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# Personal factors of creativity: A second order meta-analysis

Silvia da Costa[a,*], Darío Páez[a], Flor Sánchez[b], Maite Garaigordobil[a], Sonia Gondim[c]

[a] Universidad del País Vasco, Spain
[b] Universidad Autónoma de Madrid, Spain
[c] Universidad Federal de Bahia, Brasil

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ABSTRACT

This article integrates seven meta-analyses of individual factors associated with creativity and innovation and reports effects based on one ($r$) or two or more ($\bar{r}$) meta-analyses. Emotional intelligence ($r$ = .31), divergent thinking ($\bar{r}$ = .27), openness to experience ($\bar{r}$ = .22), creative personality ($\bar{r}$ = .21), intrinsic motivation ($\bar{r}$ = .20), positive affect ($\bar{r}$ = .19), and androgyny ($r$ = .19) are related to creativity. Age ($r$ = .17), intelligence ($\bar{r}$ = .17), extraversion ($\bar{r}$ = .13), self-efficacy ($\bar{r}$ = .13), and extrinsic motivation ($r$ = .11) were also moderately associated with innovation. Pro-risk attitudes ($r$ = .08) and being female ($r$ = .07) were weakly associated with creativity. Results are discussed, explanatory processes described, and practical implications for organizations examined.



## Factores personales y personalidad: metaanálisis de segundo orden

*Palabras clave:*
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Personalidad creativa

RESUMEN

Este artículo integra siete meta-análisis sobre factores individuales asociados a la creatividad e innovación y estima el efecto en base a uno ($r$) o varios ($\bar{r}$) de ellos. Entre los rasgos que se asocian positivamente a la creatividad se encuentran la inteligencia emocional ($r$ = .31), el pensamiento divergente ($\bar{r}$ = .27), la apertura a la experiencia ($\bar{r}$ = .22), la personalidad creativa ($\bar{r}$ = .21), la motivación intrínseca ($\bar{r}$ = .20), la afectividad positiva ($\bar{r}$ = .19) y la androginia ($r$ = .19). La edad ($r$ = .17), la inteligencia ($\bar{r}$ = .17), la extraversión ($\bar{r}$ = .13), la auto-eficacia ($\bar{r}$ = .13) y la motivación extrínseca ($r$ = .11) se asociaron con menor fuerza a la innovación. Una actitud favorable al riesgo ($r$ = .08) y ser mujer ($r$ = .07) se han asociado débilmente a la creatividad. Se discuten los resultados y posibles procesos explicativos y las implicaciones prácticas para el ámbito organizacional.



Numerous studies and interventions exist on the topic of creativity in the domains of education, work, art, science, and in society in general (Artola et al., 2012; Garaigordobil & Pérez, 2004). This thriving development exists side by side with an open debate on how to measure, apply, and develop creativity (Garaigordobil, 2003). While it has been shown that creativity is a basic human trait (Artola et al., 2012), research has allowed us to understand that it does not depend exclusively on stable characteristics (Averill, 2004), but that it is the result of individual, cognitive, affective, behavioral, and contextual processes (Amabile, Barsade, Mueller, & Staw, 2005; Csikszentmihalyi, 2011; Sternberg & Lubart, 1995). Creativity may be understood as a human resource to deal with the challenges of life, supporting psychological and social adaptation (Artola et al., 2012; da Costa & Páez, 2015). The relationship between creativity and intelligence has been widely debated, and while there is agreement that very creative people are also intelligent, a high IQ it is not a necessary nor a sufficient precondition for high creativity (Garaigordobil, 2003; Gardner, 2010). Those

* Corresponding author: Department of Social Psychology and Methodology of Behavioural Sciences. Avenida de Tolosa, 70, 20018. Donostia/San Sebastián, País Vasco.
*E-mail address:* silviacristina.dacosta@ehu.es (S. da Costa).

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studying creativity agree that there are two principal aspects that define creativity: a) novelty – creative work has to be original and different in some way from previous work (Amabile, 1996; Feldman, Csikszentmihalyi, & Gardner, 1994; Runco, 2014), and b) quality – the new product must be deemed suitable, even useful, by a reference group with respect to a problem or situation (Sternberg & Kaufman, 2010). Creativity can be analyzed as a personal attribute, a process, a product, and as the context which enables it (Baer, 2010).

In this study, we review personal factors of creativity and innovation. To this end, the available meta-analyses on the subject (see Table 1) are synthesized and the impact of the results is discussed in terms of the work domain. Before this, we will review the relationship between creativity and innovation, given that the latter is the application of the former in organizations. We will also investigate the creative context and process in order to highlight the role of personal factors in creativity.

## Creativity and innovation

Both concepts share the generation of new ideas and practices. Innovation is the successful implementation of creative ideas (Hennessey & Amabile, 2010) and in this sense is understood as a broad process which includes the generation of ideas or creativity but also the application of these in real environments (at work, in education, etc.). Creativity is about absolute novelty, while in innovation relative newness may include the application in a new or different way of products, procedures, or processes which have already been used in a different place (Anderson, De Drew, & Nijstad, 2004).

## Social context and creativity

The context in which creativity is developed is a further factor to take into account in its analysis (Baas, De Dreu, & Nijstad, 2008; Davis, 2009; Hammond, Neff, Farr, Schwall, & Zhao, 2011; Hülsheger, Anderson, & Salgado, 2009b; Hunter, Bedell, & Mumford, 2007; Kozbelt, Beghetto, & Runco, 2010; Ma, 2009). We propose an interactional model which suggests that in order to analyze innovation in organizations it is necessary to consider different levels: individual, group, and organizational (Amabile, 1996; Csikszentmihalyi, 2011; Hülsheger et al., 2009b; Sternberg & Lubart, 1995). An organizational context rich in resources and with complex and autonomous roles reinforces creativity (Costa, Páez, Sánchez, Gondim, & Rodríguez, 2014), while it is in the interaction with the personal factors of creativity (see Table 2) that innovation is reinforced.

## Creativity as a process

Different authors (see for example Amabile, 1996; Basadur, Basadur, & Licina, 2012; Csikszentmihalyi, 2011; Ma, 2009) have proposed models of stages in the creative process, such as: 1) preparation stage, with immersion in the problems inherent in a task and/or in something that arouses curiosity; 2) incubation stage, with formulation of problems or conceptualization of hypothesis; 3) generation of solutions or assembling the pieces of a puzzle (Csikszentmihalyi, 2011); 4) generation of criteria to evaluate appropriate solutions, involving communication, evaluation, modification and/or validation of ideas for the solution of the problem; and 5) selection, solution, and application, involving decision making or implementation of the proposed solution (product, ideas and practices) or innovation (Amabile, 2013; Basadur et al., 2012; Hammond et al., 2011). This last stage can be included in a process of combining the categories or reorganizing knowledge depending on the complexity of the problem.

Prior knowledge will be decisive in the first and second stages, with divergent thinking (DT) playing an important role in stages three and four, and convergent thinking being essential for the final stage (Csikszentmihalyi, 2011; Ma, 2009; Simonton, 2012). The meta-analyses have revealed that personality traits influence the generation of ideas more strongly, while the contexts in which they are developed have greater influence on the application stage (Hammond et al., 2011).

## Individual characteristics of creativity favoring the process and product of creativity

Sternberg and Lubart (1995) propose that personality, intelligence, knowledge, thinking style, motivation, and environment are factors associated with creativity. While the first five are individual factors corresponding to the creative person, we also need to consider given characteristics such as age and gender, acquired characteristics such as education, and other individual attributes such as attitude, affect, and emotional intelligence (Garaigordobil, 2003, p. 151; see Table 2 for definition and examples of items).

With respect to given characteristics, like gender and age, previous reviews suggest a positive relationship between being a woman and creativity. Narrative reviews (Baer & Kaufman, 2008) find many results with no difference between genders, although some slightly favor being female as opposed to male. The results of one study of gender identity and creativity found that subjects who were both "feminine" or expressive and instrumental or "masculine" (androgynous) were more creative than people who scored low on both dimensions. Highlighting the importance of instrumentality, the participants who reported strongly instrumental or masculine gender characteristics showed greater creativity (Stoltzfus, Nibbelink, Vredenburg, & Thyrum, 2011). In terms of the development of creativity related to age, some studies suggest a curvilinear progression, peaking between 30 and 40 year of age and declining after 40. Regarding acquired characteristics like education, it has been suggested that the level of education is associated with creativity, although it is not a determining factor beyond a certain level (Artola et al., 2012).

With regard to individual traits associated with creativity, it has been proposed that favorable personality traits are creative self-concept (CSC) or creative personality and openness to experience (OE). The relationship with creativity is less clear than with other traits such as extraversion, agreeableness, neuroticism, and being conscientious (see for example Feist, 1998; Hülsheger, Anderson, & Salgado, 2009a). Continuing with cognitive individual traits, intelligence is linked to creativity and, since it is not decisive beyond a certain level, there is an asymptotic relationship between intelligence and creativity (Kim, 2005). As well as the role of general mental ability, some authors posit the existence of thinking styles and attitudes associated specifically with creativity, such as field independence, tolerance of ambiguity, perseverance in the face of frustration, relative disinterest in social approval, and a pro-risk attitude (see Feist, 1998; Hülsheger et al., 2009a). It is specifically thought that creativity correlates positively with DT and weakly or negatively with convergent thinking. The former allows tasks with multiple solutions to be completed, and is characterized by high ideation, intuition, tolerance of ambiguity, and low evaluation, while the latter is found in the area of logical deduction, and is defined by evaluation, reasoning, adaptation, and intolerance of ambiguity (Guilford, 1968; Ma, 2009). A further important skill is to distance thinking from the procedures normally applied in dealing with problems (for example making the unusual normal and the normal unusual), or when all else fails to try something