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The generality-specificity of creativity: Exploring the structure of creative potential with EPoC☆

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ABSTRACT

It is increasingly acknowledged that creative potential involves partly a generalized ability, partly a set of domain-specific abilities, and partly a set of task-specific abilities. We extend and illustrate this view in a study of 482 children and adolescents, exploring the extent to which the scores variance of the Evaluation of Potential Creativity (EPoC)'s eight subtests can be decomposed by five variance components: thinking-process general, thinking-process specific, domain-specific, task-specific, and measurement error. A structural equation model derived from an extension of the multi-trait multi-method matrix analysis revealed that (1) the contribution of each variance component depends greatly on the task under consideration, and that (2) the contribution of a general creative thinking-process factor is overall limited. This study outlines the multidimensional and hierarchical structure of creative potential and the need to measure it with comprehensive test batteries sampling a range of creative tasks, domains and creative thinking-modes.

1. Introduction

Creativity is often defined as the ability to produce original work that fits within particular task or domain constraints (e.g., Runco & Jaeger, 2012; Stein, 1953; Sternberg & Lubart, 1995). Producing original work relies on creative thinking – the mental operations that lead to new ideas or products regardless of domains of knowledge – which is conceptually a general ability, as are other higher-order mental operations such as intelligence. However, producing an original work that fits the domain or task constraints also requires domain-specific knowledge and skills (unrelated to creative thinking) to make it a valuable contribution.

As a result, there is much debate on the nature of creativity as a "general" as opposed to "domain-specific" ability. This debate stems also from the observation that, though creative thinking may be domain general (e.g., Milgram & Livne, 2005), only a few eminent creative individuals have been recognized for their high levels of creativity in multiple subdomains, and eminent creativity in more than one domain remains particularly rare (Baer, 1998; Gray, 1966). Consistently, creativity research using general population samples and samples of individuals engaging in creative activities at a professional level usually support the domain-specificity of creativity. This is evidenced by creative self-beliefs studies (e.g., creative self-efficacy, or self-perceptions of one's creativity in multiple domains), suggesting often the multidimensional structure of creative self-concepts, organized by content-domains (Karwowski & Barbot, 2016; Kaufman, 2012; Kaufman & Baer, 2004; Kaufman, Cole, & Baer, 2009; Vispoel, 1993), and by studies exploring actual creative behaviors or achievements, also outlining the domain-specific rather than domain-general nature of creativity (e.g., Carson, Peterson, & Higgins, 2005; Dollinger, 2006; Silvia, Kaufman, & Pretz, 2009).

Conciliating debates on the general versus domain-specific nature of creativity, hybrid models and multivariate approaches have suggested that creativity results partly from a generalized ability, partly from a set of domain-specific abilities, and partly from a set of task-specific abilities (e.g., Lubart & Guignard, 2004; Plucker & Beghetto, 2004). For example, the Amusement Park Theoretical (APT) model of creativity (Baer & Kaufman, 2005) proposes domain-general initial requirements for creativity and domain-specific outcomes. It is indeed increasingly acknowledged that the ability to produce creative work is partly domain-specific because the nature of the creative work varies with the field

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(e.g., Barbot, Besançon, & Lubart, 2011), and even varies as a function of the task within a domain or the constraints within the task (Barbot, Lubart, & Besançon, 2016; Treinen & Barbot, 2008). A follow-up question is therefore, whether the person-level resources that lead to creative performance in each domain are different or the same across domains (e.g., Kaufman, Plucker, & Baer, 2008).

In related work (Barbot, Besançon, & Lubart, 2015; Barbot & Tinio, 2015; Barbot et al., 2011, 2016; Lubart, Besançon, & Barbot, 2011; Lubart, Zenasni, & Barbot, 2013), we have posited that there is a similar set of skills and traits that lead to creative performance in each domain, but their optimal combination may vary according to the creative domain and task under consideration. Specifically, demands of the task interact with a person's unique combination of resources coming into play in creative work. As a result, individual differences in creative outputs depend on the quality of "fit" between task demands and the person's unique profile of resources. Accordingly, creative potential can be defined as a latent ability, resulting from the confluence of several distinct, but interrelated psychological resources (e.g., Lubart, 1999; Sternberg & Lubart, 1995) that are partly genetically grounded (Barbot, Tan & Grigorenko, 2013). These resources include specific aspects of intelligence, knowledge, cognitive styles, personality, motivation, affect, and physical and socio-cultural contexts (e.g., Lubart et al., 2013). The particular combination of these resources results in an individual's profile of creative potential, which may lead to various degrees of creative outcomes due to hypothetical mechanisms of compensation, thresholds (minimum level of resources needed), interaction between resources (e.g., Sternberg & Lubart, 1995), and ultimately, interaction between individual resources, creative task demands, time and place (Barbot & Tinio, 2015). Hence, each individual can be described as having more or less creative potential in a specific domain of work or task (Lubart et al., 2013), and therefore, individuals have multiple potentials for creativity depending on the fit between their profile of resources and various creative task demands (some of which are domain general, others are domain-specific, and others are uniquely relevant to a particular creative task).

This general framework can help understand the rarity of exceptional levels of creativity in multiple domains because it is not likely that a person's profile of resources optimally fits multiple domains or tasks constraints. Instead, most people will show a profile of resources that rarely fit optimally to the demands of a specific creative task, resulting in a vast majority of outputs of "average" creativity (Barbot & Tinio, 2015). Additionally, a person might never achieve her potential if she doesn't have the opportunity to do so. This view of creative potential urges for the use of assessments accounting for the multifaceted nature of creative potential (multidimensionality of an individual's profile of resources relevant to a given creative task) in multiple domains, in order to address adequately the empirical study of the issue of generality-specificity of creativity.

1.1. Measuring creative potential: integrating domain-general and domain-specific aspects

As outlined above, the concept of creativity is viewed as a multifaceted and partly a domain-specific ability, which is thought to be trainable. As reviewed in related work (Barbot et al., 2015; Besançon, Lubart, & Barbot, 2013), several domain-specific training programs have been developed with the objective to enhance creative thinking at elementary and secondary school levels in a number of ways (e.g., Lynch & Harris, 2001; Starko, 1995). In order to better target and monitor students' development with these programs, creative potential should be measured by assessment tools tapping into the multidimensionality of the construct (Barbot et al., 2011). Two main paths to the measurement of creative potential have been developed to achieve this endeavor (Lubart et al., 2013): the first is "analytic" (or resource-based) and examines the fit between an individual's resources and creative tasks demand, whereas the second is "holistic" (or outcome-based) and captures an individual level of creative potential, using task performance in situations simulating various aspects of the creative work. Both approaches shed light on the issue of generality versus domain-specificity of creativity.

1.1.1. Analytic-componential approaches

The "analytic" approach to the evaluation of creative potential combines the assessment of individuals' characteristics and task parameters to identify the specific set of abilities, knowledge, and traits involved in a particular activity, and the relative weights of these different resources needed to yield highly creative outcomes (e.g., Caroff & Lubart, 2012). Therefore, this approach relies greatly on the analysis of a particular task demand. In this vein, expert-elicitation methods have been used to identify the set of resources needed in a particular domain, such as creative writing (Barbot, Tan, Randi, Santa-Donato & Grigorenko, 2012) or managerial creativity (Caroff & Lubart, 2012). Although these approaches have proved useful to identify the most central resources, they may be limited to estimate the relative importance of each resource because various relevant sub-groups of experts tend to value these resources differently depending on their own experience with the creative outlet under investigation (Barbot, Tan et al., 2012).

Alternatively, we developed a "creative profiler" approach (Lubart et al., 2013) which is a more direct, analytic evaluation of domain-specific potential for creativity. It consists of measuring the likelihood that an individual's multidimensional profile of creative potential fits the optimal profile established for a given creative work. After modeling a "target" profile of relevant resources derived from a group of individuals recognized for their high level of creative outcomes in a given domain, individual profiles are then compared to the target profile using classic statistical measures of distance (e.g., Barbot, Haeffel et al., 2012).

Because this approach is highly domain-, or even task-specific, it may prove efficient for improving the predictive validity of creative potential measures (within the set of targeted creative outcomes), which represents, thus far, a severe limitation of existing "general" creative potential measures (Barbot et al., 2011; Haensly & Torrance, 1990; Houtz & Krug, 1995) often used as predictor of "specific" creative outcomes (e.g., Barbot & Tinio, 2015; Kaufman et al., 2008; Plucker & Renzulli, 1999). However, the downside of this approach is that test scores may not be generalized to creative outcomes other than those already modeled in the targeted profile, unless some specific resources represent the "building-blocks" of any creative activity, which is the position assumed by "holistic" approaches to the evaluation of creative potential.

1.1.2. Holistic approaches to the evaluation of creative potential

Holistic approaches to the evaluation of creative potential involve tasks that simulate various aspects of the creative work. Here, the outcome is not an actual creative accomplishment, but the performance on a standardized task that engage all, or some aspects of a person's creative potential, in one specific domain (e.g., Barbot & Lubart, 2012) or multiple domains (Lubart et al., 2011; Torrance, 1966). Performance on such tasks may be norm-referenced or criterion-referenced and is sought to elicit conceptually the "building blocks" of the individual's creative potential, traditionally in a unidimensional perspective (i.e., creativity viewed as a unitary construct; e.g., Torrance, 1966) coined "g-factor view" (Barbot & Tinio, 2015), and more recently, in a multidimensional perspective. Following the later approach, we developed a measure to assess creative potential in children and adolescents: the *Evaluation of Potential Creativity* (EPoC; Lubart et al., 2011).

EPoC was designed to measure two key creative thinking-process clusters (divergent-exploratory and convergent-integrative) in multiple domains (currently verbal-literary and graphic, with forthcoming extensions in social problem-solving, scientific and musical domains). The divergent-exploratory mode of thinking refers to the process of expanding the range of solutions in creative problem solving. Conceptually, this thinking-process cluster involves cognitive components such as flexibility, divergent thinking or selective encoding, and conative

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