

Scott Barry Kaufman's Review of *Creativity and Reason in Cognitive Development*, edited by James C. Kaufman and John Baer (2006). Cambridge University Press.

Creativity and Reason in Cognitive Development is a novel and appropriate attempt to synthesize various threads on the nature of reasoning and the nature of creative thinking to investigate their interplay and educational impact. Such general questions that are posed are: *To what extent do creativity and imagination decline in childhood?*, *Is there something about the development of one kind of thinking that undermines imaginative and creative thinking?*, *What is the role of domain knowledge in creative thinking?*, and *How does the process of schooling affect creative thinking skills?* A variety of perspectives are brought to bear on the relationships among creativity, reason, knowledge, and schooling. The list of contributors is impressive, as is the scope. The reader will walk away from the book realizing that the general questions the book hopes to answer are very complex, and riddled with many caveats.

The first part of the book is theoretical in nature, and includes empirical research findings on the relationship between reason and creativity. Unlike many academic compilations, each chapter stands out as unique and there is very little overlap of research findings, or even in particular theoretic orientation. For instance, Robert Weisberg, Dean Simonton, Adam Bristol et al., Michael Mumford et al., John Feldhusen, and Richard Mayer all specifically take up the topic of the role of domain knowledge in creative production yet present different research on the issue which is reflected in their different theoretical perspectives.

Weisberg and Simonton emphasize the important role domain knowledge plays in the achievement of world class eminence. Weisberg's position is that knowledge and expertise are required for high level performance. In Weisberg's view, the relationship between knowledge and creative production is linear, and what distinguishes geniuses from non-geniuses is the amount of knowledge they have acquired. Simonton's chapter also shows the importance of expertise, but uses a historiometric approach to show that there is a trend for an optimal level of expertise, upon

which further expertise can be a hindrance to creative production. The discrepancy between these views may be a result of the fact that Weisberg relies mainly on individual case studies for support of his ideas, whereas Simonton averages over a massive amount of quantitative data on geniuses. Both approaches are valid however, and both display the importance of expertise acquisition for high-level creative performance in a particular domain.

The chapters by Bristol et al., Mumford et al., Feldhusen, and Mayer all take up the role of domain knowledge in reasoning and creative thinking, but go into much greater detail on the precise memory processes involved. It is clear by reading their chapters that “Knowledge” and “Expertise” are actually quite complex constructs, and that it is important to consider *how* such knowledge is acquired when considering the role of expertise in creative production and reasoning.

Mumford et al.’s chapter elucidates the importance of schemas, associations, and cases in creative problem solving. Feldhusen’s chapter provides a nice complement to Mumford’s chapter by discussing the importance of schemas for high level creativity. Bristol et al.’s chapter discusses encoding and retrieval situations that can inhibit remote associations. They also present quite intriguing brain data showing how different areas of the brain such as the prefrontal cortex can actually inhibit the forming of associations in other parts of the brain such as the hippocampus and the medial temporal lobe. Finally, Richard Mayer focuses on the role of domain knowledge within mathematics. His chapter is quite consistent with the other chapters in the book showing the importance of factual, conceptual, procedural, strategic, and metacognitive knowledge for mathematical problem solving.

The first section of the book is also filled out by interesting research that usually don’t get attention in the creativity literature such as David Pizarro et al.’s conceptualization of everyday moral reasoning as a form of creativity. They review evidence showing the flexible nature of moral reasoning, and the role emotions play in moral decisions. Warren TenHouten’s chapter on Alexithymia provides a nice complement to Pizarro et al.’s research, by demonstrating the impact

of emotions on reasoning. In particular, they present evidence that contrary to some views, emotions play a critical role in reasoning and symbolic elaboration, which are in turn important for creative reasoning.

The first section of the book also includes research specifically looking at the relationship between creativity and reasoning. Both Daniel Fasco, Jr. and Mark Runco argue that reasoning and creativity are two peas in a pod. Runco focuses on personal creativity, and how the reasoning that children do to construct knowledge of their world is inherently creative. This general idea, which has its roots in Piaget, is a reoccurring theme throughout the book. Fasco focuses on the importance of both convergent *and* divergent thinking processes in creativity. Finally, the first section of the book ends with the work of Howard Gardner and his collaborators, where they discuss two lenses—axis and focus— through which each domain (and even each subdomain) of activity can be viewed. They argue that each domain draws on different types of creativity and expertise and show examples of how different subdomains within dance and law differ to the extent that they rely on broad situations vs. modular tasks and focus on preserving traditions (vertical creativity) vs. encourage novelty (horizontal creativity).

The second section of the book has a more practical focus, and the chapters in this section add schooling to the mix, to understand the complex relationships between reasoning, creative thinking, and education. If the first section of the book didn't convince you already of the immense complexity of these relationships, the second section most definitely will.

Susan Gelman et al. discuss the nature of creativity in children's thought, and provides case studies and research showing how children display creative use of language deliberately. The focus of their chapter is on the process of thought, and their ideas are consistent with Runco's viewpoint that some everyday mental processes are inherently creative. This chapter is particularly interesting in the context of this book since it shows that some forms of everyday creativity need not *require* extensive levels of expertise, since children are creative even before they have acquired extensive knowledge of language conventions. Paris et al. echo this sentiment

by providing real examples of children displaying creativity and making novel combinations without possession of extensive knowledge. They even show examples of how knowledge can constrain children's thinking, and can potentially limit their responses.

This idea of reasoning causing a "slump" in creative thinking during the childhood years is also discussed in chapters by Guignard et al. and Beghetto et al. Guignard et al. review evidence that while logical skills progress between 3rd and 4th grade, creative thinking skills show a decrement. They also review evidence of decreased cognitive flexibility around age 9 but no concomitant decrement in reasoning skills, and argue that emphasis on convergent thinking skills at this age may have a negative impact on the development of creativity. They do not argue that reason across the lifespan is detrimental, however. In fact, they review evidence that for adults, reasoning and problem finding abilities are indeed crucial for creativity.

Along similar lines, Beghetto et al. delineate certain conditions in the classroom that may hinder or facilitate creativity. They differentiate between *teacher-centered* classrooms in which instructors just feed knowledge to the student, and *learner-centered* classrooms in which students are given the opportunity to learn by drawing on their own experiences and interpretations. They emphasize meaningful learning in their chapter and argue that a memorization-based high stakes atmosphere may hinder student's creativity and that true learning comes about by giving students the opportunity to arrive at the answers themselves, through their ability to construct their own knowledge. Joyce VanTassel-Baska also raises similar issues in her chapter when she argues that the teaching of creativity is not prevalent in many classrooms due to an emphasis on accountability and standards that do not value creative skills. She reviews evidence that classrooms who specifically adopt an approach to enhance creativity subsequently enhance academic success and even adult productivity. She also reviews specific programs designed to teach higher level skills that involve creative problem solving.

The second section of the book also includes chapters by Susan Rostan on the development of artistic talent in children and Weihua Niu et al. on cultural differences in

reasoning and creativity. Rostan presents evidence that artistic creativity is a result of knowledge and visual information processing and shows how the development of problem-finding skills is dependent on the drawing situation (life or imagination) and level of expertise of the child. Rostan also shows how the acquisition of artistic conventions can increase the development of creativity. She stresses the need for both early successes as well as the capacity to overcome inevitable failure along the way as a foundation for the continued construction of knowledge, reasoning, and creativity. Lastly, Niu et al. do a cross cultural analysis of reasoning and creativity abilities. They present evidence that cultural differences exist between Chinese and American students' on measures of creativity, but not in deductive reasoning. They argue that when the influence of context is stripped away, that people may behave almost identical in their thinking. They therefore suggest that culture may have an impact on certain modes of thinking, but that humans still share universal thinking modes.

In sum, this is a remarkable book that combines very diverse perspectives and methodologies. The editors do a good job synthesizing the research in their concluding chapter, and rightly point out the complexities of the relationship between creativity and reason, especially how it plays out in cognitive development. Nevertheless, all the research taken together makes it quite clear that the strength of the relationship depends on various factors such as the particular domain in question, how knowledge is processed, how information is taught in school, etc. The book always makes it clear though that reason and knowledge are mostly compatible with creativity, and that for the highest levels of success in a domain, all three are required at some capacity. This book hopefully will serve as a model for future researchers to integrate these various threads and complexities into their own research to increase our understanding of the dynamic interplay between creativity and reason.

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