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Domain Specificity and the Limits of Creativity Theory

ABSTRACT

A growing body of research evidence suggests that creativity is very domain-specific and that domain-general skills or traits contribute little to creative performance. The term "creativity" is a convenient term for collecting many interesting artifacts, processes, and people into a single category, and the term "creative thinking skills" may be a useful way to connect a diverse set of unrelated cognitive processes that operate on different content and in different domains. These concepts are misleading, however, because although they connect things that may seem similar to observers, they lack any underlying cognitive psychological validity.

This has implications for the ways we understand and assess creativity, and also for how we should direct our efforts to develop creative-thinking skills in diverse domains. Creativity training needs either to target the domains in which creativity enhancement is desired or to use a wide range of activities in diverse domains if the goal is more general improvement in many domains. Creativity assessment needs to focus on domain-by-domain assessment and to review findings based on allegedly domain-general tests of creativity that may have misled researchers to unsupportable interpretations. Creativity theory needs to set more modest goals of domain-by-domain theory development and to recognize that theories that may *seem* domain-general might better be understood as meta-theoretical heuristics that do not actually describe domain-general processes. These meta-theories might in some cases help guide the search for domain-based theories.

Keywords: creativity, domains, domain specificity, domain generality, theory.

One of the big questions in creativity research and theory is the degree to which the skills that underlie creativity vary by domains. Is there something analogous to the *g* of intelligence — call it *c* — that is predictive of creative performance across most domains? Can many of the creative-thinking skills that might help someone design a creative advertising campaign also be employed in helping that person write a creative sonnet, find a creative resolution to a scheduling conflict, develop a creative new approach to an engineering problem, choreograph a creative dance routine, and devise a creative scientific theory? Or, conversely, are the skills that underlie

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creative performance in different domains largely distinct and applicable only in their respective domains?

The question of domain generality or specificity is ultimately one of transfer. Whenever something previously learned in one context is applied successfully in a different context, transfer has occurred. The difference in the contexts may be relatively large or relatively small, with transfer much more likely the more similar the situations (Woolfolk, 2010). Distinctions have been made between "low-road transfer" ("the spontaneous, automatic transfer of highly practiced skills, with little need for reflective thinking"; Salomon & Perkins, 1989, p. 118) and the much more difficult "high-road transfer" (which involves consciously applying knowledge or skill learned in a different context).

If there were no transfer at all, then all knowledge would be situational and essentially rote (and education would necessarily be extremely inefficient). Transfer occurs—e.g., students are able to deploy their hard-earned multiplication skills and understandings in diverse situations—but most transfer occurs within contexts that are quite similar. Research has suggested that transfer across domains is both difficult to achieve and relatively rare (Willingham, 2002, 2007).

A recent large-scale study that looked at the possibility of transfer of practiced intellectual skills came to a very negative conclusion. In this 6-week training study, 11,430 participants practiced and trained several times each week on cognitive tasks designed to improve reasoning, memory, planning, visuospatial skills, or attention.

> Although improvements were observed in every one of the cognitive tasks that were trained, no evidence was found for transfer effects to untrained tasks, even when those tasks were cognitively closely related.
>
> *(Owen et al., 2010, p. 775)*

The Owens et al. study is especially interesting because the skills taught—reasoning, memory, planning, visuospatial skills, and attention—are all part of what we normally think of as general intelligence, and there is rather convincing evidence that there is substantial generality to *g* (or whatever it is that IQ tests measure; see Neisser et al. (1996) for an excellent summary of what we know about intelligence and the relationships among its components). We have reason to believe that many of the skills trained and tested in the Owens et al. study are related (they all rise and fall with *g)*, and yet training in separate skills produced increases only in the skill trained, and not in any other, untrained skills. This may be a result of the specific training materials employed (although given that they produced the expected skill increases, this is a bit hard to argue) or the length of the training (it may be that 6 weeks of regular practice is enough to train a skill, but not for transfer to occur, although it is hard to understand why there might be a delay in such transfer). Because this study was conducted (intentionally) in an area in which the greatest transfer might be expected—in skills related to general intelligence—the failure to observe such transfer is striking and surprising.

Contrast this finding with what one would expect in the way of transfer had the training consisted of domain-specific knowledge. Had subjects studied statistics, field

hockey, 18th-century British literature, quantum physics, pre-Columbian pottery, or the Tokugawa shogunate, no one would expect any transfer effects to any of the other areas. Expertise (or, at a less exalted level, content knowledge) is not expected to transfer readily to other domains. There may be times in which one's expertise in one field might come in handy in one's explorations of some other domain, but these would be the exception, not the rule. Expertise is very narrowly domain-specific.

Motivation provides another interesting specificity/generality question of a different kind. It seems reasonable to assume that motivation of some kind might be necessary to do almost anything that might, at some level of performance, be called creative. Amabile has argued for the importance of intrinsic motivation (1996), and intrinsic motivation might see like a good candidate for domain generality. But even if we assume that the theory linking intrinsic motivation to creativity is correct, the implication that intrinsic motivation would then be a domain-general factor is misleading because intrinsic motivation is actually very domain-specific. One cannot simply take one's motivation to write poetry and apply it somewhere else. (One cannot, e.g., turn one's love of writing sonnets into love of balancing one's checkbook, doing one's math homework, or working out at the gym—although it may of course possible to use writing as a *reward* for doing something else that one is not otherwise motivated to do.) Doing something in any domain requires motivation of some sort, but intrinsic motivation is not fungible. It is very domain-specific.

So we have some things that are clearly domain-specific (expertise); some that seem at first to be domain-general, but, upon closer inspection, can be seen to be just the opposite (intrinsic motivation); and some in which there appear to be considerable levels of domain generality, but where training studies have failed to show expected transfer effects (intelligence). Where in this puzzle does creativity itself fit? Are there cognitive skills, thinking styles, personality traits, or work habits that (a) are not part of *g* (one area in which there is clear evidence for domain generality and which might contribute to creativity in some (perhaps many) domains) and (b) are truly domain-general in their operation?

I and others have made the case for the domain specificity of creativity in detail elsewhere. In this article, I will summarize that argument and the evidence for the domain specificity of creativity. I will then show what that evidence for the domain specificity of creativity suggests regarding: (a) creativity training, (b) the assessment of creativity, and (c) the outlook for large-scale creativity theories.

DOMAIN SPECIFICITY OF CREATIVITY

To choose between competing theories, it makes sense to see what differences there are in the predictions each theory makes, then compare those predictions with research outcomes. Domain generality and domain specificity make very different predictions regarding actual creative performance and in the kinds of things we could observe in an experimental study. One creativity researcher summarized these predictions quite succinctly:

> Domain generality would be supported by high intercorrelations among different creative behaviors and a common set of psychological descriptors for those behaviors, while domain specificity would be supported by relatively low correlations among different behaviors, and a diverging set of psychological descriptors of those behaviors.
>
> *(Ivcevic, 2007, p. 272)*

If creativity were a domain-general skill, it should (to some degree at least) influence creativity on virtually any task one undertakes. This is not to say that there would not also be many other factors contributing to creative performance (e.g., specialized domain skills, knowledge, and interest) that might be highly domain-specific; but if creativity were domain-general and subjects had sufficient knowledge to perform at some level in a set of domains,[1] then people who evidence higher levels of creativity in one domain should be, on average, more creative in other domains as well.

The theory that creativity is domain-general therefore predicts positive correlations among the levels of creativity exhibited by individuals in different domains. Domain specificity predicts the opposite. To test the theories, one would simply need to collect creativity ratings of artifacts created by a large sample of subjects, with each subject creating such artifacts in several different domains. One could then easily determine if there are in fact "high intercorrelations among different creative behaviors" (Ivcevic, 2007, p. 272), as domain generality predicts.

This research has been conducted, in most cases using Amabile's (1982, 1983, 1996) consensual assessment technique (CAT) to rate levels of creativity. Here's a description of how the CAT works:

> The CAT is based on this idea that the best measure of the creativity of a work of art, a theory, or any other artifact is the combined assessment of experts in that field. Whether one is selecting a poem for a prestigious award or judging the creativity of a fifth-grader's collage, one doesn't score it by following some checklist or applying a general creativity-assessment rubric. The best judgments of the creativity of such artifacts that can be produced—imperfect though these may be—are the combined opinions of experts in the field. That's what most prize committees do (which is why only the opinions of a few experts matter when choosing, say, the winner of the Fields Medal in mathematics—the opinions of the rest of us just don't count). The CAT uses essentially the same procedure the judge the creativity of more everyday creations.
>
> *(Kaufman, Plucker, & Baer, 2008b, pp. 54–55)*

[1] Some tasks require specialized skills that many people do not have. Asking subjects to compose a fugue, create architectural drawings for a bridge, or develop a theory explaining dark energy would be unreasonable. Few people could do even one of those things, much less all three. But there are many tasks (e.g., creating a collage or writing a story) that most subjects, even rather young ones, could perform at some level.

Experts rate the creativity of a collection of artifacts by comparing them with one another. The experts work independently of one another and are instructed to use their own expert sense of what is creative in a domain in making these judgments. Despite working alone and without outside guidance, inter-rater reliabilities tend to be quite good, generally in the .80–.90 range (Amabile, 1982, 1983, 1996; Baer, 1991, 1993, 1994a, 1994b, 1994c, 1996; Baer, Kaufman, & Gentile, 2004; Conti, Coon, & Amabile, 1996; Han, 2003; Kaufman, Baer, Cole, & Sexton, 2008a; Kaufman, Plucker et al., 2008b; Ruscio, Whitney, & Amabile, 1998).

CAT and CAT-like assessments of the creativity of subjects in diverse domains have been conducted, and the result is generally quite low inter-correlations among the creativity ratings of artifacts in different domains produced by the same subjects (for a summary of these studies, see Baer, 2010). The "high intercorrelations among different creative behaviors" (Ivcevic, 2007; p. 272) that would demonstrate domain generality have not been observed. What these studies have reported is either low or essentially random correlations. Even in the few studies that have claimed to show modest degrees of domain generality (e.g., Conti et al., 1996; Ruscio et al., 1998), there is only evidence of some generality across performances *within the same domain*, such as (a) the creativity of stories written in response to different kinds of prompts or (b) the creativity of different kinds of art activities. For example, Conti et al. (1996) reported substantial correlations of creativity ratings on different writing tasks (ranging from .43 to .87). This confirms the authors' prediction that "creativity measures taken within the same context and domain should be strongly positively related" (p. 387)—but both domain generality and domain specificity make the same predication here. Correlations among the different art tasks reported in this study were also positive, although the correlations were smaller, probably because the art tasks were more diverse. But neither of these results addresses the question of domain specificity vs. domain generality because both theories make the same prediction in each case. The crucial test for the generality–specificity question requires looking at the correlations of creativity ratings of products in *different* domains. Of the 13 correlations of this kind reported by Conti et al. (1996), eight were positive, four were negative, and one was zero, and *none* of these correlations was statistically significant, which means that they provided no substantive evidence at all for domain generality. The mean of those 13 correlations was .109, which would account for barely more than 1% of the variance. If this is all that domain generality is claiming, then it is a trivial claim.

Although the approach just described is perhaps the most straightforward kind of investigation of the generality–specificity issue, other approaches have also been fruitful. Silvia, Kaufman and Pretz (2009) used latent class analysis to provide what they term "positive evidence" (p. 147) for domain specificity (in contrast to the "negative evidence"—a "lack evidence for generality" (p. 147)—that the kinds of studies reported above provide). Taking a different tack, Baer (1996) showed that when creativity training is targeted at improving divergent thinking skills in a particular domain (or even a particular sub-domain), it is creativity in that area alone that shows an increase in subsequent testing. Creativity ratings on tasks in

other domains or subdomains were not affected by domain-specific creativity training.

Others have discussed the theoretical significance of the existence of individuals who have shown exceptional creativity in more than one domain (e.g., Leonardo da Vinci, Benjamin Franklin, Clare Booth Luce, Bertrand Russell, Linus Pauling, and Paul Robeson). The fact that such polymathically creative individuals exist has sometimes been mistakenly viewed as evidence for domain generality, but such domain-transcending geniuses are actually *predicted* by domain specificity. Domain specificity does not argue that individuals can only be creative in a single domain; it argues only that creativity in one domain is not predictive (either positively or negatively) of creativity in other domains. If such creative polymaths were commonplace, that indeed would be evidence for domain generality, but they are in fact rather rare. The level of creative polymaths actually observed—they are indeed uncommon, but not unheard of—is precisely what domain-specificity theory predicts (Kaufman, Beghetto, Baer, & Ivcevic, 2010b; Kaufman, Beghetto, & Baer, 2010a).

There is, then, a large and growing body of evidence that argues for the domain specificity of creativity. This has serious implications for creativity assessment, research, theory, and training.

CREATIVITY TRAINING

If creativity were domain-general, then any creativity-relevant skills acquired through training should positively influence creative performance in all domains. Domain-specific knowledge would still matter, but an increase in domain-general creative thinking skills—if they existed—should influence creative performance across domains. If one were teaching or practicing a truly domain-general creative thinking skill, then it would not matter what content one used for such practice. So if a teacher asked students to do a number of divergent thinking exercises, it really wouldn't matter whether one practiced by brainstorming unusual uses for bricks, words that rhyme with love, or things that taste like chicken. The effect would be the same because any increase in divergent thinking skill would be applicable in *all* domains, not just the domain used in the divergent thinking exercises.

Most creativity training problems assume—more often implicitly than explicitly, as is the case of popular creativity-training programs like Talents Unlimited (Newman, 2008; Talents Unlimited, 2011), OM (Micklus, 1986; Micklus & Micklus, 2006), Synectics (Gordon, 1961), and CPS (Eberle & Stanish, 1980; Isaksen, Stead-Dorval, & Treffinger, 2010)—that creativity is domain-general. But to the extent that creativity is domain-specific, the content of the divergent thinking exercises matters very much; training that employs divergent thinking exercises with one type of content should be expected to improve creative performance *only in that domain.* In fact, this is exactly what happened in one experiment (Baer, 1996) in which middle school students were led through a variety of poetry-relevant divergent thinking exercises. They later wrote both poems and short stories. Expert judges who were unaware which students had been trained judged the poems of the trained students

to be significantly more creative than those of the untrained students, but the training had no observable effect on the creativity of the students' short stories.

The goal of most creativity trainers and teachers is to boost creative thinking skills in many areas, not just in a single domain. If a teacher were interested in fostering only a particular kind of creativity, then it would be appropriate to use only activities that relate to that domain. But if the goal is to increase creative-thinking skills in multiple domains, then designing training activities that relate to diverse domains is essential. The common "unusual uses" kinds of brainstorming activities may be a good place to start because they are relatively easy for students to do, but teachers should branch out and include content from all areas in their divergent thinking practice or other kinds of creativity training. For example, teachers might ask students to brainstorm:

- *reasons we should or should not explore space, study world languages, censor postings in social media, etc.;*
- *things that might happen next in a story one is reading (or that one is writing);*
- *things they think they know about some topic (Abraham Lincoln, Jupiter, polygons, etc.);*
- *ways to design an experiment on a given topic; and*
- *ways to resolve an ethical dilemma, a scheduling conflict, a dispute among friends, etc.*

Whether one is using brainstorming or some other creativity-training activity, it is easy to treat the content of those exercises as if they don't matter. If one's goal is to improve students' creativity in general, however, then the exercises, activities, prompts, problems, puzzles, and questions one employs should be drawn from as many different domains as possible. To do otherwise is to waste potentially valuable creativity training efforts.

ASSESSMENT OF CREATIVITY

If creativity is domain-specific, as I have argued, then creativity assessment must also be domain-specific. If no domain-general creativity-relevant skills or other attributes exist, then there are no domain-general creativity-relevant skills or other attributes to measure. One could assess domain-specific skills that might contribute to creative performance in one (or some) domain(s), but any measure of creativity would need to state for what domains it claims to be a valid measure.

Creativity assessment has often assumed domain generality. By far, the most common tests of creativity have been divergent thinking tests, and the most widely used divergent thinking tests are the torrance tests of creative thinking (TTCT), which come in two forms, figural and verbal, although both are used as general measures of creativity (Kaufman, Plucker et al., 2008b; Torrance & Presbury, 1984). Validation studies of such supposedly domain-general tests have in fact lent support to the theory of domain specificity, however, not the domain generality these tests assume

(Baer, 2012a, 2012b). Divergent thinking may be important, but we may need multiple measures of it, domain by domain, for it to be useful:

> Generalized tests do not have as much predictive validity as tests more specifically tailored to a particular domain.… Hence, tests of divergent thinking must be tailored to each domain.
>
> *(Simonton, 1999, p. 86)*

When Plucker (1999) re-analyzed the longitudinal data that is the primary validation support for the TTCT, he found that verbal divergent thinking was a powerful predictor of the kinds of things the test was supposed to predict, but figural divergent thinking was not:

> The importance of verbal DT relative to figural DT may be due to a linguistic bias in the adult creative achievement checklists. For example, if a majority of the creative achievements required a high degree of linguistic talent, as opposed to spatial talent or problem-solving talents, the verbal DT tests would be expected to have a significantly higher correlation with these types of achievement than other forms of DT.
>
> *(Plucker, 1999, p. 110)*

This finding is in line with evidence Torrance himself offered showing that figural and verbal divergent thinking scores are not correlated, and are therefore measuring two essentially unrelated sets of skills:

> Reponses to the verbal and figural forms of the TTCT are not only expressed in two different modalities.... but they are also measures of different cognitive abilities. In fact, Torrance (1990) found very little correlation ($r = .06$) between performance on the verbal and figural tests.
>
> *(Crammond, Matthews-Morgan, Bandalos, & Zuo, 2005, pp. 283–284)*

What does this mean for interpretation of the Torrance Tests? Both the verbal and the figural tests are commonly used, both by researchers and by school systems, as general measures of creative potential. But they are almost completely orthogonal measures—they can't both be measuring the same thing if they yield totally different and uncorrelated scores—so they cannot be measures of domain-general creativity. They can, at most, be measures of creativity in their respective domains. If there is not one divergent thinking skill but many, then even if one or the other of the Torrance Tests is able to measure some of those divergent thinking skills, it may not be measuring the ones of interest to the researcher or teacher using the test.

Both researchers and school systems are interpreting Torrance Test scores as measures of creativity very generally, but the validation evidence doesn't support the validity of such interpretations. This means that the ways the Torrance Tests are being used are probably generating many false research interpretations and producing many unreliable and invalid decisions in such arenas as admission to gifted/

talented programs. These are serious harms that the widespread use of these tests—and of all domain-general measures of creativity—has caused.

DOMAIN SPECIFICITY AND THE POSSIBILITY OF LARGE-SCALE CREATIVITY THEORIES

Domain specificity suggests that we will need many theories of creativity, not a single grand unifying theory. There may be room for what might be termed meta-theories—heuristic approaches that suggest places we might look for more domain-specific theories of how creative thinking actually operates—and concepts like divergent thinking and intrinsic motivation might be quite useful in that way (Baer, 2011). But the distinction between domain-specific theories that actually describe how creativity works in a domain and these domain-general heuristics that point out possibly useful directions for research in several domains is a crucial one.

The need for expertise is a useful analog for many seemingly domain-general theories of creativity. It is true that some degree of expertise is important in many domains—creativity requires some level of knowledge and skill in most domains—but the content of such expertise varies by domain. Saying that one needs expertise of some kind to be creative is a helpful (if perhaps obvious) observation, but it doesn't really tell us much because it in no way clarifies what kinds of expertise one needs in any particular domain. The kinds and degrees of expertise likely to promote creativity in a domain will vary greatly across domains. The same is true of all of the general ideas commonly proposed for skills or other attributes important to creativity. They vary by domain (The theory that creativity is domain-specific is itself a kind of meta-theory. It can help guide the search for specific theories in different domains—mostly by showing the need for such separate theories rather than a grand, domain-general theory—but by itself it does not provide a theory of how creativity works in any given domain. This is also true of the need for expertise, which doesn't say anything about the kinds of expertise relevant to creative performance in any given domain, and of other possible meta-theories of creativity, as outlined below. They are not so much theories of creativity, but rather theories about how we might productively search for theories in different domains.).

As explained above, intrinsic motivation is not fungible—one cannot take one's interest in shellfish or choral music and apply it in a way that motivates one to write poetry or study cosmology—but the notion that intrinsic motivation is valuable in many (perhaps all) domains is a powerful meta-theory, one that will help us look for the kinds of motivations that will promote creativity in a given domain. But if one looks for domain-general intrinsic motivation (or perhaps tries to develop a domain-general measure of intrinsic motivation), the search will be in vain.

Similarly, although divergent thinking skills are domain-specific, they may be important in many domains. There may be many different kinds of divergent thinking skill that operate in diverse ways. These distinct varieties of divergent thinking may be unified only from the outside, as it were, not on the level of cognitive or neural operations: they may be unified only through the construction observers put upon them, while having no underlying cognitive unity at all. It may also turn out

that in some domains, some variant of what might be described as divergent thinking is important, whereas in others, there is no significant variable that looks like divergent thinking. These are questions for future research to determine. But because of what could be called the dogma of domain generality—the untested and unproven assumption that there must be a large-scale unifying theory of creativity, an assumption that domain generality promotes—divergent thinking has been too readily accepted as a domain-general theory of creativity. If something is observed to influence creativity in one domain, then this dogma of domain generality has often misled researchers to assume it must influence creativity more generally (Baer, 2012c).

It is precisely this assumption that has made investigations into possible links between creativity and mental illness so problematic (Baer, 2011). Observations that the incidence of mental illness was higher among creative people go back almost a century (Ellis, 1926), but subsequent research has suggested that creative people tend to have both higher and lower rates of mental illness than their less accomplished counterparts. This has of course led to disputes about the interpretation of these discordant data sets (Simonton, 2010). The problem, however, seems to be the domain-general assumption lurking behind the questions that have been asked. In some fields (e.g., the arts), there is a positive correlation between creativity and mental illness, whereas creators in some other domains (e.g., the sciences) show no mental illness–creativity connection. And even within larger domains (like the arts) where the evidence seems to suggest a connection, there may be significant micro-domain differences (Kaufman, 2001a, 2001b; Kaufman & Baer, 2002).

> The rate and intensity of adulthood symptoms vary according to the particular domains in which creative genius is expressed ··· geniuses in the natural sciences tend to be more mentally healthy than in the social sciences; geniuses in the social sciences, more so than those in the humanities; and geniuses in the humanities, more so than those in the arts.
>
> *(Simonton, 2010, pp. 226–228)*

Because researchers assumed domain generality, they assumed what was true in one domain was probably true in all domains. The search for large-scale, domain-general answers misled researchers, who were able to make real progress only by discarding this false assumption and seeking more domain-specific theories.

Many other ideas that seem at first blush to be domain-general will, if examined closely, be seen as just the opposite—very domain-specific. Attitudes such as openness to new ideas, fondness for playing with ideas, and willingness avoiding premature closure may be useful in many domains (although in just which domains such attitudes are important is a mostly unanswered, perhaps because generally unasked, question). But these are not attitudes that people have universally. One might be extremely open to new ideas in either cosmology or cosmetology, but have no interest in new ideas in the other. One's openness to new ideas in the area of sculpture is unlikely to have much relationship with one's openness to new ideas in medicine,

astrology, personal relationships, cooking, or theology. Such seemingly domain-general attributes are, in fact, extremely domain-specific. And although it may be true that openness to new ideas (or fondness for playing with ideas, or willingness avoiding premature closure) may contribute to creative performance in some, even many domains, the extent that this is true in almost any given domain is an open question. It is not even that clear what these things mean in different domains: Does this mean openness to *any* new idea, or only to certain kinds of ideas? What kinds?

Some higher level concepts seem to describe things that have an essential unity, a unity that would exist even if there were no concepts to describe it. Electromagnetic radiation existed before anyone could describe it as such or understand how different kinds of light, radio waves, X-rays etc. share a fundamental similarity. Other concepts, like the liberal arts, formal attire, books with purple book jackets, or words with seven letters may be more artificial; although some such concepts or groupings may be quite useful, they do not "carve nature at its joints," as Plato's *Phaedrus* suggested successful theories should do.

Categories can be useful even when they do not represent natural divisions in the world, but we should be careful when assuming that just because a category or concept that we have described seems useful to us that it must therefore have some fundamental essence and would exist even if we did not find it convenient to give it a name. It is sometimes useful to group together beautiful artifacts, fascinating ideas, brilliant designs, and ingenious theories and call them all creative, but that does not mean that they share any underlying unity. The same must be said for the cognitive processes that produce beautiful artifacts, fascinating ideas, brilliant designs, and ingenious theories. We can term them all creative thought processes, just as we can describe the people who think these diverse wonderful thoughts and do these diverse wonderful things as creative, but that does not mean that they actually share anything more than the common label we have attached to them all. They may have no more underlying unity than does a collection of books that all have purple book jackets. What unity there is in the concept of creativity may be solely in the eye of the beholder and not at all in the beheld, whether the latter is artifacts, cognitive processes, personality attributes, or people. The term "creativity" can be a very convenient term for collecting many interesting artifacts, processes, attributes, and people into a single category and yet have no psychological validity or theoretical import whatsoever.

Domain-specific theories of creativity limit the range of creations and creative processes that are presumed to have some underlying unity. This theoretical modesty gives them much more likelihood of actually describing something real. Consider this analogy: The category "science" is a convenient one in many ways, but it is at too high a level of abstraction—or is too much of a collection of essentially unlike parts, the similarity of which is mostly artificial—to allow any single theory to encompass all of its disciplines. Scientific theories of molecular biology or plasma physics can tell us a great deal, but scientific theories of science as a whole can tell us very little. We might find creativity to be a similarly convenient category for some purposes, but not one that is amenable to domain-general or grand theories or useful in any kind of serious

theory-building. We may have to settle for many modest domain-specific theories of creativity if we want theories that actually have real explanatory or predictive power.

The premature assumption that a grand unifying theory *must* exist can (and often does) mislead us and misdirect our research energies. Some fields, like physics, may support grand unifying theories, and other, such as creativity, may not. As philosopher of science Godfrey-Smith (2003, p. 98) has argued, "we should treat theoretical physics as a special case and *not* as a model for all science." An unproven but widely accepted assumption that such large-scale theories must be possible in creativity theory can very easily turn into dogma that limits our thinking. For this reason, creativity researchers and theorists would be wise to assume domain specificity unless research evidence from many different domains can be shown to point in a single consistent direction. This means that rather than search for domain-transcending grand theories of creativity, researchers and theorists would be wise to focus on more limited, domain-specific theories that attempt to explain how creativity works in different domains.[2]

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[2] Two excellent recent examples of this are Dean Simonton's studies of creativity in movies (2011) and psychology (2002).

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