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1 Creativity Across Different Domains

An Expansive Approach

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Abstract

Domain-generality and domain-specificity have long been debate fodder for the creativity field. As the two positions have begun to converge, the need emerges for a new reference work that both explores the general topic and offers in-depth coverage of creativity for particular domains. Our goal for this edited handbook is to offer a reference for existing research, provoke ideas for collaborations and interactions, and propel the field forward as we consider the domains that may be covered in future editions.

Creativity Across Different Domains: An Expansive Approach

Think about a computer scientist developing a new program, an artist working on a painting, and an advertising executive crafting a slogan. All three are engaging in creative endeavors, but in very different domains. Are the cognitive processes they use similar, or are they different? What about their motivations, their skills, their personalities, the way they interact with their environment? What are the particular features that distinguish them? What are the commonalities?

The question of the degree to which creativity is a general ability or domain specific is an important one in creativity research that is still being studied and discussed. The topic has grown from a dichotomy to gradually converging levels of discussion. In the only point-counterpoint, debate-style pair of articles in its history, the *Creativity Research Journal* asked two leading proponents of these competing positions to argue the case for domain specificity versus generality (Baer, 1998; Plucker, 1998).

A pair of edited books came out less than a decade later that examined the issue from different perspectives. Sternberg, Grigorenko, and Singer (2004) had top scholars write essays on the topic. Kaufman and Baer (2005a) invited researchers who studied creativity in several domains to write essays about the nuances of creativity in

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that domain. Both works offered essays that provided converging approaches to the topic in Plucker and Beghetto (2004) and Kaufman and Baer (2005b).

Studies have continued to examine nuances and different components of this issue. One approach that favors domain specificity but acknowledges the role of domain-general aspects is the Amusement Park Theoretical Model (Baer & Kaufman, 2005; Kaufman & Baer, 2004, 2006). We will review this theory in more detail later in this book. Just as theorists who favor domain specificity acknowledge domain-general aspects of creativity, so too do those who argue for the existence of domain-general creative-thinking skills recognize that domain-specific thinking skills play important roles in creative thinking (Sawyer, 2012).

The domain-specific approach to creativity asserts that the content matters, and that it matters very deeply. In fact, domain-specificity theorists suggest that saying that someone is creative without specifying the domain (or domains) in which they are creative is rather like saying someone is an expert without mentioning the area of that person's expertise. No one is an all-around expert, and neither is anyone universally creative across all domains. Just as someone may be an expert in Japanese literature but know nothing about quantum mechanics (or vice versa), so it is possible to be creative in one area and not at all creative in another (Baer, 2011, 2013, 2016). Of course, one may be an expert in both Japanese literature and quantum mechanics - there's no reason one can't have multiple areas of expertise but we simply can't predict expertise in one area based on expertise in some unrelated domain. The same is true, according to domain specificity, for creativity. There are of course polymaths who are highly creative in several domains, but they are the exception, not the rule (Kaufman, Beghetto, & Baer, 2012; Kaufman, Beghetto, Baer, & Ivcevic, 2010). The underlying skills, motivations, personality traits, cognitive strengths and styles, self-beliefs, and knowledge bases that lead to creativity in different domains are different.

A domain-specific perspective has helped psychologists make sense of many troublesome and seemingly conflicting findings in the creativity literature, findings that have seemed to generate much heat but precious little light when viewed from an assumption of domain generality. For example, the highly charged question of the relationship between creativity and mental illness has long dogged creativity studies, with research pointing both toward a strong association and no association whatsoever. Recent domain-specific studies have explained past research findings that seemed contradictory by demonstrating that the mental illness–creativity connection exists in some domains and at some levels of eminence, but not others (Kaufman, 2014). So, for example, creativity in science at the highest levels is not generally associated statistically with mental illness (Simonton, 2014), but poetic creativity at such levels is more likely to show a relationship (Kaufman, 2001a, 2001b; Kaufman & Baer, 2002).

In a somewhat less-charged arena, there is similar domain-specific evidence that conscientiousness, one of the Big Five personality traits, has a significant positive impact on creativity in some domains (such as science; e.g., Feist, 1998) and a significant negative impact in others (such as creative writing or the arts; e.g., Wolfradt & Pretz, 2001). There are also differences in lower-level domains; for

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example, ballet dancers are more conscientious than modern/contemporary dancers (Fink & Woschnjak, 2011). These kinds of domain-based differences are allowing creativity theorists to make sense of what often seem, from a domain-general perspective, to be conflicting results.

It has been more than a decade since the two edited books (Kaufman & Baer, 2005a; Sternberg, Grigorenko, & Singer, 2004) first appeared. Since then, a great deal has happened in the world and in creativity research. Online data collection allows us to study people all over the world (Hass, 2015). We can measure creativity with applications for mobile devices (Reisman, 2017) or in a more stealthy manner using video games (Shute & Ventura, 2013). Technological advances mean we have to reconsider past creativity theory (Gangadharbatla, 2010). Creativity has been studied in text messaging (Tagg, 2013), YouTube videos (Courtois, Mechant, & De Marez, 2012), and iPad artwork (Kucirkova, & Sakr, 2015).

Considering creativity across domains means something different in the present day than in past years. We had several goals for this book, and one goal was to reflect the changing world. Some chapters are on traditional domains, whereas others are on domains that have radically expanded or entirely changed in our lifetimes. We are fully aware that many emerging domains are only cursorily addressed in the current volume and hope that future editions will be even more inclusive. Some of the most exciting potential domains, such as social networking or digital media, are slowly growing but did not offer an obvious contributor who would be well-versed both in that world and the creativity realm. Our chapters on computer science, biomedicine, educational technologies, and many others, however, do include material on creative activity that would have been unimaginable when Guilford, Barron, and Torrance were developing the field.

Another goal was to highlight important scholarship that may not quickly occur to creativity researchers as being relevant. We so often exist in silos - by discipline, department, topic, or journal - and it is easy to miss work that could influence and nurture our own approaches. Creativity studies flourish in the realms of sports, terrorism, animals, law, and cooking, and we believe that the measures, theories, and ideas discussed in these chapters will be interesting and applicable to people interested in creativity in other domains.

A third goal was to offer reflection on the ideas of creative domains themselves. In this first section, we proceed with a chapter describing the Amusement Park Theoretical Model in more detail.¹ Next come insights into cross-domain creativity² and the importance of considering domain-general components.³ In the second section, we have chapters on traditional arts: literary writing,⁴ visual arts,⁵ architecture,⁶ photography,⁷ acting,⁸ music,⁹ and dance.¹⁰ The third section includes essays on creativity in the sciences: physical science,¹¹ biomedicine,¹² psychology,¹³ engineering,¹⁴ mathematics,¹⁵ and computer science.¹⁶ In the fourth section are chapters on creativity in business, with wide-ranging content covering

³ See Chapter 4. ⁴ See Chapter 5. ⁵ See Chapter 6.
⁸ See Chapter 9. ⁹ See Chapter 10. ¹⁰ See Chapter 11.
¹³ See Chapter 14. ¹⁴ See Chapter 15. ² See Chapter 3. ¹ See Chapter 2.

⁶ See Chapter 7. 7 See Chapter 8.

¹² See Chapter 13. ¹¹ See Chapter 12.

¹⁶ See Chapter 17. ¹⁵ See Chapter 16.

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advertising,¹⁷ marketing,¹⁸ leadership,¹⁹ educational technologies,²⁰ design,²¹ and entrepreneurship.²² In the fifth section, we include the chapters on the newer domains we mentioned above (specifically law,²³ cooking,²⁴ sport,²⁵ animals,²⁶ and terrorism²⁷). Our final full section, part six, considers creativity in many different aspects of everyday life. There are chapters on emotion,²⁸ teaching,²⁹ culture,³⁰ therapy,³¹ play,³² and craft.³³ Finally, we offer integrative and future-oriented thoughts in a last concluding chapter.³⁴

This book has been a fascinating and gratifying experience. We were able to work with dear friends and meet new colleagues. Some of the authors you will read are the leading superstars in the field, others are rising bright lights. Some people regularly publish in creativity journals, whereas others have academic homes elsewhere. We hope that this will be an enjoyable intellectual journey for you, the reader, with some chapters reinforcing what you know about a topic and others offering pure discovery.

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- ¹⁷ See Chapter 18.
 ¹⁸ See Chapter 19.
 ¹⁹ See Chapter 20.
 ²⁰ See Chapter 21.
 ²¹ See Chapter 22.
 ²² See Chapter 23.
 ²³ See Chapter 24.
 ²⁴ See Chapter 25.
 ²⁵ See Chapter 26.
 ²⁶ See Chapter 27.
 ²⁷ See Chapter 28.
 ²⁸ See Chapter 29.
- ²⁹ See Chapter 30. 30 See Chapter 31. 31 See Chapter 32. 32 See Chapter 33.
- ³³ See Chapter 34. ³⁴ See Chapter 35.

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2 The Amusement Park Theoretical Model of Creativity

An Attempt to Bridge the Domain-Specificity/Generality Gap

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Abstract

The Amusement Park Theoretical (APT) Model of Creativity weaves together both domain-general and domain-specific factors supporting creative performance with a hierarchical structure. There are four levels of the model – Initial Requirements, General Thematic Areas, Domains, and Microdomains – that describe increasing levels of domain specificity. The APT Model reminds creativity researchers and theorists of the need to consider and to identify the differing degrees of domain generality and domain specificity in the constructs they are investigating. The APT Model also provides a useful and flexible framework for such discussions.

Is creativity domain specific, or is it domain general? Do some of the same abilities, traits, skills, motivations, habits of thought, knowledge bases, or cognitive styles underlie creative performance in all domains? Or, instead, are there different patterns that predict creative success for each domain? Does being creative when performing a task in one domain make it more likely that a person will be creative when undertaking tasks in unrelated domains? In other words, can one apply one's creativity in engineering to help write more creative sonnets, paint more creative landscapes, teach more creative history lessons, or bake more creative soufflés?

Although (by its nature) this book takes a domain-specific stance, the question is a complex one. The same broad concept underlies a recurring and fierce debate in the field of intelligence – is there a g, a single general factor of intelligence which accounts for most of the variance in intellectual ability? Or is intelligence comprised of distinct abilities, as conceptualized by some psychometric approaches (such as the CHC model; Horn & Cattell, 1966; McGrew, 2009) and modern theories (such as the theory of Successful Intelligence; Sternberg, 1996)? This question is quite important – there are implications for everything from best hiring practices to teaching strategies to even larger concerns about social issues – and has produced considerable vitriol.

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Creativity: Domain Specificity and Domain Generality

The parallel question in creativity may provoke fewer fistfights but continues to be a hot topic after more than twenty-five years. It was the subject of *Creativity Research Journal*'s only Point-Counterpoint pair of articles in its history (Baer, 1998b; Plucker, 1998), and eleven years later the issue was at the heart of the first debate sponsored by the American Psychological Association's Division 10 (Baer, 2009; Kim, 2009; see also Baer, 2011b & 2011c and Kim, 2011a & 2011b for a follow-up written version of the same debate that was solicited by the APA journal *Psychology of Aesthetics, Creativity, and the Arts*).

When creativity research began in earnest, this issue was not debated much because there was often an implicit assumption that creativity was domain general. The early pioneers, from Wallas (1926) to Guilford (1950) to Torrance (1963), tended to approach creativity as being domain general or as being minimally different across domains. Barron (1969) was one of the few pioneers who did large bodies of research exploring creativity in different areas, studying eminent creators across several specific occupations.

Today, things are quite different (Baer, 2010, 2016). We are by no means suggesting that the tide has turned such that domain specificity is now implicitly assumed, but rather that the question of domains is often considered as a key variable (either to be studied, controlled, or included as a potential limitation) in studies. In addition, many modern theories include creativity domains as a key element or topic to be considered. There are still arguments being made for both sides, but there has been a slow movement toward the middle of the issue. Although the focus in this book is on the domain-specific components of creativity, we would not argue that there are no domain-general components. The Amusement Park Theoretical (APT) Model we will describe includes both domain-specific and domain-general aspects. Indeed, one of the purposes of this book is to gather together information on creativity across many different domains such that it can be used for many different purposes; one such purpose could be finding measures or approaches used in one domain that could then be used in more domain-general work.

Before we detail the specifics of the APT Model, we want to elaborate on some of the core principles that it is built upon. For one, abilities, skills, and traits are not seen as *either* domain specific *or* domain general. There is no clearly divided specificity-generality dichotomy, with traits and abilities falling neatly on one side or the other. Each factor related to creativity rests on its own continuum, with some being more domain specific and others more domain general. Throughout the rest of the chapter, when we say creativity-related factors, we are referring to the abilities, knowledge bases, motivational states, interests, skills, personality traits, cognitive styles, habits of mind, and individual preferences that play a role in both domain-general and domain-specific creativity.

One further issue to discuss are creativity-related factors that might be considered either broad theoretical constructs or (quite differently) actual abilities or traits. For example, think of "content knowledge." As a theoretical construct, "content knowledge" sounds very domain general, and indeed it is essential for creativity in most, if

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not all, domains. The need for some kind of content knowledge to be creative is so obvious that it generally goes without saying; creativity does not occur in an intellectual vacuum. But no one argues that *actual* content knowledge is a domaingeneral factor. Content knowledge in dance and content knowledge in chemistry and content knowledge in economics have fairly little overlap; a large database of information about the life and dance moves of Bob Fosse will probably not include much related to fluorescence microscopy. Indeed, the specific content knowledge needed to be creative in each domain is generally recognized to be domain specific. When we discuss most concepts in the model, it is usually as the specific skill or trait (i.e., being conscientious) as opposed to the larger theoretical construct (i.e., personality).

The Amusement Park Theoretical (APT) Model

Over a decade ago, the authors of this chapter edited a book about creativity across domains (which could be considered the current book's intellectual predecessor). As we tried to integrate the disparate ideas and studies presented throughout the book, we derived a theoretical model to explain our current thoughts (Kaufman & Baer, 2005), which we proceeded to further develop over time (Baer & Kaufman, 2006; Kaufman & Baer, 2004a, 2006).

The APT Model proposed a hierarchy with four levels — Initial Requirements, General Thematic Areas, Domains, and Micro-domains — that range from extremely domain general to extremely domain specific. Why is it called the Amusement Park Theoretical Model? Alas, there are no high-speed rides or parade floats to be found anywhere in the model; it serves as a central metaphor for the creative process (albeit, perhaps, one that is a bit too flippant).

Initial Requirements

The first level is the Initial Requirements. There are some things you need to enter any amusement park. You need transportation – either your own car or a friend who will give you a ride or reliable public transit. You need money; most parks aren't free and there are always souvenirs and food. You need the time to go, and perhaps someone to go with you,. Of course the importance of those things (transportation to the park, money to purchase an admission ticket, and companions to share the experience) might vary from park to park (e.g., some amusement parks are much more expensive than others).

Similarly, there are certain things one needs to be creative in any domain. In our initial model, we highlighted three key factors. First is general intelligence. Although creativity and intelligence consistently show a weak but significant correlation (Jung, 2014; Kim, 2006), the relationship is quite nuanced. We're not referring to the nuance (which would include both different aspects of intelligence and how some domains of creativity are more or less dependent on intelligence) here, however. Instead, intelligence is an initial requirement for creativity in that it is

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virtually impossible to be intentionally creative without some level of intellectual ability. There are exceptions, of course; some people with savant syndrome can be very creative (Treffert, 2014). But it is rare.

The second construct suggested by the initial model was motivation. As with intelligence, we stayed nonspecific and did not refer to intrinsic or extrinsic motivation (Deci & Ryan, 1985). We refer here to the motivation needed to get up off the couch and do something, regardless of its impetus. It might be a burning passion to change the world or the vague desire to avoid boredom, but it is motivation regardless of its expression. The third and final construct named in the original model is a supportive environment that allows one the freedom to try something (anything) new.

There are, of course, many other constructs we could have chosen. For example, repeated studies have shown that the personality factor of openness to experience is related to creativity across a wide variety of domains and activities (see review in Kaufman, 2016) and, indeed, being open to new experiences and ideas is a pretty key component of creativity. Our guess is that you could come up with a few more yourself.

General Thematic Areas

It's one thing to decide to go to an amusement park; it's another thing to decide what type of park you want to choose. Maybe you want to go on exciting roller coasters, or be in the water, or be surrounded by particular cartoon characters. Each of these different types of park represents a different theme – much as, we have argued, creativity has different General Thematic Areas.

There are many different attempts to outline the structure of creativity. Some are rooted in more broad cognitive terms. Gardner (1999) has proposed eight such "intelligences": interpersonal, intrapersonal, spatial, natural history, language, logical-mathematical, bodily-kinesthetic, and musical; he also later debated adding existential intelligence (Gardner, 2006). Hirschfeld and Gelman (1994) propose eight "domains of mind" (cognitive neuroscience, cultural anthropology, biological anthropology, developmental psychology, education, linguistics, philosophy, and psycholinguistics), whereas Feist (2004) proposes seven (art, biology, linguistics, math, music, physics, and psychology).

In creativity, Carson, Peterson, and Higgins's (2005) Creativity Achievement Questionnaire (CAQ) has two factors and ten domains. There is an arts factor (drama, writing, humor, music, visual arts, and dance) and a science factor (invention, science, and culinary). The tenth domain, architecture, did not load on a factor. In another study, Ivcevic and Mayer (2009) outlined three main factors: the creative lifestyle (e.g., crafts, self-expression, interpersonal creativity, visual arts, writing, sophisticated media use), performance arts (music, theater, and dance), and intellectual creativity (technology, science, academia).

We have conducted many studies on this topic (Kaufman, 2006, 2012; Kaufman & Baer, 2004b; Kaufman, Cole, & Baer, 2009), constructing several different self-assessment measures in the process. The number of factors has varied from three to

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eight; the current measure, the *Kaufman Domains of Creativity Scale* (K-DOCS; Kaufman, 2012) outlines five General Thematic Areas: everyday, scholarly, performance, math/scientific, and artistic; it has shown evidence of solid reliability and validity (McKay, Karwowski, & Kaufman, in press). Earlier incarnations included factors such as hands-on creativity, communication, problem-solving, entrepreneurship, sports, and humor.

Domains

As we descend the model we go further and further in the direction of specificity. Once you've decided on the type of amusement park you want to go to, you still have to choose the exact park. If you want roller coasters, do you choose Six Flags or the local park? If you want cartoons, do you pay up for Disneyworld or Sesame Place?

In creativity, the General Thematic Areas are only the beginning. You might begin on the path of performance creativity, but there are many possible domains, from theater acting to solo singing to group dancing. The underlying skills needed for creativity in all these areas would have many similarities, as would the traits that lead to creative performance. Many of these traits and skills may have little association with creativity in other General Thematic Areas (although there may be overlap with domains in some General Thematic Areas but not others).

It is important to note that we are using domain in a different way from how Csikszentmihalyi (1999) uses the term in his Systems Model. His "domain" is an area of expertise but can be very broad or very specific; in his model, a domain could just as easily refer to conducting research on creativity assessment or to being a psychologist. The scope is not important because the other dimensions in the model (the "field" of gatekeepers and the "person" who creates) are different categorical concepts. In our case, we use domain to refer to a particular level of specificity – not so broad as "music composition" but not so specific as "Sondheimesque musical theatre." We are not, in this instance, using it in the same way that Csikszentmihalyi (1999) uses the term in his Systems model.

Micro-domains

Once you've settled on the right park, there are still decisions to be made. If you're at an amusement park known for its roller coasters, you can go on the death-defying drop rides or the gentle ones for kids and wimps. If you're at a Disney park, there are a multitude of different worlds and lands to explore. Within creativity, there are still domains inside of domains – namely, micro-domains.

Even if you've winnowed everything down to poetry, you still have to choose between different forms, such as epic, haiku, sonnet, villanelle, elegy, sestina, abecedarian, limerick, and tanka. Many poets work with several of these forms while others concentrate on just one or two, and the underlying abilities and traits that lead to creative performance in these different micro-domains would have considerable (but far from complete) overlap. If you've settled on psychology, more decisions are still needed – Clinical? Cognitive? Social? Educational?