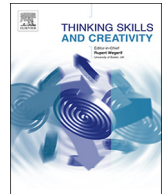




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The role of motivation in the prediction of creative achievement inside and outside of school environment

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ABSTRACT

The present study used a latent variable modelling approach to investigate the influence of motivation on creative achievement in different environments. This was used in conjunction and interaction with other creativity-related predictors, such as openness to new experience and response originality in a divergent thinking task. Specifically, the inside school and the outside school environments were analyzed in a sample of university students. Results showed that the interaction between openness and intrinsic motivation was the strongest predictor of creative achievement. This interaction predicted both outside and inside school creative achievement, which was further influenced by extrinsic tendencies. In particular, intrinsic motivation predicted creative achievement only when associated with a medium or high level of openness to experience. Originality only predicted outside school creative achievement. Limitations and implications of these results are discussed.

1. Introduction

Creativity can be considered as a multifaceted construct that defies a single definition (Agnoli, Corazza, & Runco, 2016; Corazza, 2016; Sternberg, 1988). Indeed, creativity research spans several disciplines in psychology, including cognitive, differential, developmental, and social psychology (Simonton, 2012). Abundant research has been dedicated to the explanation of creative abilities, personality attitudes, social and context variables leading to the expression of creativity. From a cognitive point of view, large interest is dedicated to the analysis of the mental processes and mechanisms involved in creative thinking. A central role in this field is played by the study of cognitive abilities leading to original and effective ideas, such as divergent thinking, i.e., the ability to generate many alternative solutions to a problem. This thinking ability has been explored in cognitive science as well as in neuroscience through a number of experimental paradigms (Agnoli, Zanon, Mastria, Avenanti, & Corazza, 2018; Fink, Benedek, Grabner, Staudt, & Neubauer, 2007; Runco, 2014) essentially because it is highly associated to the expression of the individual creative potential (Runco & Acar, 2012). Beside the study of the main cognitive constituents of creative potential, individual differences in the expression of this potential are considered to be essential to understand creativity. Research showed that creative persons seem to have some distinctive personality traits. Creativity is for example highly associated to the openness to experience trait (e.g., Carson, Peterson, & Higgins, 2005), which emerged to be central for the processing of apparently irrelevant environmental information leading to the best creative performance (Agnoli, Franchin, Rubaltelli, & Corazza, 2015). At the same time, however, creative persons in different knowledge domain are characterized by different creative profiles (Feist, 1998), showing that different personality attitudes are necessary to the

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expression of creative potential in different domains, such as art and science (Corazza & Agnoli, 2018).

Building on this wide base of data, nearly unanimous consensus has been reached in the realm of education that creativity can be taught (Amabile, 1996; Baer & Kaufman, 2006; Cropley, 1992; Kaufman & Beghetto, 2009; Runco & Chand, 1995; Wilson, 2005). In addition to training techniques originally designed to stimulate an individual's creative thinking ability (e.g., brainstorming or CPS; Fryer, 1996), cognitive and social psychologists and educational researchers have generated practices and programs for fostering creativity in school teaching (Amabile, 1996; Esquivel, 1995; Feldman & Benjamin, 2006; Lin, 2011). In particular, education of creativity entails two main aspects. The first aspect concerns *teaching*, i.e., how to provide creative and innovative educational practices which stimulates higher-level thinking, risk taking, and the opportunity to explore multiple alternative solutions (Cropley, 1992; Fryer, 1996; Lin, 2011). The second aspect concerns *creating a supportive environment*, which can stimulate learners' motivation and creative behavior (Collins & Amabile, 1999; Hennessey, 2007; Lin, 2011; Torrance, 1995). Both educational aspects integrate the results obtained by psychological research in order to foster the main constituents and determinants of creative thinking.

We believe that new insights to the education of creativity could derive from modern integrated approaches to the study of creative thinking. Driven by the theoretical bases provided by comprehensive models of the creative thinking process (for a review, see Lubart, 2001), which explain the creative process through an ensemble of cognitive, personality and contextual factors, and by modern statistical techniques, these new approaches explore the creativity phenomenon by analyzing simultaneously the individuals' cognitive and attitudinal elements. In particular, using as reference variable the creative success achieved by people in real life, these approaches analyze the interaction of cognitive and dispositional variables to explain, through predictive models, individual creative achievement (Agnoli, Vannucci, Pelagatti, & Corazza, 2018; Jauk, Benedek, & Neubauer, 2014; Kirsch, Lubart, & Houssemand, 2016; Silvia, Kaufman, & Pretz, 2009).

While several predictive models have been proposed to explain the interactive role played by cognitive abilities and personal dispositions in the prediction of real-life creativity (i.e., creative achievement in real life), less is known on the effects of the context on this interactive relationship. Can the role played by different personality dimensions and cognitive abilities in the prediction of real-life creativity change according to different contexts? This is the main question addressed by the present study. Specifically, starting from the central importance of fostering learners' motivation in the educational context, the current work analyzed which is the weight of motivation in the prediction of real-life creativity within and outside of the higher education context, taking into account its interaction with personality and cognitive abilities. Understanding whether motivation plays a role in the creative success within and outside of the school environment, over and above personality and creative abilities, can indeed provide important insight to develop *ad hoc* educational approaches to foster motivational attitudes leading to creativity. While several predictive models have been indeed proposed analyzing the interactive role played by personality traits (such as openness to experience; e.g., Jauk et al., 2014) and cognitive abilities (such as the ability to produce original alternative responses in divergent thinking tasks; e.g., Agnoli, Vannucci et al., 2018; Agnoli, Zanon et al., 2018; Jauk et al., 2014; Kirsch et al., 2016) in the prediction of creativity, no study has yet explored the interactive role played by individual motivation in a comprehensive statistical model, as well as its importance in predicting creative achievements within different contexts.

1.1. Motivation

When considering the features that lead a thinker through the creative process, a number of important elements arise. Resisting the frustration caused by failure, the ability to reformulate ideas, considering alternatives, and tolerating uncertainty and ambiguity are all examples of necessary elements for obtaining creative success. Arguably, the fundamental component that drives the entire creative process is the underlying motivation. Motivation activates the cognitive and conative-attitudinal resources that allow individuals to face the challenges which are inherent to the creative process. Specifically, an extensive body of literature showed that the main enabler of creative behaviour are personal interest and enjoyment (e.g., Forgeard & Mecklenburg, 2013). Recent research showed that individual motivation both directly activates the creative process and is indirectly influenced by the successful or unsuccessful attainments in the course of the process (Agnoli, Franchin, Rubaltelli, & Corazza, 2018). The central role of motivation for creativity has been recognized by various theoretical models. Amabile (1983) highlighted the special importance of task motivation for creativity, besides creativity-relevant skills and domain-relevant skills. The investment theory of creativity (Sternberg & Lubart, 1992; Sternberg & Lubart, 1996) includes task motivation in the six necessary resources for creativity to occur. The DIMAI model of the creative thinking process, recently introduced by Corazza and Agnoli (2015), considers motivation as the essential spark for the creative process.

The creativity literature distinguishes between two major forms of motivation: intrinsic and extrinsic motivation. While intrinsic motivation "arises from the intrinsic value of the work for the individual" (Amabile, 1993, p. 185), extrinsic motivation "arises from the desire to obtain outcomes that are apart from the work itself" (Amabile, 1993, p. 185). According to Collins and Amabile (1999), most creativity theories agree on the importance of *intrinsic motivation*, which was also supported by a large number of empirical findings (Torrance, 1983; Barron, 1963; Gruber & Davis, 1988; Gruber, 1986; Heinzen, Mills, & Cameron, 1993; MacKinnon, 1962; Torrance, 1981, 1987). Intrinsic motivation is closely related to the notion of flow from Csikszentmihalyi (1990), which arises if the task difficulty optimally matches the level of performance of the individual (Csikszentmihalyi, 1996, 1988). The relation between *extrinsic motivation* and creativity is more ambiguous. As described by Collins and Amabile (1999), extrinsic motivation was initially thought to undermine creativity and extensive research was devoted to this presumably negative effect of extrinsic motivation on creativity. This research reflected the social-psychological perspective, according to which intrinsic and extrinsic motivation are mutually exclusive (Calder & Staw, 1975; Deci, 1971; Lepper, Greene, & Nisbett, 1973). In recent times however, the definition of extrinsic motivation (Amabile, 1993; Deci & Ryan, 1985; Ryan & Deci, 2000) and the conceptualization of the relation between

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