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Twenty years ago, *New Directions for Child and Adolescent Development* (NDCAD) published an influential volume on the development of creativity (1996, vol. 72) under the editorship of Mark Runco, featuring landmark contributions such as those by Robert Albert, Sandra Russ, and Ruth Richards. Two decades later, it is evident that much has happened in this line of work at the intersection of creativity research and developmental science. Up to this point, creativity development was already understood as a nonlinear process (illustrated by “slumps” research triggered by Torrance, 1968), which begins early in life (as manifested in play and other antecedents of creativity described early on by developmentalists). As the environmental and sociocultural roots of creativity began to be acknowledged (e.g., Amabile, 1996), so did its multifaceted and partly domain-specific nature (e.g., Baer, 1991; Sternberg & Lubart, 1991). This had important implications for understanding creativity development.

What did the past two decades bring into this picture? Certainly a great deal of depth to the various “facets” of creativity development, which some may interpret as a fragmentation of the field. These advances occurred at the same time as the emergence of (developmental) neuroscience perspectives on creativity that have greatly colored the theoretical landscape in recent years. This volume attempts to represent and integrate these various perspectives on the development of creativity, a challenging, yet very much needed endeavor for researchers and practitioners who seek to promote creativity development in children and adolescents.

Specifically, Baer (Article 1) makes the case for the domain specificity of creativity as the basic condition for understanding its development and for nurturing it in children and adolescents. Russ (Article 2) outlines the antecedent of adult creativity that can be found in the pretend play of young children, because cognitive and affective processes in play are also important for later creative production. Together with Besançon and Lubart (Barbot, Besançon, & Lubart, Article 3), we interpret classic creativity “slumps” and other evidence of the nonlinearity of creativity development in light of the interaction between individual-level resources, task-specific demands, and environmental influences. In their empirical study, Kornilov, Kornilova, and Grigorenko (Article 4) offer a psychometric approach to understanding how culture may shape the structure and development of creativity throughout the life span. Rooted in the emerging developmental cognitive neuroscience approach to creativity, Cassotti, Agoguë, Camarda, Houdé, and Borst (Article 5) present evidence of the central role inhibitory control has in creative problem solving and idea generation from childhood.
to adulthood. Also based on recent neuroscience evidence, Kleibeuker, De Dreu, and Crone (Article 6) summarize studies that have demonstrated a dramatic development of creativity in adolescence, interpreted in light of the development of adolescents’ brain and behavioral control processes. Beghetto and Dilley (Article 7) focus on how experiences, especially negative experiences, influence the development of creativity of children and adolescents and how these experiences can lead to what they coined “creative mortification”. Finally, commentaries by Runco and by Silvia, Christensen, and Cotter provide a very different, yet surprisingly efficient integration of these multiple perspectives on creativity development. Indeed, despite their apparent heterogeneity, the contributions in this volume all outline some common, important directions for research in the field that are further put forth in the commentaries.

In sum, this 20th anniversary of NDCAD volume on creativity development not only represents some of the main directions of the field in the past 20 years; it also provides an agenda for creativity researchers and developmentalists for the next few decades. Given the renewed interest for the study of creativity development and suggested directions presented in this volume, I am looking forward to what another two decades of research in this area will bring.

**Author Notes**

I am grateful to all authors for their wonderful contributions to this volume, as well as to all reviewers, the NDCAD board, Cheri Stahl (NDCAD administrator), Jens F. Beckmann (action editor for this issue), and Elena Grigorenko (NDCAD editor-in-chief).

Baptiste Barbot
Editor

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Creativity Doesn’t Develop in a Vacuum

John Baer

Abstract

The skills, knowledge, attitudes, motivations, and personality traits that lead to creative thinking and creative behavior do not exist—and do not develop—in a vacuum. They are inextricably tied to content, to domains, in particular, and they therefore vary by domains. The more we learn about creativity, the more we discover how domain specific creativity is. This means we cannot nurture creativity, or any of the skills or attributes that contribute to creativity, without thinking about content. One cannot become physically fit by doing just one kind of exercise that trains a single set of muscles; all-around fitness requires diverse exercises that use and train many different sets of muscles. So it is with creativity. Different domains require different creativity-relevant skills, knowledge, attitudes, motivations, and personality traits. If we want to help children and adolescents become more creative, then we need to attend to the domains we use in the development of creativity. © 2016 Wiley Periodicals, Inc.
The development of creativity is something almost all educators agree is important, but most creativity educators would argue that disturbingly little is being done to promote creativity (Baer & Kaufman, 2012; Beghetto, 2013; Besançon, Lubart, & Barbot, 2013; Plucker & Beghetto, 2015). In an introductory essay for a special issue of *Psychology of Aesthetics, Creativity, and the Arts* on “Creativity and Education,” a long-time observer of schools noted that:

> There are hundreds of books and thousands of articles on how to teach children to think creatively. If one walks into a classroom, however, one is not likely to see a lot of teaching for creative thinking. (Sternberg, 2015, p. 115)

Why the absence of creativity-focused education? Some will argue that the standards and accountability focus of recent decades have driven creativity education from schools. To the extent that this is true, it is based on a misunderstanding of both how to teach for creativity and how best to promote the acquisition of skills and knowledge (Baer, 1999, 2002). Creativity *requires* a great deal of domain-based skills and knowledge, so the need to meet content standards is not a barrier to creativity development (Baer, 2015); and the best ways to acquire domain-based skills and knowledge involve using them constructively and in diverse ways, which makes assignments to promote creative thinking natural allies with the goals of the content standards movement (Beghetto, Kaufman, & Baer, 2015).

Content standards like the Common Core are not—or should not be—roadblocks to teaching creative thinking skills. The obsession with testing that both preceded and now accompanies the Common Core, however, has become just such an obstacle:

> Another unfortunate misconception is the belief that we must be able to measure every outcome that we care about. Valid and meaningful assessment is hard, especially if we want to assess complex kinds of thinking, but the fact that we may not be able to test, in a standardized format, some of the things that we want to teach should not prevent us from teaching or valuing those things. For this reason, Common Core testing may be a genuine roadblock and the use of such tests for any high-stakes decisions (e.g., who gets a diploma, or who gets—or gets to keep—a teaching job) should be reconsidered, but that is no reason to avoid using the Common Core (or another set of rigorous content-based standards) as guides in education. We can (and should) teach things that matter whether or not we can test them adequately (Baer, in press-b).

The fact that creativity may be impossible to test in the kind of standardized format that will allow valid cross-district and cross-era comparisons does not mean that creativity in many domains cannot be assessed in any way. Experts in a domain can very reliably assess the creativity of
artifacts produced in that domain, as Amabile and others have shown convincingly (Amabile, 1982, 1983, 1996; Baer, Kaufman, & Gentile, 2004). But attempts to assess creativity in a standardized format have had little success. As Csikszentmihalyi (2013) observed:

If one turns to the literature of creativity research and asks the simple question: What is being measured? What is creativity? One soon realizes that the entire research enterprise moves on very thin ice. (p. 143)

Sawyer's (2012) summary of the results of more than a half century of work in creativity test development is similarly pessimistic:

Different tests, each designed to measure creativity, often aren’t correlated with one another, thus failing to demonstrate convergent validity. Another problem is that even though some of these tests correlate with creative achievement, the tests might in fact correlate with all achievement. Rather than measuring creativity, they might be measuring success and social achievement more generally—and IQ tests probably do a better job of that. (p. 61; original italics)

Attempts to assess creativity in a standardized way have mostly taken the form of divergent thinking tests, with the Torrance Tests the most widely used, but these tests have been under attack for many years for lack of validity. Anastasi wrote in 1982 that any “evidence of relation between the Torrance Tests and everyday-life criteria of creative achievement is meager” (p. 391), and a decade earlier Crockenberg (1972) reviewed the evidence that Torrance (1972a, 1972b) had offered for his tests and concluded that “given the creativity criteria used . . . [the results of his validity studies] should not be taken too seriously” (p. 35). Sternberg (1985) opined that “Such tests capture, at best, only the most trivial aspects of creativity” (p. 618). In 2009, Division 10 of the American Psychological Association (Psychology of Aesthetics, Creativity, and the Arts) held its first ever debate with the topic “Are the Torrance Tests still relevant in the 21st century?” (Baer, 2009; Kim, 2009).

There are many things that schools try to teach that cannot be assessed in standardized ways, however, and this assessment failure has not prevented schools from trying to teach those things anyway. What school mission statement doesn’t say something about such hard-to-assess goals as creating socially responsible citizens, lifelong learners, and students who respect and value diversity? The fact that some kinds of skills, knowledge, attitudes, and traits are hard to measure (and especially hard to measure when the relevant skills, knowledge, attitudes, and traits that matter for creativity vary from domain to domain) is not a reason to abandon them as goals. If, like respect for diversity and other important goals, creativity
is hard to assess, that is not a reason for schools to dismiss it as not worth promoting and teaching.

One problem that creativity education has faced—a self-imposed problem—is the erratic success of creativity training programs. Far too much creativity training has been time wasted, mostly because of poorly designed programs based on a fundamental misunderstanding of the nature of creativity (and its development).

Scott, Leritz, and Mumford (2004) conducted a quantitative meta-analysis of creativity training research covering a half century of research—70 published and peer-reviewed studies on the effectiveness of creativity training. There was good news: they found that “well-designed creativity training programs typically induce gains in performance” (p. 361). But there was also bad news, which was encapsulated in the phrase “well-designed creativity training programs.”

What constituted good design, the kind that led to positive outcomes?

[More successful programs were likely to focus on development of cognitive skills and the heuristics involved in skill application, using realistic exercises appropriate to the domain at hand. (p. 361)

The key issue was that the training exercises needed to be “appropriate to the domain at hand.” Creativity training worked when the training and the goals of the training (and the ways the effectiveness of the training was assessed) were in the same domain. “The most clear-cut finding to emerge in the overall analysis was that the use of domain-based performance exercises was positively related (r = .31, β = .35) to effect size” (p. 380).

Barbot, Besançon, and Lubart (2011) suggested the need for an even tighter focus than domain specificity in arguing for task specificity: “the most effective training programs will be those tailored to enhance creativity in a specific domain, and even better in a specific task” (p. 130). This call for task or subdomain specificity echoes Pretz and McCollum’s (2014) caution about the need for extremely domain-specific analyses: “Perhaps prior studies of domain-specific creativity were not specific enough” (p. 233) to uncover effects that more specific assessments might have revealed.

For those who have followed creativity research over the past two decades, these results should come as no surprise. It was almost two decades ago that the Creativity Research Journal published the only point–counterpoint debate it has ever featured. The topic of that 1998 debate was the domain specificity of creativity, and even the debater arguing for domain generality acknowledged that the outlook for domain generality was already looking rather grim:

Recent observers of the theoretical (Csikszentmihalyi, 1988) and empirical (Gardner, 1993; Runco, 1989; Sternberg & Lubart, 1995) creativity literature