Domains of Creativity

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Glossary

Divergent thinking A kind of thinking often associated with creativity which involves the generation of varied, original, or unusual ideas in response to an open-ended question or task.
Domain The set of representations that underlie and support thinking in a specific area of knowledge; also, any specific area of knowledge, such as art, literature, history, or astronomy.
Domain specificity A theory that argues that the skills, traits, or knowledge that underlie creative performance in a given domain are largely unrelated to the skills, traits, or knowledge that underlie or creative performance in other domains.

General intelligence, a general factor that governs performance on all cognitive task. IQ tests are designed to measure g.
Microdomain A subset within a larger domain, such as the microdomain of poetry within the larger linguistic domain.
Modularity A theory of domain specificity that claims there can be no exchange of representations among different domains – that information is encapsulated within its given domain.
Task specificity A theory that argues that the skills, traits, or knowledge that underlie creative performance in different microdomains within the same more general domain are different and largely unrelated.

Introduction

Single-factor theories of creativity, like single-factor theories of intelligence, are very appealing because they allow one to paint the full picture of creativity – or at least a large part of it – with a single brushstroke. If creativity were a general trait or a single set of cognitive skills that influenced creative performance of all kinds, it would be much easier to understand, train, and test creativity.

Although single-factor theories of creativity have been popular for many years and continue to dominate creativity assessment, there is growing evidence that they may not explain creative performance across a wide variety of content domains as well as more narrowly defined, domain-specific theories and assessment techniques. In fact, there is considerable evidence suggesting that the skills underlying creative performance are not even so general as to span the many tasks that make up such common content areas as the verbal, mathematical, or artistic domains. This task specific (or microdomain specific) view of creativity argues that the skills that lead to creativity on one task in a broadly defined domain of knowledge, such as writing, are not the same (and show little overlap with) the skills that lead to creativity in another task within the same writing domain. Thus, for example, poetry-writing and story-writing creativity may not rely on the same set of cognitive skills, and creativity in writing plays might call on yet a third distinct set of creativity-relevant writing skills.

Such a fragmented approach to creativity, in which every domain (or even every narrowly defined task within a domain) relies on its own unique underlying set of traits or skills, is naturally less satisfying than a grand, all-encompassing theory of creativity. The most widely held general view of creativity, which posits divergent thinking to be a general, domain-transcending skill applicable in all areas of creative endeavor, has been popular in creativity theory, training, and testing for many years, and despite doubts raised regarding the possible validity of any general theory of creativity by new research suggesting that creativity must be domain specific, divergent thinking theory continues to be used widely both in education and psychology.

After outlining the evidence for domains of creativity and current understandings of domain specificity and domain generality, this article will conclude by examining the implications of domain specificity of creativity for creativity theory, testing, and training. It will also consider theories that bridge generality and specificity and discuss how a newly emerging metatheory of creativity that is rooted in a modified divergent thinking theory and that incorporates a domain specific view of creative-thinking skills can replace earlier general theories as a unifying idea in creativity theory, training, and testing.

Domains and Domain Specificity

The concept of a domain as a set of representations or understandings underlying comprehension of a specific area of knowledge and performance of the tasks associated with that domain is, at the conceptual level, a fairly clear one. Applying this definition in a way that demarcates domain boundaries can be a much more contentious exercise, however.

In 1983 Howard Gardner published Frames of Mind: The Theory of Multiple Intelligences, and the domains (or, as Gardner termed them, ‘intelligences’) that he described have become familiar to many readers and are especially influential in the field of education. Gardner has distinguished the following intelligences:

- linguistic intelligence (abilities having to do with understanding and using the sounds, rhythms, and meanings of words and the functions of language);
• musical intelligence (abilities having to do with understanding and employing rhythm, pitch, timbre, and musical expressiveness);
• logical-mathematical intelligence (abilities having to do with finding logical and numerical patterns and producing chains of reasoning);
• spatial intelligence (abilities having to do with understanding the visual–spatial world and transformations within that world);
• bodily-kinesthetic intelligence (abilities having to do with control of one’s body movements);
• interpersonal intelligence (abilities having to do with understanding and responding appropriately to the feelings, moods, and motivations of others);
• intrapersonal intelligence (abilities having to do with understanding one’s own feelings, moods, and motivations, with assessing accurately one’s own strengths and weaknesses, and with drawing upon such knowledge to guide one’s behavior);
• naturalist intelligence (abilities having to do with recognizing, categorizing, and drawing inferences about features of the environment; this intelligence was added later and was not part of the original list of seven intelligences).

Gardner’s classification is based on such evidence as: (a) the effects of brain trauma, such as strokes, that influence functioning in one domain but not others; (b) the existence of prodigies and autistic savants who show extreme abilities in one domain but not others; (c) psychometric evidence that suggests consistency among the skills that lie within a given domain and independence between the skills that fall in different domains; and (d) the existence of a set of core information-processing operations that can deal with specific kinds of input.

Gardner’s eight intelligences are not the only way that domains have been conceptualized, but they will suffice as an illustration of the idea of broadly defined cognitive domains. The term domain is often also used to refer to general fields of knowledge or ways of knowing without specifying clear-cut boundaries between domains, and the breadth of what may be properly called a domain is in most instances not precisely defined. For example, a child’s understanding of gravity may be viewed as a different domain of knowledge than her understanding of object permanence, number, animacy, and so on. It is also possible to lump many such understandings together as a single larger and more inclusive domain (in which case, e.g., a child’s understanding of gravity and her understanding of object permanence, number, animacy, etc., might be thought of as all falling within the domain of early mathematical and scientific concepts). Overall, as the idea that development is domain specific has increased in popularity among psychologists, the number of such domains has also tended to increase, and the breadth of the hypothesized domains has tended to shrink.

Some writers use the term microdomain to refer to subsets of skills that seem to go together and yet have somewhat separate developmental histories. The use of pronouns, for example, can be considered a microdomain within the larger linguistic domain, and counting skills can be thought of as a microdomain within the larger mathematical domain. There are not clear guidelines for demarcating domains and microdomains, and usages often overlap.

An important area of disagreement among those who argue for the significance of distinct domains of knowledge is the possibility of interaction among the skills and knowledge that make up the various cognitive domains. Some theorists argue for strict modularity; under such an interpretation, each information-processing module is encapsulated and cannot make use of representations from other modules. One oft-cited example of such an encapsulated module is the perceptual system, which is at least relatively immune from input from other modules (and thus one’s beliefs or preferences cannot interfere, or can interfere at most only slightly, with what one sees or hears – and the fact that one does not want or expect to see an elephant in one’s living room will in no way interfere with actually seeing or hearing an elephant if one should appear there!). Strict modularity is an extreme version of domain specificity, but modularity and information encapsulation are not essential features of theories of domain specificity.

Evidence for Domains of Creativity

Any evidence that there are different cognitive domains, even when that evidence is collected with an indifference to creative performance, is indirect evidence that creativity is domain specific. This is true for the simple reason that creative performance must occur in some content domain; and if the basic cognitive skills underlying performance in that domain are domain specific, this will necessarily have an impact on creative performance in that domain as well as the performance of more ordinary tasks in the domain (tasks unrelated to creativity).

The larger battle about domain specificity – which includes, for example, disagreements about the degree to which generic intellectual competencies exist and can be tested, as is assumed in standard IQ testing – is beyond the scope of this article. The evidence for domain specificity of creativity goes beyond the assertion that different content domains rely on different basic skills for performance of all kinds, however. Even if there is a significant degree of general intellectual ability (or g, which is what IQ tests purport to measure) that influences performance across many domains, creativity may still be largely domain specific as long as g accounts for less than half the observed differences in performance across domains. Domain specificity in creativity isn’t an argument against general intellectual skills per se. What domain specificity theorists claim is that the skills, traits, and understandings that underlie creative performance – which are conceptualized as a set of skills, traits, and understandings that go beyond those skills needed for successful (but not necessarily creative) performance – vary from domain to domain. Under domain specificity, general intelligence might still influence performance across domains, but creativity-specific skills or traits (such as divergent or associative thinking, resistance to premature closure, openness to experience, or intrinsic motivation) are not domain general skills of the kind that general intelligence (g) is theorized to be.

Arguments for the domain specificity of creativity are based primarily on research into the creativity of actual creative products, such as works of art, and not on the testing of specific intellectual abilities associated with various content domains.
This evidence suggests that levels of creative performance on tasks in one domain are essentially unrelated to levels of creative performance on tasks in other domains, especially once the effects of g (as measured by IQ or similar general aptitude tests) have been statistically removed. This research has even shown that creativity in performing one kind of task within a broad cognitive domain may be unrelated to creativity in performing other tasks within the same domain.

A widely used technique in creativity research is to ask subjects to create something, and then to have groups of experts in that field independently evaluate the creativity of those products. This method is called the consensual assessment technique. It was developed and validated by Teresa Amabile in the early 1980s and has been used widely in creativity research since then. It is based on the idea that no matter what creativity may turn out to be and no matter what theory may someday best explain it, judgments of the creativity of work or products or performances in a given field are most appropriately made by recognized experts in that field. Thus the creativity of poems is best judged by poets and poetry critics, and the creativity of cosmological theories is best judged by cosmologists. Although at the cutting edge of any field and where paradigm-shifting work is likely be the focus there may be many disagreements about the creativity of a particular work or idea, assessments of more garden variety or everyday creativity – the kind of creativity that occurs in most psychological studies of creativity – tend to produce fairly uniform judgments among appropriate experts. Thus by asking a group of artists and art critics to independently evaluate the creativity of a group of collages, or a group of fiction writers and critics to independently evaluate the creativity of a group of stories, a researcher can obtain a reliable and valid measurement of the creativity of a group of creative products.

Several studies using subjects of different ages ranging from kindergarten to adults have shown that when subjects are asked to produce more than one creative product – such as collages, poems, stories, and mathematical puzzles – the creativity ratings of the products of each individual vary significantly. In fact, there is often little or no relationship between the creativity ratings a subject’s various works of different types receive, despite the fact that the level of one’s creative performance on a given task is highly predictive of performance on the same task, even when the second work is produced as much as a year after the first.

It should be noted that this lack of relationship among creativity ratings on different products is not only true across broadly defined domains – such as the linguistic and artistic domains – but also, in at least some cases, within domains. A prime example of such within-domain task specificity is the lack of correlation between poetry- and story-writing creativity that has been observed in several studies.

Approaching the question of domain specificity of creativity from a creativity training perspective, it has also been shown that training in divergent thinking (which is the most common kind of creativity training exercise) can also be targeted to specific domains, or even to specific tasks within domains. For example, divergent thinking training using only poetry-relevant exercises – such as brainstorming words with similar beginning sounds (alliteration) or words that can stand for or represent a given thing or idea (metaphor) – tends to increase poetry-writing creativity far more than story-writing creativity.

An important source of evidence against domain specificity of creativity – evidence favoring domain generality of creativity – comes from studies using self-report scales of creativity. When individuals are asked to rate their creativity across various domains, the levels of creative achievement they report in the various domains tend to be moderately correlated. Critics of this research point out (a) the questionable validity of self-report scales and (b) the response-set bias that may lead individuals to systematically under- or overestimate their own creative activities in all or most domains.

Creativity theorists and researchers are far from unanimous about how best to interpret the available evidence regarding domain specificity of creativity, and although the trend in recent years has favored a more domain-specific approach, this could change depending on the results of future research.

**Common Misunderstandings About Domain Specificity: The Puzzle of Polymaths**

There have always been a few people of exceptional talent who are highly creative in many domains. Some observers focus on the rarity of such polymaths and take this as evidence in favor of domain specificity; others home in on the existence of polymaths, however rare they may be, and take it as evidence for domain generality. Either way, such arguments are misleading. Domain specificity does not predict there will be no polymaths; in fact, it predicts that some such multitalented people should exist. And domain generality theorists can explain their rarity just as easily.

What domain specificity claims is that creativity in one domain does not predict creativity in other domains. It thus claims that correlations between creativity in different domains should, on average, be zero. This means that one should expect some people will have high levels of creativity in many areas and some should demonstrate very low levels of creativity in many areas, not that everyone should be creative in the same number of domains. Some creative painters might also be creative poets, while other creative painters might exhibit no creativity as painters whatsoever. (By way of analogy, think of any two unrelated traits, such as having green eyes and being tall. The fact that a few people with green eyes are also tall does not show these traits are related. When two factors are unconnected, they will appear together in some cases. This is what randomness predicts.) If domain specific creative abilities are randomly distributed, one would expect a few people to be creative in many domains, some people to be creative in several domains, and some others to be creative in few domains or none, based on a normal distribution of unrelated abilities. The existence of a few polymaths does not disprove domain specificity. It is exactly what domain specificity predicts.

For very different reasons, the scarcity of polymaths can be explained by domain generality theorists. If creativity is domain general and a person has enough of it to be highly creative in any domain, then it might seem that one should be creative across the board. Most genius-level creators are not immensely creative outside the one domain in which they show excellence, however. This is probably best explained but what creativity
researchers call the ‘ten year rule,’ which argues that it takes many years of preparation in a field before one can do ground-

breaking work in that domain. If it takes ten years of hard work in a field before one can produce works of genius, it is hardly surprising that few people manage to reach the highest levels of creativity in a variety of fields. There simply isn’t time.

So the presence of creative polymaths tells us nothing about domain specificity, and their rarity tells us nothing about domain generality. In this case, both theories predict well the world as we find it.

### Mixed and Hierarchical Models

Creativity theorists needn’t choose simply between domain generality and domain specificity. There are theories of creativity that incorporate aspects of both positions.

At the most basic level, one can simply posit the existence of both creativity general and domain specific skills and traits. Amabile's componential model, which argues for three factors – creativity general skills and knowledge, domain specific skills and knowledge, and task motivation – does just that.

James Kaufman and John Baer’s APT model is a hierarchical theory of creativity that includes both domain general and domain specific elements. The central idea of a hierarchical model is that there are varying degrees of domain specificity and generality ranging from the most general, such as general intelligence (g), to the most specific (e.g., microdomains or task specificity) There are four levels in the APT hierarchy:

- **Initial Requirements** are completely domain-general factors that influence creative performance to some degree across all domains (e.g., intelligence);
- **General Thematic Areas** are broadly defined fields or areas that include many related domains, such as Artistic/Verbal, Artistic/Visual, and Math/Science. The seven General Thematic Areas that they have identified are shown in **Figure 1**.

![Figure 1](image_url) General thematic areas of the APT model of creativity.

- **Domains** lie within larger General Thematic Areas and refer to more limited ranges of creative activities. For example, in the General Thematic Area of Artistic/Verbal one would find subdomains such as narrative fiction, drama, and poetry.
- **Microdomains** refer to more specific tasks within domains. For example, within the domain of poetry one might find haiku, epic poetry, and sonnets.

A hierarchical model such as the APT provides a bridge connecting domain generality and domain specificity and argues that aspects of both theories should be not only acknowledged but incorporated fully into a complete theory of creativity.

### Conclusions and Implications

If creativity is domain specific, it means that a single theory of creativity – such as the theory that divergent thinking is a basic component of all creative thinking – cannot account for the diversity of creativity across domains. Creativity theories must either become domain specific themselves or find some general approach to dealing with these domain-based differences. Similarly, domain specificity of creativity means that creativity testing as currently practiced is necessarily inadequate and of limited validity. And finally, creativity training programs cannot be assumed to increase creativity across all domains simply because they successfully promote creativity in one domain.

Baer has proposed a divergent thinking metatheory of creativity that, although encompassing all domains of creativity in a single conceptual scheme, nonetheless takes into account the domain specificity of creativity. According to this metatheory, divergent thinking is an important creative thinking skill, but the cognitive mechanisms underlying divergent thinking are different in each domain (or possibly even for each task within a given domain). Thus there are many different divergent thinking skills rather than a single divergent thinking skill. Divergent thinking as a general class of thinking skills is still a useful construct, however, both (a) because it makes this wide range of skills more coherent and easy to conceptualize and (b) because it makes it simpler to postulate and identify the appropriate domain-specific divergent thinking skills that will be important within any given domain or microdomain. Thus in terms of what is happening inside a creative thinker's head, divergent thinking skill may actually be many unrelated, domain specific cognitive skills; but in terms of how psychologists can understand these many diverse skills (viewing divergent thinking from the outside, as it were), divergent thinking is a coherent class of skills that bear a strong family resemblance.

Moving from the implications of domain specificity for creativity theory to its implications for creativity testing, a domain specific understanding of creativity provides a very direct challenge to existing notions of how to test creativity. Simply put, to the extent that creativity is domain specific, creativity testing becomes that much more difficult. If creativity is domain specific, what exactly is one to test? Creativity testers will necessarily have to determine in which domain(s) of creativity they are interested, because under a domain-specific theory of creativity, general creative thinking skill becomes an empty
construct. Tests of creativity in specific content domains – which might use the consensual assessment technique to evaluate the creativity of products, or might instead find simpler (perhaps paper-and-pencil) techniques for assessing domain specific skills – would still be possible in principle, but they could be of only limited range and applicability. Major test developers may not be willing to support extensive test development efforts for tests of such limited potential use.

Creativity training, on the other hand, can accommodate domain specificity of creativity rather easily. Most creativity training programs already use a wide variety of tasks, spread across various content domains, in the exercises they use to improve divergent thinking and other creative thinking skills. Creativity training programs aimed at a particular domain can easily limit their training exercises to ones connected to that domain, while programs aimed at increasing creativity in general – the vast majority of programs – must be careful not to limit their training exercises to just one or a few content domains.

Creativity theory has only recently begun to accommodate research evidence suggesting that creativity is task specific, although the hierarchical approach discussed above is promising. General, domain-transcending theories – if true – would have far greater power than domain specific theories that account only for creativity in a limited content domain. For this reason, and because creativity theories have historically been one-size-fits-all theories, domain general theories of creativity continue to have great appeal.

It should be noted that the research evidence pointing toward domain specificity of creativity is fairly new, and, like the research that preceded it, this research may not tell the whole story. As noted above, self-report scales of creative behavior suggest more generality of creativity than do assessments of the creativity of actual creative products. It is quite possible that both domain specificity and generality are true, each in part and in its own way. More research will be needed to clarify the conditions under which generality or specificity of creativity is the more valid perspective. In the meantime, both views will continue to claim adherents among researchers and theorists.

See also: Consensual Assessment; Divergent Thinking; Intelligence (as Related to Creativity); Multiple Intelligences.

Further Reading