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Commentary: The Development of Creativity—Ability, Motivation, and Potential

Paul J. Silvia, Alexander P. Christensen, Katherine N. Cotter

Abstract

A major question for research on the development of creativity is whether it is interested in creative potential (a prospective approach that uses measures early in life to predict adult creativity) or in children's creativity for its own sake. We suggest that a focus on potential for future creativity diminishes the fascinating creative world of childhood. The contributions to this issue can be organized in light of an ability \times motivation framework, which offers a fruitful way for thinking about the many factors that foster and impede creativity. The contributions reflect a renewed interest in the development of creativity and highlight how this area can illuminate broader problems in creativity studies. © 2016 Wiley Periodicals, Inc.

Creativity science attracts, shall we say, a certain sort of researcher—someone relatively high in openness to experience, interested in the arts, and willing to stand out. Because it attracts researchers interested in novelty and innovation, creativity research is unusually heterogeneous. We certainly see that diversity in this collection of contributions, which cover an unusually broad range of samples, constructs, methods, and approaches to creativity and its development. As researchers who study adults, we're happy for the opportunity to reflect on these articles and the broader problem of the development of creativity. In this commentary, we raise some general issues that cut across these articles and consider a general framework that might organize the many factors that contribute to the development of creativity.

What Develops? Creative Potential or Creativity?

What develops in the development of creativity: *creative potential* or *creativity*? These terms tend to be used interchangeably, especially in discussions of creative thought and divergent thinking (DT), but each term is freighted with tacit meanings that shape how we study creativity's development.

When we emphasize *creative potential*, we take a future-oriented view of a child's creative actions. Processes like pretend play or divergent thinking, when viewed as measures of creative potential, are interesting because they predict creative behaviors later in the life span. What we assess in childhood isn't creativity *per se* but rather some indicator that predicts future creative accomplishments. Runco (2014) has probably developed the view of creative potential most thoroughly. In his writings, he has argued that DT tests measure creative potential, not creativity. Runco and Acar (2012), for example, conclude that "DT tests are not tests of creativity. They are estimates of the potential for creative problem solving" (p. 72).

Focusing on creative potential shifts the goals of research and intervention. If we are interested in potential, then our eyes are looking down the road. We are studying children, for example, but our evidence for validity comes from studying what these children do later on as teens and grown-ups. The criterion for validity for measures of creative potential are necessarily prospective: if DT tasks didn't predict later creative achievement, for example, they would have clearly failed as a measure of creative potential. Likewise, the aims of creativity-enhancing interventions shift. If we seek to improve a child's creative potential, then our outcome metrics are measures of future, not current, creativity.

Alternatively, we can study the development of creativity itself. Creativity clearly means many things, but when contrasted with creative potential, it is present oriented instead of future oriented. It emphasizes what people—be they little kids, teens, or grown-ups—are doing and thinking *right now*. This changes the complexion of research and intervention. First,

evidence for criterion validity is no longer necessarily prospective. If we are studying how children generate clever ideas for its own sake—not as a measure of their potential to do so as adults—then it is irrelevant if scores on that task predict later achievements. It would be noteworthy if they did, but it wouldn't matter if they didn't. Second, an intervention for creativity—as opposed to creative potential—would be interested in what changes now instead of down the road.

And finally, a focus on creativity, instead of creative potential, includes a wider range of interesting outcomes, not merely public, observable creative accomplishments. Researchers interested in *everyday creativity* and mundane creative acts—the sorts of “little c” creative things people do in everyday life, such as dabbling with musical instruments, scrapbooking, fiddling around with recipes, or making cat memes—point out how much we miss when we emphasize genius, eminence, and achievement (Conner & Silvia, 2015; Kaufman & Beghetto, 2009; Silvia et al., 2014). Focusing on fame, achievement, and accomplishment is perhaps an American thing, but most of the creativity that happens—and perhaps the acts that say the most about people's basic creative natures (Richards, 2007, 2010)—are the more humble daily acts of the silent creative majority.

Our impression is that bickering over whether a task is a measure of *creativity* or *creative potential* is fruitless and misses much of the point of psychological assessment. Executive functioning tests, for example, strongly predict things like later earnings, incarceration, and the number of car accidents someone will go on to cause (Deary, 2001), but we don't commonly call an intelligence test a measure of “earnings potential” or “incarceration potential” or “car accident causing potential.”

Test scores can be more or less valid for a wide range of research purposes (Messick, 1995): one's purpose might be using a DT task to understand how children play with ideas, or one might use the scores to forecast later public accomplishment. Validity isn't one thing, and fixating on future achievement as the most important marker of “criterion validity” promotes a limiting conception of validity and assessment. A task could be used as a tool to understand how people come up with good ideas; it could also be used to predict other variables, including ones yet to be measured.

Conceptually, however, the distinction between creativity and creative potential matters, particularly when we consider interventions and creativity training. In some sense, the everyday creative acts of childhood are diminished when adults view them through the lens of future value and achievement. We don't want to be misunderstood: predicting later creativity from childhood constructs is valuable and fascinating. But it would be a shame if the captivating world of childhood creativity were viewed as merely a preparatory period for the big leagues of adult creativity. Children surely don't view their drawing and building and playing and imagining that way.

An Ability × Motivation Framework for the Development of Creativity

A general model of creativity can help us wrap our brains around the diversity of thought surrounding creativity's development. The many ideas tackled in these contributions can be fruitfully nested within an *ability × motivation* framework. Ability and motivation loom large in many theories of creativity, particularly systems, componential, and sociocultural theories (e.g., Amabile, 1996; Sawyer, 2012; Sternberg, 2006). Factors related to *ability* include traits, knowledge, skills, and environmental affordances that can foster or impede the capacity for creative work; factors related to *motivation* include goals, self-regulatory processes, and experiences that foster or impede wanting to invest time in creative activities.

Ability. Many of the ideas developed in these contributions concern abilities: personality traits, cognitive abilities, and acquired skills and knowledge that afford exercising creativity. The study of cognitive abilities has had a renaissance in creativity studies (see Silvia, 2015, for a review), and several of the contributions examine it. Until recently, divergent and convergent thinking were seen as unique and unrelated strengths—most of the textbooks either omitted intelligence or described why it has little to do with creativity. An example of the changing times is the article by Cassotti, Agogu  , Camarda, Houd  , and Borst (Article 5), which proposes that inhibitory abilities are central to creative thought in childhood. This takes the study of cognitive abilities and creativity full circle. The debate started in earnest with two landmark studies of childhood creativity (Getzels & Jackson, 1962; Wallach & Kogan, 1965), both of which found that measures of intelligence and creativity were essentially unrelated. Cassotti et al. (Article 5) raise some strong arguments for why the ability to manage your mind is useful for generating, evaluating, and refining ideas, even at early ages. In recent years, research with adult samples has found that many intellectual variables aid in creative thought (see Silvia, 2015), so extending this approach to creative cognition in childhood would be fruitful.

Kleibeuker, De Dreu, and Crone (Article 6) expand on this problem by exploring later age ranges and by considering the neuroscience of creativity's development. It's hard to understate the dramatic quality of brain development across the life span, and their emphasis on how brain development influences creative growth deserves much more attention. The neuroscience of creativity is flourishing, but for practical reasons, nearly all studies recruit adults. Illuminating the connections between brain and the development of creativity—particularly the growth of abilities associated with executive control—would also illuminate some more general problems in the neuroscience of creativity.

Most of developmental neuroscience has focused on individual activated regions of the brain. Neural activity in a specific region, the

prefrontal cortex, has shown significant changes throughout childhood and adolescence that correspond to increased executive control and creative ability (Kleibeuker et al., Article 6). Whereas developmental research has concentrated on an individual regions, approach, adult studies have examined local and global interactions via models of brain networks (Jung, 2014). This technique not only gleans information from specific regions but also gives insight into the operation of large-scale networks, such as the default mode network, the salience network, and the executive control network (Andrews-Hanna, 2012; Beaty et al., 2014; Jung, 2014). Studies using this method have shown creative processes are much more complex than previously thought, congruent with the neuroimaging evidence discussed in this issue (Cassotti et al., Article 5; Kleibeuker et al., Article 6). Emphasizing the integration and interaction of individual areas in the form of networks, as well as how different networks in turn interact, greatly expands the scope of creativity neuroscience (Beaty, Benedek, Silvia, & Schacter, 2016). In adult studies, for example, creative thought involves the coupling of the default mode network and the executive control network, two networks that are often negatively related (e.g., Beaty, Benedek, Kaufman, & Silvia, 2015). Although more difficult in children (Kim et al., 2016), network models of creative cognition offer an intriguing avenue for future work in the neuroscience of creativity development.

One promising direction is to examine how changes in semantic network structures affect creativity across development. Recent research on semantic networks shows the structure of knowledge influences idea generation and constrains the effects of other cognitive abilities on creative thought (Kenett, Anaki, & Faust, 2014). Strong executive and inhibitory abilities clearly help, but the way the raw materials are organized matters as well. Given how quickly language and knowledge develop in childhood, it would be fascinating to examine how semantic knowledge organization affects children's creative thinking.

Motivation. The contributions illustrate several of the most important motivational factors in creativity. Russ (Article 2) provides a snapshot of her long-standing research program in pretend play. This is a landmark line of research in the study of the development of creativity, for it raises provocative issues about the creative lives of children and how creativity can be encouraged. We see pretend play as nested within the motivation category for a couple of reasons. For one, the ubiquity of pretend play says much about the creative passion of children. Moreover, individual differences in pretend play likely reflect broader motivational variables that persist across the life span. As researchers who study adults, when we see variation in using one's imagination, improvising new meanings for common objects, and constructing creative worlds, characters, and stories, we think of *openness to experience*, one of the major cross-cultural factors of personality (McCrae & Sutin, 2009). Personality assessment in early childhood is a tricky thing, but individual differences in pretend play must surely be a marker of

openness to experience in early childhood. People high in openness to experience, among other things, value creativity more, see themselves as creative people, and seek out chances to do things differently (Kaufman, 2013).

On the other side, we see how creative goals are stunted and discouraged, if not killed outright. The recent concept of *creative mortification* (Beghetto, 2014) is an intriguing new direction for creativity research. Beghetto and Dilley (Article 7) summarize the theory and outline some fertile directions for future research. Models for improving creativity, not surprisingly, focus on how to elevate creativity. But from a motivation perspective, removing barriers that stunt and thwart creativity is just as important—sometimes getting out of the way is just as important as nudging someone forward. Viewed practically, “doing no harm” would be a good starting point for educators, mentors, and parents concerned about fostering creativity in children. In any case, research on who becomes discouraged and who becomes resilient in the face of critical feedback is sorely needed.

Both Ability and Motivation. And, of course, many of the ideas presented in these articles involve both ability and motivation. Baer’s (Article 1) emphasis on the importance of specific domains, for example, straddles both. Baer points out that creativity happens within specific—and occasionally idiosyncratic—domains of creativity. Attempts to train or teach for creativity are more likely to work if the creative domain appeals to the child. As a result, educational interventions have to respect and grapple with the variety of creative preferences children have—including some children’s relative lack of interest in creative pursuits. At the same time, interest and ability in domains are linked. Vocational interest researchers, for example, have illustrated how people’s self-efficacy for a career affects their interest and motivation (Lent, Brown, & Hackett, 1994). When people feel more capable of succeeding in a career, they find it more appealing and interesting. Notably, vocational interest research is domain specific—a core assumption is that the world of work is differentiated, and people need to find a spot where they fit.

Speaking of fit, Barbot, Lubart, and Besançon (Article 3) describe an emerging global model of creativity that promises to reshape research on children’s creative trajectories. The “fourth-grade slump” was one of the most intriguing findings in Torrance’s influential research program, but it’s clear that this trajectory fails to capture the complexity of creative growth. Thinking of creativity in terms of optimality—of personal resources, task features, and environments—is both theoretically useful and surprisingly practical, so this is a model that creativity researchers should keep an eye on. When we consider optimal fit between people and their environments, we can see the need for a more expansive understanding of creative environment. Some can clearly nurture creativity, and others can crush it (Beghetto & Dilley, Article 7), but what about environments that are merely mediocre,

that fail to mesh with or engage students' creative aptitudes? Do these evoke a sort of "creative drift"? Will people seek out more congenial environments or try to modify their environments to improve the fit with their aptitudes?

Culture, too, is an issue that straddles ability and motivation. The role of culture in creativity is so vast that we barely know where to start. One place, suggested by Kornilov, Kornilova, and Grigorenko (Article 4), is to tackle the assessment issues involved in work that crosses cultures, borders, and languages. The authors offer some cautionary tales and illustrate some useful tools for tackling the seemingly simple problem of assessing creative writing in two cultures. If aspects of raters aren't controlled, one could easily find specious differences between two cultures, be they mean differences in creative performance or structural differences in how constructs are constituted and assessed.

So, given all these influences, it's no surprise that training for creativity is not as simple as some may think. Once the many factors that influence creativity are recognized, it becomes apparent that a general, catch-all approach to training for creativity will not be effective—it must be specific to the situation at hand (Baer, Article 1). And this type of training need not be relegated to the stereotypical creative domains: many areas could benefit from creativity training. Take, for instance, engineering education. Many programs focus on its technical aspects and theoretical concepts instead of developing creativity (Cropley, 2015). This emphasis could be for a number of reasons, such as not realizing the value of creativity, but it could also result from the complexity of effectively training for creativity in this domain. It is easy to see how a training program asking students to generate novel but impractical ideas would be off-putting to engineering educators—that is not what their field values. It quickly becomes apparent that these creativity training programs must be tailored to their audience. Training for creativity—something that, if done well, could add new dimensions to creativity development—needs a domain-specific makeover.

Conclusion

Several of the contributors pointed out factors that slow the growth of knowledge about the development of creativity. Developmental research—especially longitudinal research—is slow, expensive, and intricate. Research with children can be particularly vexing: they won't sit still for hours of surveys and brain scans. It is thus nice to see an expanding interest in creativity and its development. The creative lives of children are fascinating—both as hints of adult creativity but primarily as objects of fascination in their own right. All of creativity science's major problems come together in the study of creativity's development, so it offers lessons that are particular to development and that are general to all of our field's concern. We're more than a little curious to see how this field itself develops.

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PAUL J. SILVIA is an associate professor of psychology at the University of North Carolina at Greensboro. He studies creativity assessment and how executive processes shape creative thought.

ALEXANDER P. CHRISTENSEN is a graduate student in the Department of Psychology, University of North Carolina at Greensboro. His research focuses on individual differences in creativity and cognition.

KATHERINE N. COTTER is a graduate student in the Department of Psychology, University of North Carolina at Greensboro. Her research interests include musical imagery and the psychology of art and aesthetics.