrzak et al., 2004).

From a componential perspective (Amabile, 1983), team member creativity is the result of the interplay between the creative capabilities of team members and their work environment. There has been increasing interest in identifying the characteristics of the work environment that influence creativity (*e.g., Amabile et al., 1996*). One condition frequently mentioned in the literature is the time pressure team members experience at work (Amabile et al., 2002; Kach et al., 2012; Nordqvist et al., 2004). According to Baer and Oldham (2006: 963), time pressure is the extent to which team members perceive they lack the needed time to develop creative ideas within the project. Research on time pressure and creativity has produced contradictory results, with some studies reporting positive effects (Andrews and Farris, 1972; Ekvall and Ryhammar, 1999; Hsu and Fan, 2008; Ohly and Fritz, 2010); some revealing negative effects (Andrews and Smith, 1996; Kelly and McGrath, 1985); and others suggesting nonlinear, *i.e., highest levels of creativity at moderate levels of time pressure* (Baer and Oldham, 2006; Janssen, 2001; Ohly et al., 2006), or non-significant effects (Amabile et al., 1996). To date, Binnewies and Wörmlin's (2011) study represents that most comprehensive attempt to clarify the time pressure-creativity relationship. The authors indeed suggested that such a relationship is not only curvilinear, but also dependent on work design characteristics. Their results specifically showed that job control moderated the inverted

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