

Theoretical and Interdisciplinary Perspectives

Bridging Generality and Specificity: The Amusement Park Theoretical (APT) Model of Creativity

John Baer
James C. Kaufman

One of the most contentious areas in creativity theory is the question of domain specificity. How we conceptualize creativity — as something that transcends content domains, or as something that varies depending on the domain in question — has important implications for both creativity research and creativity training programs. The Amusement Park Theoretical (APT) model of creativity is the first creativity theory to successfully bridge the gap between these contrasting views of creativity. The APT model uses the metaphor of an amusement park to explore creativity. There are four stages: Initial requirements, general thematic areas, domains, and micro-domains. The first level (initial requirements) is very general, and each subsequent level gets more and more domain-specific. The APT model can provide a powerful framework for creativity assessment, selection of students for gifted education programs, and the development of creativity training programs.

Dr. John Baer is the author of four books, including *Creative Teachers, Creative Students* (Allyn and Bacon) and *Creativity and Divergent Thinking: A Task-Specific Approach* (Erlbaum). He was awarded the Daniel E. Berlyne Award from Division 10 of the American Psychological Association for outstanding research by a junior scholar in 1992 and the College Teaching and Learning Conference's annual Award for Innovative Excellence in Teaching, Learning, and Technology in 1997. E-mail: baer@rider.edu

Dr. James C. Kaufman is the director of the Learning Research Institute and an assistant professor of psychology at California State University at San Bernardino. He is the author or co-editor of six books, including *Creativity Across Domains: Faces of the Muse* with John Baer (Erlbaum, 2004), and he won the 2003 Daniel E. Berlyne Award from Division 10 of the American Psychological Association for outstanding research by a junior scholar. E-mail: jkaufman@csusb.edu

Is Creativity the Same in All Domains?

A recent review of creativity research and theory (Kaufman & Baer, in press-a) noted a number of topics that have captured the sustained attention of scholars in the field, such as divergent thinking, creativity training, creativity assessment, personality traits of creative people, intrinsic motivation, and the difference between genius and more garden-variety creativity. Of all the topics surveyed, however, perhaps none has been more controversial than the question of the domain generality or specificity of creativity. In the only Point-Counterpoint pair of articles in its history, the *Creativity Research Journal* asked two leading proponents of these competing positions to debate the question of domain specificity versus generality (Baer, 1998; Plucker, 1998), and just this year two new books

have been released focusing on this issue (Kaufman & Baer, 2005a; Sternberg, Grigorenko, & Singer, 2004).

The generality-specificity issue goes to the heart of the question of what it means to be creative, challenging even such ideas as whether it can make sense to describe someone as “creative” without reference to specific works or domains (Kaufman & Baer, 2004a). Everyone acknowledges that to be creative one must do something in a particular domain – creativity can’t be entirely free-floating and abstract, but must touch down and embrace some content. Yet the use of the single word “creativity” to encompass so many diverse kinds of things suggests a common element, something that links all creative endeavors. Is this true? Are there cognitive processes, skills, personality traits, work habits, sources of motivation, or thinking styles that all creative sculptors, creative chefs, and creative chemists necessarily share? Is creativity one thing, or is it many things? Is creativity a general ability? Or is it domain-specific?

These questions have obvious implications for creativity research, theory, and assessment, but how (or even if) the generality-creativity debate should impact educational practices is less clear. Plucker (1998, 2005; Plucker & Beghetto, 2004), for example, has argued for a hybrid position and written that, in terms of its educational implications, “the distinction between general and specific approaches does not matter” (Plucker & Beghetto, 2004, p. 162). Despite discounting the importance of this distinction, however, he nonetheless applauds Renzulli’s (1994) schoolwide enrichment model precisely because it is able to balance these two competing ideas – “to walk this fine line between generality and specificity” (Plucker & Beghetto, p. 162) – a balance that could be achieved only through an understanding of that very difference. Sternberg (in press) has also questioned the usefulness of the distinction between domain specificity and domain generality in creativity – and in psychological phenomena in general – basing his argument in part on the current lack of clear understanding of the term “domain.”

In contrast, Baer (1996, 1997, 1998) has argued that the generality-specificity distinction matters very much in educational practice. If one chooses creativity training activities based on a domain-general model (in which any choice of content for a creativity training exercise would, according to the generality hypothesis, be equally useful and valid), one might reasonably select only activities in a limited range of domains. In fact, unless one takes pains to avoid it, such a narrow selection is highly likely, because it is much easier to design creativity training activities in some domains than others (which is perhaps why so many divergent-thinking exercises begin with the words “Think of many different uses for a . . .”). If domain generality were true, then creativity would be enhanced equally across all domains, even if all the exercises came from a single

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domain. But if creativity is in fact domain specific, then such a choice of creativity training exercises would result only in increased creativity in the domains chosen for training exercises, with little or no impact on creativity in other domains. Therefore, if domain specificity plays a significant role in creativity, then it matters greatly for creativity training.

Differences of opinion remain, and evidence continues to be gathered and debated. But certainly some kind of middle ground must be possible. Even those who argue for the existence of domain-general creative-thinking skills recognize that domain-specific thinking skills also play an important role in creative thinking (e.g., Amabile, 1996; Anderson, Reder, & Simon, 1996; Conti, Coon, & Amabile, 1996), and domain theorists acknowledge that there are some general skills that play a role in all creative endeavors (e.g., Baer, 1993; Feist, 2004). Plucker, who has argued for domain generality in the past (1998), now proposes a hybrid approach (in press; Plucker & Beghetto, 2004) to both creativity theory and creativity training.

Creativity Theory in Gifted Education

Finding the right conceptualization of creativity matters in gifted education because developing students' potential as creative thinkers is (or should be) one of the most important goals of education. And a wide variety of creativity training programs do exist, including many aimed specifically at gifted students (e.g., Daniels, Heath, & Enns, 1985; Glover, 1980; Kay, 1998; Micklus, 1982, 1984, 1986; Noller & Parnes, 1972; Noller, Parnes, & Biondi, 1976; Osborn, 1953; Parnes, 1972; Parnes & Noller, 1972, 1973; Renzulli, 1994). Although these programs vary greatly, one common feature in most of these programs is some kind of training in techniques to promote divergent thinking, an idea rooted in the ground-breaking work of Guilford and his colleagues (Guilford, 1956; Christenson, Guilford, & Wilson, 1957; Wilson, Guilford, Christensen, & Lewis, 1954). Many writers also emphasize the importance of training in critical and/or evaluative thinking in creativity training (e.g., Baer, 1993, 2003; Fasko, 2001; Nickerson, 1999; Treffinger, 1995).

However they balance the competing demands of divergent and evaluative thinking, most creativity training programs tend to assume (either implicitly or explicitly) that creativity is a general skill or set of skills that can be applied in any domain to help solve any problem more creatively. If this were the case, all creativity training would improve creative thinking in all areas to an equal degree. Much research suggests this may not be the case, however (Baer, 1993, 1998; Lubart & Guignard, 2004; Nickerson, 1999; Weisberg, 1999). In fact, there is evidence suggesting that creativity training on a specific task may not even transfer to different tasks in the same domain. For example, Baer (1996) taught middle school students divergent-thinking skills related to poetry writing, and when these students were later asked to write poems, their poems were significantly more creative than those in a control group. The same students also wrote short stories, but in this case the students trained in poetry-relevant divergent-thinking skills were no more creative than the control group students.

Acknowledging the need for a middle ground regarding generality-specificity and advocating a hybrid approach to designing training programs are important first steps (Amabile, 1996; Lubart & Guignard, 2004; Plucker & Beghetto, 2004). But recognition of the problem is not enough. Creativity training programs need a theory of creativity that

goes further than simply saying, "Creativity is partly domain general and partly domain specific." For example, if the goal of a creativity training program is narrowly focused (e.g., to increase poetry-writing creativity) then one kind of training might be appropriate, whereas if the goal is broad (e.g., to increase engineering creativity), then another kind of program might work better. If the goal is to improve creative thinking across a number of domains, then entirely different kinds of creativity training exercises might be most effective. To decide what kinds of creativity training might best meet the needs of a particular gifted education program, one needs a theory of creativity that accounts for both domain-specific creative-thinking skills and more general kinds of creative-thinking skills.

Despite the need for a theory that encompasses both the domain-general and domain-specific aspects of creativity and the growing recognition on all sides that the truth lies somewhere between the two extreme positions, no theory or model of creativity has successfully bridged the gap between these differing views of creativity. It was to fill that gap that we developed the Amusement Park Theoretical (APT) model of creativity. The development of the APT model was based on a review of creativity research across a broad spectrum of performance domains, and it brings together domain-general and domain-specific components of creativity in a way that demonstrates how those factors overlap to varying degrees in a kind of nested hierarchy (Baer & Kaufman, 2005; Kaufman & Baer, in press-b, 2005b). We hope this model will help further our understanding of creativity and be of practical value in the conceptualization and design of creativity research, creativity assessment tools, and creativity training programs.

A note about definitions: Although the word "creativity" has been used to mean many different things, in recent years definitions of creativity seem to be cohering around an emphasis on two main requirements – novelty and appropriateness (see, e.g., Amabile, 1996; Baer, 1993; Sternberg & Lubart, 1999). Plucker, Beghetto, and Dow (2004) define creativity as "the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context" (p. 90). We think this is a useful working definition of creativity that highlights key aspects of the concept without being unduly restrictive.

The Amusement Park Theoretical (APT) Model of Creativity

The APT model uses the metaphor of an amusement park to explore creativity. First there are *initial requirements* (intelligence, motivation, and environment) that must be present at some level for all creative work – much as you need certain basic requirements in order to go to an amusement park (e.g., transportation, a ticket). Next, there are *general thematic areas* in which someone could be creative (e.g., the arts, science); this level is the equivalent of deciding which type of amusement park to visit (e.g., a water park or a zoo). The next level focuses on more specific *domains* – within the general thematic area of "the arts," for example, could be such varied domains as dance, music, art, and so forth. Similarly, once you have selected the type of amusement park you want to visit, you must then choose a particular park. Finally, once you have settled on a domain, there are *micro-domains* that represent specific tasks associated with each domain – much as there are many individual rides to select from once you are at an amusement park.

This model attempts to integrate both domain-general and domain-specific views of creativity. The first level (initial requirements) is very general, and each subsequent level gets more and more domain-specific. By the final level (micro-domains), the theory is very domain-specific.

Initial Requirements

Initial requirements are things that are necessary, but not by themselves sufficient, for any type of creative production. They include such things as intelligence, motivation, and suitable environments. Each of these factors is a prerequisite to creative achievement in any domain, and if someone lacks the requisite level of any of these initial requirements, then creative performance is at best unlikely. (There are some exceptions, of course, as in the rare autistic children who create celebrated paintings; see, e.g., Buck, Kardeman, & Goldstein, 1985.) Higher levels of these initial requirements are, in combination with other more domain-specific factors, predictive of higher levels of creative performance in general. It must be noted that although all of these initial requirements are necessary for creativity in any domain, the specific degrees of intelligence, motivation, and suitable environments needed to succeed in different areas of creative endeavor vary (just as the height requirements found at different rides may vary depending on the nature of the ride). As an example of this, intelligence is an important contributor to creative performance in all domains, but it is much more highly correlated with creativity in certain domains than others. Let us explain what we mean by intelligence, motivation, and suitable environments.

Intelligence: Some basic level of cognitive ability is needed to be creative. Most research in this area has found a consistent but modest correlation between creativity and intelligence test scores that extends to about a 120 IQ (Getzels & Jackson, 1962; Renzulli, 1986; Sternberg & O'Hara, 1999; Winner, 1996). Once a person's IQ reaches approximately 120, the chances are small that any further advances in IQ will increase creativity. It most likely will not hurt and may help. But in extreme cases, Simonton (1994) hypothesized, a very high-IQ individual may not be able to communicate his or her ideas (creative or otherwise) in an effective manner to other people. Indeed, Hollingworth (1942) found several instances of this inability of high-IQ individuals to function well in their environment. This lack of communication may result in their ideas never being implemented, regardless of how brilliant those ideas may be. But this is clearly the exception. In general, there is a positive correlation between IQ scores and creative performance in virtually all domains. (We should note that in speaking of intelligence it is not our intention to endorse any specific model of intelligence. A great deal of research is currently underway investigating complex models of intelligence, and we eagerly await the results of that work.)

Motivation: It is important to note at the outset that when we say "motivation" in this particular context, we are *not* referring to the distinction between intrinsic and extrinsic motivation, but rather to the simple necessity of being highly motivated one way or another. If someone is not motivated to do something — *anything* — for any reason, then that person will not create anything in the first place. A writer who never translates his or her ideas into words at the keyboard is not going to be a creative writer.

Motivation represents a much different construct from intelligence. Unlike intelligence, motivation can change (and does change) greatly from day to day (even from moment to

moment) and also from task to task. When we speak of motivation as an initial requirement, we mean motivation in the most general sense. One must first have the desire to do *something*, regardless of what that something may be. Someone who lies on the couch all day and does not have the motivation to do anything will not be creative. In contrast, someone who burns with a desire to make a contribution or to do something interesting and original is much more likely to be creative, if for no other reason than the fact that those who produce the most outstanding works also tend to be the most prolific. Quality turns out to be (with surprisingly accurate predictive ability) a probabilistic consequence of quantity (Davis, 1987; Platz, 1965; Platz & Blakelock, 1960; Simonton, 1985, 2003a, 2003b, 2004, in press; White & White, 1978). Thus motivation, by leading to an increase in productivity, is likely also to lead to higher levels of creative success.

It should be noted that we are speaking here of motivation in a most general way. Motivation is a complex phenomenon, and may result from both positive and negative (and even abusive) experiences that interact within the individual to produce very unique constellations of interests and drives. People have motivations to excel, to be original, to perform, and simply to be creative that exist apart from specific interests in a given domain. They also have very domain-specific (or even micro-domain-specific) motivations that do not generalize to other kinds of tasks (as, for example, someone who is highly motivated to compose music but not at all motivated to write short stories, or a person who is interested in writing short stories but not in writing poetry). Motivation thus plays a role both at the initial requirements level and also at more domain-specific levels of the APT model.

Environment: Environments are important in both the past and present tenses. A person who grows up in a culture or in a family in which creative thoughts or actions are not encouraged (or are even punished) will have a harder time being creative. Similarly, a person living or working in an environment that is supportive of original thought is more likely to be creative than a person in an environment that discourages such thought. Being creative is a very different thing to a woman living in Saudi Arabia or Pakistan as compared to a woman living in England or Portugal. And no matter what the country, a child growing up in an abusive household may have a more difficult time expressing novel ideas than may a child growing up in a nurturing family.

As with motivation, we are referring to environment here in a very general way. There are also more specific environmental influences to be found at other levels of the model, such as a family that invites study or inquiry in one area (e.g., music) but not in another (e.g., engineering), or an environment that contains the tools and materials necessary to one kind of creativity but not another (e.g., if one has an abundance of sports equipment but no musical instruments, one's environment is more conducive to athletic creativity than to musical creativity).

General Thematic Areas

Once you have decided to go to an amusement park, you must decide what kind of go you wish to visit. Maybe you are in the mood to go to a water park and splash around. Or perhaps you are feeling more daring and want to ride scary roller coasters that plunge you down rapidly. Maybe you want to see animals or fish, or you want to visit a theme park centered on a cartoon character.

Similarly, every field of creative endeavor is part of a large general thematic area, all of whose component fields share an underlying unity. How many general thematic areas are there? We recently asked 117 college students in an educational psychology course to rate their creativity in nine areas – science, interpersonal relationships, writing, art, interpersonal communication, solving personal problems, mathematics, crafts, and bodily/physical movement (Kaufman & Baer, 2004b). A factor analysis of their responses for the nine domains yielded three factors: Creativity in Empathy/Communication (creativity in the areas of interpersonal relationships, communication, solving personal problems, and writing); “Hands On” Creativity (art, crafts, and bodily/physical creativity); and Math/Science Creativity (creativity in math or science). We find it interesting that these map rather closely to the three factors that Amabile (1989, as cited in Ruscio, Whitney, & Amabile, 1998) found for student motivation: writing, art, and problem solving (and these also bear an interesting similarity to verbal, spatial, and quantitative abilities, a possible connection we are exploring in research now underway). Provided that an individual has the requisite levels of intelligence and motivation and is in a suitable environment – that he or she has met the initial requirements for any kind of creative activity – then we need next to consider in which of these general thematic areas that person is engaged to see if he or she has the necessary skills and traits associated with creativity in that arena.

Some basic differences have emerged at the level of general thematic areas. For example, some skills – such as math or verbal skills – are essential for creative performance in one general thematic area, but not in another. Emotional intelligence, although it may be of some use in all three general thematic areas, may play a larger role in creativity in the area of empathy/communication than in the math/science area.

Further research needs to be conducted to define more clearly the general thematic areas. A similar study of Turkish undergraduates found a slightly different factor structure, with an Arts factor (art, writing, crafts), an Empathy/Communication factor (interpersonal relationships, communication, solving personal problems), and a math/science factor (math, science). Bodily/kinesthetic did not load significantly on any factor (Oral, Kaufman, & Agars, 2004).

It is important to note that our general thematic areas are similar in nature to what some people call domains (Feist, 2004) or intelligences (Gardner, 1999). Feist’s proposed seven domains of mind (psychology, physics, biology, linguistics, math, art, and music) and Gardner’s eight intelligences (interpersonal, intrapersonal, spatial, natural history, language, logical-mathematical, bodily-kinesthetic, and musical) are both consistent with the types of categorizations we eventually anticipate will be derived from future empirical work.

Domains

Once you have decided on a type of amusement park to visit, there are still many more decisions left. Even within one genre, there are many different parks to choose from. (If you want roller coasters, do you choose Six Flags or Disneyland?). Similarly, within each of the general thematic areas are several more narrowly defined creativity domains. The domain you choose at this point may well have its own specific profile – within the domain of the Arts, for example, might be poetry, sculpture, painting, music, journalism, and several others.

Let’s compare, for example, a creative poet and a creative journalist. Both would fall in the general thematic area of empathy/communication (or, following Feist [2004] or Gardner [1999], linguistics or language). Indeed, there will likely be many similarities between the two writers (e.g., both are likely to have strong verbal abilities). However, early research has shown differences in practitioners of these closely related fields (Kaufman, 2002a).

Journalists and poets differ across a wide variety of ways – starting with the finding that journalists and other nonfiction writers outlive poets by approximately 6 years (Kaufman, 2003). Many other differences are less readily apparent – journalists, for example, have been found to have different thinking styles than poets (Kaufman, 2002b). A journalist may lean toward a more Executive thinking style (in which one prefers to follow directions, to carry out orders, and to work under a great deal of structure; see Sternberg, 1997) or a more Paradigmatic thinking style (in which one prefers to think in a more logical or scientific manner; see Bruner, 1986). In contrast, a poet may tend to think in a more Legislative thinking style (in which one prefers to create things and to be self-directed; see Sternberg) or a more Narrative thinking style (in which one prefers to think of possibilities and what “may be”; see Bruner).

The *type* of motivation is more important at this level – perhaps the poet does his or her most creative writing when working with an intrinsic motivation, whereas the journalist may put forward his or her best and most creative work under a deadline (or perhaps when angling for a front-page story). One’s motivation to write may be quite strong for one kind of writing but at the same time weak for another.

Knowledge plays a large role at the domain level. For example, although psychology and sociology and criminal justice and political science all may require many skills in the general thematic area of empathy/communication, the knowledge bases for these four social science subjects are strikingly different, with only modest overlap, as are the knowledge bases that are foundational for work in the life sciences, chemistry, and physics, even though all will require skill in the math/science general thematic area.

Some personality traits may also be particularly useful in some domains. For example, conscientiousness (a mix of organization, persistence, accuracy, discipline, and integrity; see Kyllonen, Walters, & Kaufman, 2002) may be vitally important for scientists but of negligible importance (or possibly even harmful) for those in other fields (e.g., conscientiousness may not correlate positively with artistic creativity; see Dudek, Berneche, Berube, & Royer, 1991 and Walker, Koestner, & Hum, 1995). Similarly, some traits may prove to be related to creative performance in one domain in only a minor way, but at the same time be overwhelmingly important in another (i.e., although openness to experience is of some importance for mathematicians, it is *essential* for artists; see Feist, 1999). Environment and opportunity are also components here. As an example, some creative acts require a particular *kind* of nurturing background. A child who wants to play the violin (or take up horseback riding) may be out of luck if his or her family cannot afford lessons. If that child’s sibling has an interest in poetry – which requires less of a financial investment to get started – then poverty may be less of an obstacle for him or her. And if one is working for Exxon, the working environment may be more conducive to creativity in the domain of geology than in the domain of pure math.

Micro-Domains

Imagine that you have gone to a zoo, such as the world-famous San Diego Zoo. All the activities at the San Diego Zoo involve animals, but they still vary greatly. Similarly, although there are many commonalities among all the tasks that are part of a domain, there are still big differences in what one needs to know, and what one needs to know how to do, in order to be creative when undertaking different tasks in that domain.

It's rather like the transition from undergraduate to graduate education. As an example, everyone in a graduate program in psychology may be preparing for a career as a psychologist, but future clinical psychologists, social psychologists, and cognitive psychologists likely take very few of the same courses. Similarly, studying fruit flies intensively for 5 years may help one develop creative theories in one of biology's micro-domains but be of little use in another, and practicing on a 12-string guitar may help one perform creatively in some micro-domains of the music world but not others.

Application of the APT Model in Creativity Training in Gifted Education

We'd like to suggest just a few ways gifted education programs might use the ideas presented through this model. In selection of students for a gifted program, one might consider initial requirements such as intelligence or motivation, regardless of the nature of the program; but then, depending on the goals of the program and the activities that will be available to selected students, one might move down the hierarchy to make sure there is a good match between student and program. For example, if a gifted program's focus is in the general thematic area of math/science, then evidence of general intelligence and motivation (initial requirements) combined with evidence of skill and/or creativity in math and science (a general thematic area) would be highly useful predictors of success in the program (but similar evidence of skill and/or creativity in the areas of communication or art would be largely irrelevant, and measures of such skills would be inappropriate predictors of success in a math/science gifted program). If the focus of a program is only one domain within a general thematic area (e.g., the domain of physics, which is in the math/science general thematic area), then relying on assessments of overall abilities in the appropriate general thematic area (in this case, math/science) would be insufficient. Performance measures of creativity in the domain in question might be required in such a case (using, perhaps, the consensual assessment technique to judge creative products in the domain; see Amabile, 1982, 1996, and Baer, Kaufman, & Gentile, 2004). If, on the other hand, a program's goal was to enhance creativity in several domains without requiring particular skill or creativity in any one area, then nothing beyond assessments of initial requirements like intelligence and motivation would be necessary as screening devices.

Decisions regarding the choice of activities would generally follow a similar kind of logic. Interdisciplinary or transdisciplinary units, for example, might be more appropriate in gifted education programs with a wide focus, while domain- or discipline-based activities might better suit a program whose students have been selected based on abilities and interests in a specific area of creative performance (e.g., a gifted education program in dance, or advanced physics, or poetry). The APT model can therefore also be useful in designing

appropriate activities for a given gifted education program, based on the goals of the program and the nature of the students in the program.

Most gifted education programs have the goal of encouraging creativity and provide some kind of creativity training as part of their offerings. If the objective is to help nurture students' creativity in a wide variety of domains – that is, if the program is not specialized to one domain or one thematic area – then activities should draw on diverse domains in different thematic areas. The APT model can help program developers avoid the all-too-common mistake of focusing on one area to the exclusion of others. Creativity matters not only in (say) the arts, and a gifted education program whose creativity-relevant activities are *all* art activities is not a balanced program. If, of course, the goal is to develop creativity in one or a few limited areas, then the activities will come primarily from those domains (or, for a program with a somewhat more general focus, from a single general thematic area). Aligning activities with the APT model's general thematic areas will give a first-order picture of the kinds of creativity the program is likely to develop. Going down a step in the hierarchy to see which specific domains are being featured in a gifted education program can further sharpen a program's focus.

Future Development of the APT Model

We are currently collecting data that will allow us to fill in the many holes in the APT model. As presented here, one can understand the structure of the model, but many of the detailed pieces of the model are missing. Based on the factor analytic work in which we are now engaged, we expect to be able to map out in more detail the various levels of the model in the not-too-distant future. We then plan to develop measures of creativity and of interest in engaging in creativity-relevant activities that will match the elements of the model. These should be helpful to gifted educators in guiding both the selection of students for gifted education programs and the design of programs appropriate for different kinds of students. Much work remains to be done, but we hope that even as an in-progress theory, the APT model can be a useful way to conceptualize creativity and to assist in the design of gifted education programs.

We also recognize that the hierarchy that makes up the APT model is not all-inclusive, but we hope that it is *mostly* inclusive – enough that it can provide a broad conceptual framework that will help us better understand creative abilities and guide future research into their nature. We also recognize that the distinctions between levels are somewhat fuzzy, and know that even as the theory is fleshed out these boundaries will in all likelihood remain somewhat fuzzy. A comparison to stage theories in developmental psychology is helpful here. Stage theories tend to describe development in ways that suggest greater discontinuities than we actually observe in child development, in order that we might see patterns in what is otherwise an undifferentiated collection of discrete observations. In a similar way, we hope that the APT model will allow creativity researchers a clearer vision of the skills, traits, and attributes necessary for creative performance in diverse fields. We also hope it will provide those who design and deliver creativity training programs for gifted students a more solid conceptual framework within which to evaluate different kinds of creativity training activities and to match them to the particular needs of the students and goals of the program.

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