Creative potential in educational settings: its nature, measure, and nurture

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Although creativity is considered one of the key ‘twenty-first-century skills’, this ability is still often misunderstood. Persistent conceptual and methodological barriers have limited educational implications. This article reviews and discusses the three critical issues of ‘nature’, ‘measure’, and ‘nurture’ of creative potential in educational settings. A current perspective on the nature of creative potential is presented. In contrast to a classic, but inaccurate ‘g-factor view’ of creativity, this perspective emphasises a multidimensional and partly domain-specific view, upon which new assessment tools can be developed. Based on a more comprehensive evaluation of a child’s creative potential, educational programmes tailored to a child’s strengths and weaknesses can be offered. These perspectives are discussed in light of current findings in the field.

Keywords: creative potential; nature; measure and nurture

Introduction

Creativity is increasingly recognised as a valuable asset for individuals in their daily problem solving and their professional careers, that contributes to personal and societal development (Besançon, Lubart, and Barbot 2013; Lubart, Zenasni, and Barbot 2013). As one of the four key ‘twenty-first-century skills’ (together with critical thinking, collaboration, and communication), creativity has received increasing attention in the fields of psychology and education since the 1950s. Despite over half a century of systematic research on this topic, this ability is still incompletely understood. As a result, developing children’s creativity in educational settings is a complex endeavour. First, it requires that the nature of the construct of creativity be consensually understood by psychologists, educators, teachers, and the scientific community. Second, it supposes that instruments measuring accurately this construct in children are available. Third, interpretations made from creativity test scores should lead to informed decision in terms of orientation, and accurate implementation of creativity learning in the classroom. This article reviews and discusses these three major issues of nature, measure, and nurture in terms of implications in educational settings.

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The nature of creative potential

In the fields of Education and Psychology, creativity is often defined as the ability to produce original and valuable work that fits within particular task or domain constraints (Runco and Jaeger 2012; Stein 1953; Sternberg and Lubart 1995). Compared to classical intelligence focusing on analytical ability, knowledge, and expert resolution of common problems with defined solutions, creativity concerns generating new, previously unknown ideas and behaviours in novel situations or treating familiar situations in new ways (Sternberg 1985). Another important distinction between creativity and intelligence is that contrary to general intelligence (operationalised by the g-factor or IQ), creativity does not represent a unitary entity (Barbot and Tinio, 2015). If individual differences exist in the outcomes of one’s ‘potential’ for creativity, much evidence in the field has pointed to the multifaceted and partly domain-specific nature of creativity. Multifaceted, because a large set of resources come into play in creative work, and the resources needed and their combination may vary according to the specific demands of a particular creative work. Domain-specific, because most people have only a limited set of resources that ‘fits’ the optimal set and combinations of skills required in a given creative outlet, and it is therefore not likely that a person will show achievements across multiple creative tasks.

Hence, to understand the nature of creativity, it is first useful to distinguish between creative potential, creative accomplishment, and creative talent (Barbot and Lubart 2012a; Besançon, Lubart, and Barbot 2013). Creative potential is a latent ability to produce original, adaptive work, which is part of an individual’s ‘human capital’ (Walberg 1988). It results from a person’s unique combination of resources coming into play in creative work, including aspects of motivation, cognition, and personality (Lubart 1999; Lubart, Zenasni, and Barbot 2013; Sternberg and Lubart 1995). Specifically, this unique combination results in multiple potentials for creativity (ranging from low to high potential) depending on its fit between one’s resources and the various creative task demands (e.g. Lubart, Zenasni, and Barbot 2013). Importantly, a person’s potential may lead to achievement if that person has the opportunity to do so. Whereas intellectual ability often results in academic success, creative potential is best accomplished in original and unique outputs, recognised as valuable in a domain-based context. Therefore, creative achievement refers to the actual production of a creative output that has been recognised as creative by some audience. Finally, creative talent refers to the tendency to produce creative work on repeated occasions (Besançon, Lubart, and Barbot 2013). Given that exceptional contributions of child prodigies are extremely rare, most teachers, educators, and advisers who are interested in ‘creativity’ in primary and middle schooling age are in fact most often interested in the construct of ‘creative potential’ rather than creative achievement or creative talent.

According to componential approaches to creativity, creative potential reflects the confluence of several distinct, but interrelated resources (Sternberg and Lubart 1995). Person-level resources include biological and genetic factors (Barbot, Tan, and Grigorenko 2013; Kaufman et al. 2010), aspects of cognition such as divergent thinking (Guilford 1950), or metaphorical thinking (Tan et al. 2013), and aspects of conation (personality, motivational, and emotional factors) such as the willingness to take risks and be open to new ideas and experiences, while tolerating ambiguous situations and stimuli (Besançon, Lubart, and Barbot 2013). Other person-level resources include task-relevant knowledge that is necessary in each specific content area such as creative writing (Barbot et al. 2012), musical composition (Barbot and Lubart 2012b), or managerial creativity (Caroff and Lubart 2012).
Finally, environmental-level resources refer to aspects of culture, time, and place (physical and/or socio-environmental settings; e.g. Barbot and Tinio, 2015).

The presence of each of these resources and their particular combination within each person explains the individual differences in creative potential across domains and tasks (Lubart 1999; Sternberg and Lubart 1995). Indeed, a person’s creative potential for a given domain or task varies according to the nature and combination of the resources needed in that particular outlet (Lubart, Zenasni, and Barbot 2013). As an illustration, a child may show high potential in poetry composition, average potential in creative fiction composition, and low potential in musical composition. This heterogeneity is expected because these creative outlets involve a somewhat specific set of resources (not only task-relevant knowledge): for example, associative and metaphorical thinking might be crucial resources for poetry composition, whereas perseverance and imagination might be the most important resources for writing creative fiction (Barbot et al. 2013; Barbot et al. 2012; Barbot and Tinio, 2015; Tan et al. 2012).

Hence, the different nature of these creative outlets entails a different set of person-level resources that must come into play in a particular way to lead to high creativity outcomes. Extending this idea, the child showing high potential in poetry composition may also show a high potential in slam poetry because these outlets build upon a very similar set of resources. In other words, individuals show similar levels of creative potential in outlets that are highly similar. The extent of similarity between two tasks is defined by (1) the nature of the resources solicited in each creative outlet, (2) the extent to which each resource is solicited, and (3) the way in which the resources come into play during the creative process (Lubart, Zenasni, and Barbot 2013). As a result, it is increasingly acknowledged that creative potential represents simultaneously a domain-general ability (set of resources that is involved in the creative work across domains, regardless of the specific nature of the task), a set of domain-specific abilities (domain-relevant resources that are needed across creative tasks within a particular domain), and a set of task-relevant abilities (resources that are uniquely associated with a given creative outlet of interest); (e.g. Baer 1998; Baer and Kaufman 2005; Barbot and Tinio, 2015; Dietrich 2007; Lubart 1999; Lubart and Guignard 2004). Because each creative outlet may be characterised as partially similar to other outlets and as partially specific, it is most useful to conceive a person’s creative potential in terms of a set of potentialities (Lubart, Zenasni, and Barbot 2013).

There is much evidence supporting this conceptualisation of creative potential. In studies of ‘generic samples’, low- to medium-size correlations between measures of creative potential from different domains are usually reported (correlations in the .10–.30 range; Carson, Peterson, and Higgins 2005; Lubart and Guignard 2004; Plucker and Runco 1998; Silvia, Kaufman, and Pretz 2009). Furthermore, only moderate correlations between measures of creative potential from the same domains were also reported (Baer 1994), outlining the important contribution of task-relevant resources in a given creative outlet. Similarly, in studies of eminent creators (called Big-C creativity; Kaufman and Beghetto 2009), it is usually observed that exceptional levels of creativity in several lines of work in a given domain are rare, and even more so across more than one domain (Gray 1966).

In sum, creative potential refers to a particular combination of individual and contextual resources coming into play in creative work (including aspects of motivation, cognition, and personality). Depending on the fit between a given task requirements and a person’s multivariate profile of resources, individual differences in creative outcomes will emerge. Although the creativity of these outcomes will vary across individuals (with levels
presumably following a normal distribution), this does not mean that creativity represents a generalised (or unitary) entity or trait (Barbot and Tinio, 2015). Being creative in a given outlet will rely not only on a set of domain-general, domain-specific, and task-relevant resources underlying creative potential in that particular outlet, but also on the ability to transform one’s potential into real-world work that has been recognised as creative by the social world in a given time and place.

**Evaluating creative potential in school-age children**

The multifaceted and partly domain-specific view of creative potential outlined above contrasts with a classic, yet inaccurate ‘g-factor view’ of creativity in many respects (Barbot and Tinio, 2015). Indeed, many studies have made inferences about creativity as a generalised construct while using very specific tasks (in highly specific content areas), although there is limited evidence for the domain generality of creativity. However, at the individual level, it would be inaccurate to make inferences on a child’s creative potential based on a limited set of tasks, sampling a narrow range of resources involved and domains of creative endeavours. Therefore, the issue of assessment of creative potential is critical for both research and practical considerations such as testing the impact of educational contexts on creativity, or training a child’s creativity.

Currently, there are three main objectives of creative potential assessment in educational settings: (1) to identify the potential of children to guide them in an appropriate and tailored way; (2) to identify the average level of potential for creativity of a whole group of students (e.g. classroom level, school level, nation level) to conduct comparisons between groups and gauge the effects of training programmes, alternative pedagogies, or culture on creativity; and (3), to monitor change in creative potential under ‘natural’ development or in response to a training or educational programme. Regardless of the specific objective, creative potential should be measured by assessment tools tapping into the multidimensionality of the construct (Barbot, Besançon, and Lubart 2011). Indeed, as outlined above, the construct of creative potential is viewed as multifaceted, partly domain-specific, and is thought to be trainable. In line with this, several domain-specific training programmes have been developed with the objective of enhancing creative thinking at elementary and secondary school levels in a number of ways (e.g. Besançon and Lubart 2008; Besançon, Lubart, and Barbot 2013; Lynch and Harris 2001; Starko 1995). However, most programmes have monitored change in creative potential with instruments that do not capture its multidimensionality and domain specificity.

To date, two main paths to the measurement of creative potential have been used (Barbot, Besançon, and Lubart 2011; Lubart, Zenasni, and Barbot 2013). One is resource-based (or analytic) and examines the fit between an individual’s resources and creative task demands, whereas the second is outcome-based (or ‘holistic’) and captures an individual level of creative potential, using task performance in situations simulating various aspects of the creative work. Among numerous creative potential assessments that were developed to date, many resource-based approaches have focused on a limited set of components thought to contribute to creativity (Barbot, Besançon, and Lubart 2011). After Guilford (1950), this approach to creativity assessment was prevalent with the underlying view of creativity as a general and unidimensional construct. Often, it has led researchers and practitioners to use measures of a specific resource involved in creative potential (in particular, divergent thinking), and interpreted test scores as pure indicators of a child’s ‘general’ creativity, without distinction of the resource, type of task, or domain of creative expression (Barbot, Besançon, and Lubart 2011).
In related work (Barbot, Besançon, and Lubart 2011; Lubart, Zenasni, and Barbot 2013), we have reviewed measures of the person-level resources that are commonly used in this general and unidimensional view (g-factor view) of creative potential. For the cognitive aspects, divergent thinking tests such as the Torrance Tests of Creative Thinking (1966) or the Wallach and Kogan tests (1965) have been commonly used. These standardised tasks evaluate the capacity of the children to generate, in a limited time, many ideas from a simple starting point. This starting point can be a hypothetical situation (e.g. ‘What if?’ – type questions), a graphic stimulus (e.g. supplement as many incomplete graphic shapes as possible by generating original drawings using the graphic stimulus) or an object (e.g. propose various alternative uses of a familiar object). Individual differences in the divergent thinking production generated in response to the stimuli are quantified according to the number of responses (ideational fluency), their variety (ideational flexibility), and their relative (i.e. norm-referenced) infrequency (originality). Divergent thinking is essential for creativity because generating numerous ideas and considering alternative pathways of research increase the probability of finding an original and adapted idea (Lubart, Besançon, and Barbot 2011).

Regarding conative resources (Selby, Shaw, and Houtz 2005), essential features typically measured include perseverance and motivational aspects (Amabile et al. 1994), creative personality-based characteristics (e.g. tolerance to ambiguity, openness to new experiences, individualism, risk-taking, or psychoticism), as well as aspects of creative self-beliefs such as creative self-efficacy (e.g. Beghetto and Kaufman 2011; Karwowski and Barbot, forthcoming). Although these resources may apply to a range of creative outlets (measures of these characteristics generally do not apply to a specific content area, but are thought to be conductive of creativity regardless of the domain of creative outcome), it is to be noted that some domain- and even task-relevant demands might require more or less of each component. For example, a given creative task such as writing a creative fiction might require more intense commitments, and therefore, factors such as perseverance and intrinsic motivation might become more salient to lead to highly creative outputs.

With regard to outcome-based (or ‘holistic’) measures of creative potential in educational settings, children are typically presented with a standardised task, leading them to produce a single creative output such as a story, a drawing, or a musical composition (e.g. Barbot and Lubart 2012b; Jellen 1986). This assessment situation engages all of the person-level resources to lead to a creative production in the domain of interest. The productions resulting from the tasks are then scored by domain-relevant judges (Kaufman, Evans, and Baer 2010; Priest 2006) using the consensual assessment technique (Amabile 1982). This technique supposes that judgements about creativity imply a social consensus: if independent domain-relevant judges ‘classify’ the same productions in the same way with regard to their level of creativity, it is possible to conclude that raters have identified the same quality (that is, creativity). When a consensus is statistically reached (i.e. acceptable inter-rater agreement), the scores given by each judge to each production can be averaged to derive a composite score. Accordingly, the extent to which a person produces work evaluated as creative in this context, compared to other individuals who have completed the same task, is a measure of the person’s creative potential (Lubart, Zenasni, and Barbot 2013).

Combining both pathways to the evaluation of creative potential (resource-based and outcome-based), we developed a new measure to assess creative potential in children and adolescents: the Evaluation of Potential Creativity (EPoC; Lubart, Besançon, and Barbot 2011). This test battery measures two key creative thinking-process clusters (divergent-exploratory and convergent-integrative) in verbal-literary and graphic domains (with
forthcoming extensions in other domains such as social problem solving, scientific and musical domains). Building upon Guilford (1950) and others, the divergent-exploratory mode of thinking refers to the process of expanding the range of solutions in creative problem solving. The convergent-integrative thinking-process cluster refers to the activity of combining, integrating, or synthesising elements in new ways, and encompasses some convergent operations such as ‘synthesis’ and ‘evaluation of ideas’ (Cropley 2006; Osborn 1953).

To both reliably measure the thinking-process clusters in each domain of creative work and limit the overrepresentation of task-specific resources in the resulting scores, EPoC consists of two tasks engaging divergent-exploratory thinking processes and two tasks involving convergent-integrative thinking processes in each domain. As a result, EPoC consists currently of eight subtests yielding four composite scores measuring each ‘Thinking-Process–Domain unit’, namely, ‘Divergent Graphic’ (DG) (e.g. a graphic shape is provided and the child must make as many drawings as possible to complete the shape), ‘Integrative Graphic’ (IG) (e.g. a set of images of objects are provided and the child must produce a complete drawing using at least four of the eight objects provided), ‘Divergent Verbal’ (DV) (e.g. generate many endings to a story beginning), and ‘Integrative Verbal’ (IV) (e.g. generate a complete story based on descriptions of several fictional characters provided). Each task is standardised in terms of time limitation, instructions, and material provided, and two alternate forms are available (Form A and Form B) in order to use the battery in test–retest settings (e.g. pre- and post- intervention).

EPoC’s structured framework allows a child’s profile of creative potential to be examined, outlining the relative strengths and weaknesses of the child in each Thinking-Process–Domain unit (DG, IG, DV, IV). Therefore, EPoC operationalises creative potential as simultaneously ‘domain-specific’ and ‘thinking-process specific’, resulting in multiple indicators of creative potential that have been found to be relatively independent (Lubart, Besançon, and Barbot 2011).

Nurturing creative potential in educational settings

Creative potential is not a ‘fixed’ entity and each of the person-level resources of creative potential outlined above develops and evolves over time, through ‘natural’ or targeted interactions within the school, home, or work context (Besançon, Lubart, and Barbot 2013). One of the most influential microenvironments for the development of creativity is indeed the school environment (Mourgues et al. 2014). The impact of this environment on the development of creativity has been examined in some studies that contrasted traditional school settings with alternative pedagogy settings. For example, in multiple cultures, alternative pedagogies such as Montessori and Freinet lead to higher creative potential in students compared to those exposed to traditional pedagogy (Allodi 2010; Besançon and Lubart 2008; Besançon, Lubart, and Barbot 2013; Heise, Böhme, and Körner 2010). Hence, school environment can affect the development of creativity by encouraging it or discouraging it, either implicitly or explicitly (Mourgues et al. 2014). As a result, some school contexts are presumably favouring creativity more than others, and they may, to different degrees, invite children to express their cognitive, conative, and affective resources underlying creative potential. What are the school-level, classroom-level, and teacher-level factors that might explain this classic difference?

In a review of over 200 articles, Davies et al. (2013) identified characteristics of the school environments that promote creative skills in children including aspects of the physical environment, availability of resources/materials, pedagogical environment, play-based
learning, and relationships between teachers and learners. Specifically, two general aspects of the school environment seem most influential: (1) the structure, atmosphere, and operation of the classroom, and (2) the attitude of the teacher towards creativity.

At the classroom level, assessment, limitation of choices, pressure to conform, competition, and rote learning can compromise the development of creativity (Beghetto 2005; Kudryavtsev 2011). For example, if a climate of criticism and normative behaviour dominates in a classroom, children will integrate that creativity is ‘not part of the program’, will not be rewarded, and may even be seen as disruptive (Besançon, Lubart, and Barbot 2013). This classroom climate is tightly related to attitudes, practices, and personal characteristics of the teachers.

At the teacher level, there is a distinction between how to teach creatively, versus how to teach creativity (e.g. Craft 2005; Cremin, Burnard, and Craft 2006). It is first important to note that, by their attitudes and way of being, adults may impact children’s development of creative potential in a more general way. High expectations, mutual respect, the modelling of creative attitudes, flexibility, and dialogue are among the most important features of the teacher–learner relationship for creativity (Davies et al. 2013). Hence, teaching for creativity requires not only the teaching of a set of domain-specific knowledge and skills, but also a more general attitude encouraging emotional capacity to tolerate uncertainty or take risks (Cremin 2006). However, literature on creativity in education has repeatedly reported teachers’ difficulties to integrate creativity into the traditional classroom routines. In the western world, Eckhoff (2011) found that pre-service teachers valued creative thinking but were unsure about how to support it in early childhood classrooms. Similarly, Burnard (2008) outlined the challenge of teachers in teaching creativity while meeting demanding requirements for academic performance. In the eastern world, a comparative study of Asian cultures showed that, although teachers believed in the importance of teaching creativity, their attitudes and beliefs about the implementation of creativity learning in the classroom were generally negative (Chien 2010; Mourgues et al. 2014).

With regard to teaching creativity, based on a comprehensive evaluation of a child’s creative potential (such as approached with the EPoC described above), it is possible to derive tailored programmes to develop children’s creative potential, based on the most salient aspects of their multivariate profile of creative potential. For example, based on empirical studies with EPoC (Lubart, Besançon, and Barbot 2011), we have identified six typical profiles of children’s creative potential including (1) ‘High potential’ (high scores across EPoC indexes), (2) ‘Low potential’ (low scores across EPoC indexes), (3) ‘Verbal’ (strengths in Verbal tasks), (4) ‘Graphic’ (strengths in Graphic tasks), (5) ‘Divergent’ (strengths in Divergent tasks), and (6), ‘Integrative’ (strengths in Integrative tasks). According to the most salient aspects of a child’s profile, activities can be developed to stimulate the areas of weaknesses. However, it is to be noted that several training programme and short-term interventions tailored to stimulate specific thinking processes such as divergent thinking have mainly resulted in mixed outcomes (Russ 2003). More successful programmes have involved efforts to improve children’s play skills and agency (Craft, McConnon, and Matthews 2012). Using the EPoC’s framework, an optimal strategy to improve children’s creative potential is to focus first on their strengths and then work on their weaknesses.

When a child shows strength in a domain (e.g. graphic), it is not always ideal to focus the work directly on a weaker domain (e.g. verbal). However, to transfer from the graphic domain to the verbal domain, it can be useful to work with the child on his/her own drawings and ask him/her to develop stories based on these drawings, thus stimulating the verbal aspect. When one of the two thinking processes is prevalent (divergent or integrative), the strategy is
different because both thinking processes are usually building upon each other in creative work. It is therefore important to work on the development of both thinking modes. When a child is ‘integrative’, it is useful to work with him or her on the notion of openness and expanding the range of possibilities. Based on the same activity and instruction, the child could invent a first story, upon which the adult can develop another story using the same elements. Then, the child builds upon the story generated by the adult, to develop a new story.

When a child is ‘divergent’, the difficulty for the child is usually to select one or a few promising ideas in order to develop and elaborate them in a structured way. Building upon the child’s strength (generating many ideas), a brainstorming setting can be used to elicit the child’s numerous ideas. Then, the child can work on categorising his/her ideas in order to lead to ‘higher order’ ideas that synthesise the ideas classified in the same category. Ultimately, the work can be focused on the process of idea selection. Ideas that seem most interesting or original can be selected and integrated into a coherent whole. These examples illustrate the importance of considering a differentiated set of resources to identify a child’s areas of strengths and weaknesses, which could not be achieved by ‘unitary’ measures of creative potential.

Conclusion

For creativity to really become one of the ‘twenty-first-century skills’, it has to be understood as a facet of human capital which is multidimensional, partly domain-specific, and can be developed and nurtured. During over half a century, and since the beginning of the systematic study of creativity, measures of creative potential have often relied on a unitary and domain-general view that has delayed advances in the nurturing of creativity in educational settings. Indeed, the field has long suffered from the proliferation of assessment techniques, showing lack of theoretical grounds and limited educational applications (Barbot, Besançon, and Lubart 2011; Houtz and Krug 1995). Correspondingly, there have been many definitions of the concept, but limited consensus on the nature of creative potential upon which to base the development of new measures (Barbot, Besançon, and Lubart 2011). One of the most recurrent suggestions to address these conceptual and methodological barriers is to multiply the assessment approaches to yield a more complete picture of an individual’s potential for creativity (Barbot, Besançon, and Lubart 2011; Feldhusen and Goh 1995; Fishkin and Johnson 1998; Han and Marvin 2002; Hunsaker and Callahan 1995).

Towards this endeavour, we have developed a new instrument, EPoC, which aims to provide a comprehensive evaluation of a child’s creative potential. Although such multidimensional measures may help to develop new training programmes in school settings, much effort is still needed to understand the trainability of creative potential, its sensitivity to school-environment factors, as well as the conditions and pathways leading to the transformation of one’s creative potential into real-world work that is recognised as original and valuable by the social world, in a given time and place.

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