CHAPTER 2

Theories of Creativity

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Introduction: Moderation and Pluralism in Considering Theories of Creativity

The claim usually worded "moderation in all things" applies to many aspects of creativity. For instance, autonomy is good for creativity and its development, but too much autonomy, and there may be no direction, no focus (Albert & Runco, 1988). The same can be said about competition, challenges, constraints, attention, experience, and many other potential influences on creativity (Runco, 2001; Runco & Sakamoto, 1996). Moderation is also applicable to creative behavior. For example, creative ideas often result from divergent thinking, but too much divergence leads to irrelevant ideas that are not creative in the sense of being both original and useful. Moderation also plays a role in the tactic usually summarized as "shift your perspective," which can contribute to original insights. Changes in perspective can be useful, but not if they are so extreme that ideas and solutions have no connection to the problem at hand.

The notion of shifting one's perspective can also extend the idea of moderation to a higher level - that of the scientific enterprise, as applied to the study of creativity. To understand creativity in all its richness, there is a need for moderation, where no one theoretical perspective is emphasized at the expense of others. Another way to consider moderation in this context is to emphasize pluralism, whereby a multitude of theoretical perspectives, with different assumptions and methods, and operating at different levels of analysis, all (ideally) contribute to a more robust - if at times, contestable - understanding of human creativity.

This chapter provides a comparative review of major contemporary theories of creativity. The chapter is organized into two major sections. The first section presents a discussion of how the theories will be classified and compared, highlighting key challenges, considerations, and limitations. The second presents an overview of ten categories of contemporary creativity theories, highlighting the underlying assertions, key concepts, major studies, and contemporary exemplars associated with each category. The chapter closes with a brief discussion of future directions and considerations for the future development of theories of creativity.

Section I: Classifying and Comparing Theories

When attempting to review something as diverse and complex as creativity theories, it is helpful to stake out points or elements of comparison. Of course, every classification system has limitations. The choice of comparative elements is open to debate, and the resulting categorizations run the risk of oversimplifying and obscuring some aspects of a theory, while overemphasizing and privileging others. In this chapter, we choose categories and comparative elements to highlight similarities and differences across the diverse array of major creativity theories. We believe that these categories and comparative elements provide a reasonable overview of the theoretical landscape of creativity studies, which researchers can use to guide subsequent inquiry and theory development. In the sections that follow, the classifications and comparative elements used in organizing this chapter are discussed.

Classifying Theory Types and Orientations

Not all creativity theories are alike. This quickly becomes evident when considering the panoply of perspectives on creativity. This variation is partly due to the richness of the topic itself, which encompasses the subjective experience of the moment of a private, minor insight by an ordinary individual as well as the greatest achievements of human genius throughout our history - what might be called "the mind's best work" (Perkins, 1981). The variation is compounded by the fact that creativity involves a multitude of definitions, conceptualizations, domains, disciplines that bear on its study, empirical methods, and levels of analysis, as well as research orientations that are both basic and applied - and applied in varied contexts. When faced with such an array of perspectives, the need for some way to characterize commonalities among creativity theories - while still recognizing important differences - becomes paramount.

We have organized our review across ten major categories of theories: in order, Developmental, Psychometric, Economic, Stage and Componential Process, Cognitive, Problem Solving and Expertise-Based, Problem Finding, Evolutionary, Typological, and Systems. Each category is discussed in the second section of this chapter. Some, but not all, of the theoretical categories have their basis in prior categorization systems (e.g., Runco, 2001a, 2007a) and thus have some precedent in the creativity literature. Still, the categories are not monolithic; in some cases there is as much within-category variation in the type of theories as there is difference between categories. One such area of within-category variation pertains to the orientation - more scientific versus more metaphorical - of representative theories. Although we do not label each theory reviewed in this chapter in this way, we think it important to contrast these two orientations as a way of highlighting their relative strengths and weaknesses. In this way we hope to communicate the benefits and challenges that this aspect of theoretical plurality offers.

We define scientifically oriented theories as having an underlying goal of mapping the empirical reality of creative phenomena. In contrast, more metaphorically oriented theories attempt to provide alternative representations of creative phenomena. We describe theories as having an "orientation" to signal that these two basic types (scientific vs. metaphorical) are not mutually exclusive but endpoints on a unidimensional continuum. Better thought of in terms of two separate dimensions, empirical support and metaphoricity. For instance, metaphorically oriented theories are often undertaken by rigorous empirical study; likewise, more scientifically oriented theories often use metaphors.
in some cases carry more cally oriented theories offer a more specula-
rate map of reality, often with the hope of endeavor to provide an empirically accu­

unabashedly comparison for more metaphorically oriented

all approaches to creativity aim to meet tra­

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ences. Consider the observations of Nobel

models, along the lines of the harder sci­

generating empirically falsifiable hypothe­
ses, and developing formal or computational

common

A scientist will shun an

mon between them. A scientist will shun an

resulting research programs run the risk of

the driving force in a field of study, the

importance differences. Scientifically ori­

theories offer a moderating counterbalance

to the sometimes stark empirical focus of

Said another way, metaphorically oriented

ories, in which researchers find

themselves (inadvertently) shackled to the

observable, failing (or perhaps refusing) to

consider or conjecture beyond that which is

directly observable. The problem with an

extreme empiricist position is perhaps best

captured in T. H. Huxley’s admonition, “those

who refuse to go beyond fact seldom get as

far as fact” (cited in Smythe, 2005, p. 283).

At extreme empiricism becomes the

driving force in a field of study, the

resulting research programs run the risk of

diving into a form of analytically rigorous

journalism (chasing after and documenting

phemonena, in their approach to mapping out

potential, not yet explored possibilities.

Einstein’s breakthrough theoretical work on

special relativity, for instance, would have

been impossible if he had limited himself to

the direct observable.

The promise of metaphorically oriented

theories, then, is that they focus more on

hypothetical or “as if” (Wittgensteinian) and

modes of thinking, which can “provide entry

into imaginative possibilities both for theo­
rizing and for self-understanding in everyday

life” (Smythe, 2005, p. 284). Such theories

can spark new possibilities in thought and

action, help people break free from overly

restrictive and hegemonic beliefs about cre­

ativity, and – in some cases – carry more

ontological traction and deliver more prac­
tical significance than more scientifically ori­

ented frameworks. Of course, this doesn’t

mean that anything goes when it comes to

more metaphorically oriented theories; oth­
erwise they would run the risk of becom­
ing nothing more than wild speculations, never

self-justifications. Metaphorically oriented

theories are of maximal use when they bal­
ance speculation with agreed-upon methods

of empirical exploration, peer review, and

the postulation of theoretical propositions

that are open to empirical inquiry, elabo­
ration, and refinement.

In sum, the phenomenon of creativity,

richly considered, involves many nuances and

interpretations; only rather narrow

aspects of creativity are readily under­
standable in terms of empirically falsifiable

hypotheses, with resulting verdicts that sug­
gest either winners or losers. Also, con­
clusions may depend strongly on how terms

are defined; a conclusion that appears true

by one definition of creativity may sim­
ply not apply when another is used. Since

the empirical study of creativity is of fairly

recent origin (Guilford, 1950), it is proba­
ably a healthy viewpoint that theories not

be overly restrictive, lest researchers lose

ight of important issues and potential

connections.

Categories of Creative Magnitude

When comparing theories of creativity, it is also useful to differentiate between

levels of creative magnitude – smaller c (often more subjective) versus Larger C

(more objective) creativity (Csikszentmih­

ly, 1996, 1999, Stein, 1953). This allows us
to consider the scope and focus of theories, what may be missing, and what

methods and measurement practices are most appropriate for
empirically testing and exploring a theory’s central propositions. Beyond being useful,
some creativity researchers have argued that such distinctions are necessary, as they mayallow for a more complete consideration and conceptualization of creativity. Stein (1953),for instance, asserted that the tendency for creative researchers to focus on genius (or Larger C) levels of creativity “causes us to
overlook a necessary distinction between the creative product and the creative experi­ence” (p. 312, italics added).

The creative experience represents the more subjective forms of creativity, possibly

non-eminent examples, where a tangible product, never

undergoing external evaluation, or never traveling beyond an individual’s own personal


Overlooking these subjective creative experiences in favor of objectively evaluated creative products can result in a partial conception of creative phenom­

ena (Stein, 1953), runs the risk of excluding
theoretical consideration of creative potential

(Runco, 2004b, 2007b), and may rein­
force myths and misconceptions about the

nature of creativity (Beghetto, 2007; Plucker, Beghetto, & Dow, 2004).

When comparing theoretical conceptions of creativity, it therefore seems importantand perhaps, as Stein (1953) argued, even “necessary to distinguish between internaland external frames of reference” (p. 312).

Such distinctions allow for a clearer un­
derstanding of the scope, nature, and lim­i­
tations of theories under consideration.

The most common distinction has been the Big C (eminent) / little-c (everyday)
dichotomy. Big-C Creativity refers to unambigu­
ous examples of creative expression (e.g., Dickinson’s poetry, Coltrane’s jazz, Freud’s psychology). In contrast, little-c creativity focuses on every­
day life (Richards, 2007) – experiences and expressions accessible to most anyone, for example, the novel way a home cook includes ingredients in a recipe, which is later praised by family and friends.

As with most dichotomies, however, the Big-C / little-c categories can lack nuance and, somewhat paradoxically, be too inclusiv­
e in some instances and not inclusive enough in others. For instance, compare a non-eminent artist (who makes her liv­
ing selling watercolor paintings and teach­ing water-coloring at the local community college) with that of a weekend watercol­
orist (who dabbles in his free time, gives some of his creations away to friends, but doesn’t care to sell a painting) with that of an elementary school student who loves to paint with watercolor (and every time she does, she has new and personally meaning­
ful insights about how to combine shapes, shades, textures, and colors). Each repre­
sents qualitatively different levels of creativity; however, none qualify as Big-C Creat­
ivity (comparable to the watercolors of Cézanne, Dürer, or Kandinsky) – so should these non-eminent examples all be lumped
together into the little-c category? Doing so obscures potentially important within-category differences. One way to resolve this limitation is to make the categories more restrictive (e.g., including only objective and clear-cut examples of creativity), but doing so runs the already mentioned risks of excluding consideration of creative potential and more subjective forms of creative experience.

In an effort to address this limitation in the traditional dichotomy, Kaufman and Beghetto (2003) argued for the use of two additional categories (mini-c and Pro-c). These categories help distinguish the subjective and objective forms of little-c creativity (Beghetto & Kaufman, 2007); making room for more subjective or personal (Runco, 1996, 2004b), internal (Stein, 1993), or mental or emotional (Vygotsky, 1977/2004) forms of creativity. Adding the Pro-c category helps distinguish the grey area between little-c and Big-C Creativity. Pro-c makes room for professional-level creators (like professional artists) who have not yet attained (or may never attain) eminent status, but who are well beyond little-c creators (such as the weekend watercolorist who dabbles for relaxation and enjoyment) in knowledge, motivation, and performance.

Using these four categories in comparing theories can be helpful in highlighting the similarities and differences in the focus and scope of creativity theories. Such categories may also be helpful for considering future directions and potential connections, as well as the limitations of theories. However, the use of categories to classify creative phenomena (no matter how precise or flexible) is always limited, potentially obscuring as much as clarifying the nature of creativity. Keeping this in mind, we will attempt to judiciously use these categories as a comparative element when we critically consider the theories reviewed in this chapter.

The Four (or Six) P's of Creativity

Besides the previous comparative elements, theoretical approaches to creativity may also be considered in terms of which aspect or facet of creativity they emphasize (Rhodes, 1961; Runco, 2004b). Traditionally, these aspects have been referred to as the "four P's of creativity": process, product, person (or personality), and place (or press). More recent versions of this framework (e.g., Runco, 2007a) have extended it to six P's, adding persuasion (Simonton, 1990) and potential (Runco, 2003). Since this alliterative framework nicely organizes many issues in the study of creativity, we will use it as another means of comparing the scope of different theoretical perspectives. First, we summarize each "P". Theories that focus on the creative process aim to understand the nature of the mental mechanisms that occur when a person is engaged in creative thinking or creative activity. Process theories typically define different stages of processing (e.g., Mace & Ward, 2002; Simonton, 1984; Wallas, 1926; Ward, Smith, & Finke, 1992) or particular mechanisms as the components of creative thought (e.g., Mumford, Baughman, Maher, Costanza, & Supinski, 1997; Mumford, Mobley, Uhlin, Reiter-Palmon, & Doares, 1993). Some key issues in the study of the creative process include the extent to which creative thinking involves the same basic cognitive mechanisms as non-creative thinking, the relative roles of conscious versus unconscious processes, the relative contributions of chance or stochastic processes versus more controlled and guided processes, and the nature and reliability of evaluative processes during creative production. A number of theories addressing these process-level themes are described in this chapter.

Probably the most objective approach to creativity focuses on products: works of art, inventions, publications, musical compositions, and so on. Products can usually be counted, thus permitting considerable quantitative objectivity, and they are often available for viewing or judging, so interrater reliability can be readily determined - two substantial advantages. A down side is that when studying a product, little can be directly said about the process leading to it or the creator's personality; inferences are thus necessary to infer the creative process or person. Moreover, unambiguously creative products are constructed by unambiguously creative persons. Thus, studies of products tell us about highly creative individuals but not about persons with as-yet-unfulfilled creative potential (Runco, 1996).

Another longstanding perspective on creativity has focused on the creative person (or personality). Much early research compared mathematicians, architects, writers, and other groups in terms of the traits that may be indicative or contraindicative of creative potential. Several traits cut across domains; these include intrinsic motivation, wide interests, openness to experience, and autonomy (Barron, 1975; Hebson, 1972). A number of personality traits also appear to be more pervasive either among persons in artistic domains or in scientific domains (Feist, 1998, 1999). Personality is now usually viewed as one influence on creative behavior, rather than a complete explanation (Pekrun, 1996).

The expression of personality often depends on the setting or climate in which an individual resides. The research on places or "press" factors (press from pressures) is especially useful in defining such interactions between persons and environments. There are individual differences in terms of preferred environments, but again also general tendencies: Creativity tends to flourish when there are opportunities for exploration and independent work, and when originality is supported and valued (Amabile, 1990; Witt & Boerke, 1989).

Simonton (1990) offered another perspective following the alliterative scheme by describing creativity as persuasion: Creative people change the way others think, so they must then be persuasive to be recognized as creative. The notion of creativity as persuasion shares assumptions with the social perspective (Amabile, 1990), the attributional theory of creativity (Kasof, 1998), and Cziksentmihalyi’s (1998a) systems model. In the last of these, persuasive individuals are the ones who are likely to influence the direction taken by a domain. The emphasis on persuasion implies that everyday originality (Runco & Richards, 1998) may not be deemed creative, since it is often largely personal.

The enterprise of the study of creativity can thus be categorized in terms of process, products, personality, places, and persuasion. Runco (2008) recently suggested that this might be further organized into a hierarchy that starts with theories of creative performances versus creative potentials. The former is divided into products and persuasion theories, and any other perspective that focuses on manifest, unambiguously creative behavior; the latter is divided into creative personality and places, and any other perspective that appreciates yet-unfulfilled possibilities and subjective processes. This hierarchical framework captures the earlier alliterative scheme but allows research on everyday creativity and the creative potentials of children and others who may have most of what it takes but require educational opportunities or other support before they can perform in a creative fashion.

Section II: Categories of Theories

We review 10 categories of theories. Space permits only a brief description of the distinguishing features of each category; readers are advised to consult the references for more detailed specifics on particular theories. Our goal is to provide a "big picture" (rather than exhaustive) overview of each type. Likewise, within each category, we highlight a sample of individual theories to illustrate (rather than enumerate) representative theories.

We draw on the comparative elements discussed in Section I to help facilitate this overview. Most of the theories we describe have been discussed in the literature for at least several decades, boast considerable research support, and typically span multiple levels of analysis, and methodologies. We do not review theories that are limited to understanding a fairly narrow aspect or subtopic within creativity - such as creativity's relation to mental
illness (Jamison, 1995), or to personality (Baron, 1995; Feist, 1998, 1999), its biological underpinnings (Martindale, 1995), applied techniques intended to enhance creativity (Nickerson, 1992), cultural differences in creativity (Labart, 1999), and so on. The theories and comparative elements reviewed in Section II are also summarized in Table 2.1.

**Developmental Theories**

Developmental theories of creativity are among the most practical. Not only do they help us to understand the roots of creativity, as suggested by the background of unambiguously creative persons, but they also offer a specific and explicit way to design environments so that the creative potentials of children will be fulfilled. Thus, developmental views mainly emphasize the person, place, and potential aspects of creativity, and range from mini-c to pro-c. Although products are not the primary focus of developmental theories, they still play an important, but often tacit, role. This is because these theories imply a trajectory that starts with more subjective forms of creativity (mini-c) and develops into more tangible and mature forms of creative expression. Early developmental theories were devised by examining the lives and family backgrounds of eminent creative persons (Goertzel & Goertzel, 1976). These suggested that particular developmental experiences were correlated with creativity. For instance, parents of creative children seemed to expose their children to diverse experiences and most were themselves in some ways creative. These families were also characterized by a moderate amount of independence (Albert & Runco, 1989). Parents were aware of what their children were doing but were not overly restrictive. Note that this is not simply an observation without functional connection to creativity. Independence is logically tied to the creative process, as well as apparent in studies of families. Optimal independence allows children to develop autonomy that can then be used in their thinking and would allow them to devise original ideas.

Somewhat more controlled studies of development have focused on family structure. This is not surprising because family structure (e.g., birth order, ordinal position within the family, age interval between siblings, and sibsize — the term used to indicate the number of siblings in a family) have interested social and behavioral scientists, and natural philosophers whose work far predates the social sciences, for some time. To name one outstanding example, Galton (1869) had much to say about hereditary genius. He reported that firstborn children had a significant developmental advantage, and for that reason were often successful. Galton did not look specifically at creativity but instead focused on individuals with more conventional achievements.

Research on family structure has proven useful for constructing theories of creativity. For instance, consider the idea that middle children have certain developmental advantages. Sound evidence suggests that middle children are often rebellious and revolutionary (Gaynor & Runco, 1999; Sulloway, 1996), probably because they are raised in families where there are older, more capable siblings whose maturity earns them parental attention. Middle children therefore find alternative ways to get attention, often by rebelling against parental values and the status quo and finding a unique niche. Rebellion may be within the context of the family, in one's place, and for that reason was often successful. Galton had much to say about hereditary genius. He reported that firstborn children had a significant developmental advantage, and for that reason were often successful. Galton did not look specifically at creativity but instead focused on individuals with more conventional achievements.

Another important area of research involves play and creativity (Ayman-Nolley, 1999; Pearson, Russ, & Cain, 2003; Russ & Schafer, 2003). This line of work contributes to our understanding of how nurture and the environment may support creative efforts (e.g., permissive environments allow exploration and imaginative play) and to theories of the creative process itself (e.g., creative ideas may result from the relaxation and enjoyment of play).

The most powerful and trustworthy developmental research is longitudinal. Findings from longitudinal research should thus be very useful for the construction of theories of creativity, although such

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**Table 2.1: Summary of Theories of Creativity**

<table>
<thead>
<tr>
<th>Category</th>
<th>Developmental</th>
<th>Primary Assumption</th>
<th>Key Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>Children develop over time (achievement) produced by an interaction of person and environment</td>
<td>Environment can influence creativity</td>
<td>Independence, environmental supports, threshold of creativity</td>
</tr>
<tr>
<td>Psychology</td>
<td>Person, Place, Process</td>
<td>Personality</td>
<td>Personality, Process, Environment</td>
</tr>
<tr>
<td>Economic</td>
<td>Creative idea is influenced by 'will of the environment' and 'people in the environment'</td>
<td>Environment and behavior</td>
<td>Environment and behavior, people in the environment</td>
</tr>
<tr>
<td>Stage &amp; Compositional Process</td>
<td>Creative expression proceeds through a series of stages or components, the process can be compartmentalized, and research on one component can lead to discoveries for others</td>
<td>Process</td>
<td>Process, compartmentalization, environmental support</td>
</tr>
<tr>
<td>Cognition</td>
<td>Intellectual thought processes are foundational to creative person and accomplishments</td>
<td>Cognition</td>
<td>Cognition, intellectual thought processes, foundational to creative person and accomplishments</td>
</tr>
</tbody>
</table>

(continued)
investigations are difficult and expensive. A number of very good longitudinal studies have been reported (e.g., Albert and Runco, 1999; Helson, 1999; Plucker, 1999; Subotnik & Arnold, 1996). Albert, for example, has followed a sample of exceptionally gifted boys for over 20 years. He found that during their childhoods, the truly gifted had the capability to a motivational state that leads directly to actual performance and achievement. Studies like these reinforce theories of creativity that take cognitive processes, motivation, affect, and personality each into account.

Psychometric Theories

Psychometric theories are not constructed to describe the developmental background of creative individuals, nor their thinking patterns or traits or waves. Rather, they are unique in focusing on measurement, and as such they inform all other theories of creativity. Thus, psychometric theories emphasize products over the other Psy’s, and they range from little-to Big-C Creativity. They do not have any particular dependence on any one model of creativity, nor are they tied to any particular theoretical framework. Instead of creativity is that original ideas are possible only when tests (and settings) allow divergent thinking. When it is allowed, a number of ideas can be generated and considered, some of which may be unique or novel. It has been argued that the more remote an idea is (i.e., the farther from the starting point), the more likely it is to be original and potentially creative.

<table>
<thead>
<tr>
<th>Key Concept</th>
<th>Psychometric Theories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative problems</td>
<td>Theories of creativity are concerned, among other things, with the reliability and validity of assessment, which are issues in all scientific work on creativity. Reliability represents agreement or consistency of measurement. It includes inter-judge reliability and, within any particular test, inter-item reliability. Validity represents the accuracy of measurement. It is usually defined by asking, “are you measuring what you intend to measure?” One category of validity is criterion-related, which includes predictive validity and discriminant validity. Predictive validity indicates how much a measure of creativity offers information about some criterion of real creative behavior. Discriminant validity is especially important because it indicates the degree to which a measure of creativity is distinct from other indices of non-creative talents, like traditional intelligence, IQ, convergent thinking, and so on. This was the most important question in early research, which was motivated to establish creativity as an independent subject of study.</td>
</tr>
<tr>
<td>Ill-defined problems</td>
<td>Several seminal studies have supported the discriminant validity of various creativity tests (Wallach &amp; Kogan, 1965), although the exact relationship depends on the level of ability of the individuals being tested, the testing environment, and the tests administered. The first of these, level of ability, has come to be known as a threshold theory because it suggests that below a moderate level of general ability, IQ and the like are strongly related to creativity indices; above that threshold, they are largely independent (see Fuchs-Beauchamp, Kames, &amp; Johnson, 1993; Kim, 2005; Runco &amp; Albert, 1996). The second item, considering the testing environment, is important for educational settings, as it suggests that permissive environments allow more divergent, original thinking than do typical testing environments.</td>
</tr>
<tr>
<td>Expertise-based approaches</td>
<td>The third item above, concerning the convergent and divergent thinking. These are general labels given to tasks requiring that thinking converges on one correct or conventional answer or else is allowed to move in different directions. Guilford (1968) proposed these ideas as part of his Structure of Intellect (SOI) Theory. He used the terms convergent and divergent production, but what is important here is that the more a test allows divergent thinking, the more it will be independent from measures of convergent thinking. Also very relevant to theories of creativity is that original ideas are possible only when tests (and settings) allow divergent thinking. When it is allowed, a number of ideas can be generated and considered, some of which may be unique or novel. It has been argued that the more remote an idea is (i.e., the farther from the starting point), the more likely it is to be original and potentially creative.</td>
</tr>
</tbody>
</table>
Psychometric studies have also suggested that different domains of creative performance may be distinct from one another. This is another example of discriminant validity (e.g., measures of mathematical creativity differing from verbal creativity), but the implications are enormously important for theories of creativity. Indeed, the idea of domain-specific talent is now prevalent (Albert, 1980; Gardner, 1983; Runco, 1986). It has been around for many years (e.g., Patrick, 1935, 1937), but more recent psychometric studies make it hard to refute (Baer, 1998; Ludwig, 1995, 1997). This theme is further taken up in our discussion of the impact of expertise on creativity (in "Problem Solving and Expertise-Based Theories").

Economic Theories

One of the more recent categories of creativity theory draws heavily from economics. This is arguably a fresh and useful perspective, partly because it takes into account very general macro-level processes and influences. Economic theories also offer testable hypotheses about creative efforts. They predict, for instance, that larger groups will inhibit brainstorming because the costs of being different, and therefore original, are higher when the audience is large. They also predict that individuals with high levels of expertise will be less flexible about alternatives, as is the case that challenge their own views, than individuals who have invested less into their careers or into a particular theory or method. The macro-level quality of economic and investment theories encompasses all of the P's except process, and spans little-c to Big-C Creativity.

There are several different economic or investment theories of creativity. For instance, Rubenson (1990, 1992, 1995) offered a psychocognitive perspective. Rubenson and Runco described the market for creativity, which illustrates macro-level processes and interactions involving the allocation of resources. Markets can provide benefits to certain behaviors, or impose costs on them. Just as in learning theory, benefits tend to literally reinforce and elicit certain behaviors, whereas costs inhibit them and make them less likely. This perspective is psychocognitive in that benefits and costs may be defined in psychological terms. For example, there might be a stigma to being unconventional, which may inhibit the originality that is required for creativity.

Florida (2002) also examined the market for creative behaviors, going so far as to define a creative class or segment of society. This in turn allowed him to compare different cities and countries in terms of support for and investment in Florida's model has been largely discredited; thus, more recent models have acknowledged the likelihood of recursion, whereby an individual may cycle through the stages multiple times, in various combinations. For example, the individual may attempt to verify an idea but find it only partially adequate, and return to the preparation stage and start over.

Many contemporary theories have delineated the preparation stage of the creative process. This has been called problem finding (Getzels & Csikszentmihaly, 1976; Runco, 1994) or problem construction (Mumford, Baughman, Threlfall, Supinski, & Costanza, 1996; Mumford, Reiter-Palmon, & Redmond, 1994); sometimes models specify a substage of problem identification, followed by problem definition. (See the section titled "Theories Based on Problem Solving and Expertise" for more on problem finding and problem construction.) Similar empirical specificity has been directed at incubation (Gruber, 1981b; Epstein & Laposky, 1999), and verification (Runco, 1989; Runco & Smith, 1993; Runco & Vega, 1993), the last of which is sometimes broken down into evaluative and evaluative processes.

Stage and Componential Process Theories

As noted, a number of models of the creative process have been proposed that attempt to understand the structure and nature of the creative process in terms of stages, which can be sequential or recursive, or underly componential cognitive processes. Obviously, such models emphasize process over the other P's; in terms of creative magnitude, they range from mini-c to Big-C Creativity.

One of the most popular and enduring stage theories is that of Wallas (1926, 1930). Helmholtz, 1896). It begins with a preparation stage where the individual gathers information and defines a problem. Next comes incubation, which involves taking some time away from a problem, at least consciously. If incubation is effective, a third stage occurs: insight, or what Wallas called illumination. At this point, a solution or idea suddenly makes itself known. Importantly, although the insight may seem like an "aha!" moment and may feel like a very sudden inspiration (which is why insights are often symbolized with a light bulb turned on), Gruber (1981b) demonstrated that insights frequently have protracted histories. For Wallas, the final stage was verification. At that point, the individual tests the idea or applies the solution. Intellectual creativity sometimes results when an individual buys low (i.e., invests in an idea that has been largely discredited; thus, more recent models have acknowledged the likelihood of recursion, whereby an individual may cycle through the stages multiple times, in various combinations. For example, the individual may attempt to verify an idea but find it only partially adequate, and return to the preparation stage and start over.

Many contemporary theories have delineated the preparation stage of the creative process. This has been called problem finding (Getzels & Csikszentmihaly, 1976; Runco, 1994) or problem construction (Mumford, Baughman, Threlfall, Supinski, & Costanza, 1996; Mumford, Reiter-Palmon, & Redmond, 1994); sometimes models specify a substage of problem identification, followed by problem definition. (See the section titled "Theories Based on Problem Solving and Expertise" for more on problem finding and problem construction.) Similar empirical specificity has been directed at incubation (Gruber, 1981b; Epstein & Laposky, 1999), and verification (Runco, 1989; Runco & Smith, 1993; Runco & Vega, 1993), the last of which is sometimes broken down into evaluative and evaluative processes.

Some recent process theories have defined the creative process in terms of component mechanisms rather than stages (e.g., Mumford et al., 1991; Mumford, Supinski, Baughman, Costanza, & Threlfall, 1997). Runco and Chaud (1995), for example, presented a two-tiered componential model of the creative process. This differs from the model of Wallas primarily in including a second tier that recognizes the influence of knowledge and information, both procedural and factual, and the influence of motivation, both intrinsic and extrinsic. Amabile's (1997) componential model includes three facets: domain-relevant skills (e.g., knowledge about the domain, technical skills), creativity-relevant skills (e.g., appropriate cognitive style, knowledge of heuristics for generating novel ideas), and task motivation (e.g., attitudes toward specific tasks, perceptions of one's motives). For Amabile, the first of these depends heavily on innate abilities, and skill development is dependent on training and experience. The third is a function of intrinsic motivation, absence of extrinsic constraints, and the individual's capacity to minimize the debilitating effects of constraints.

Cognitive Theories

It is difficult to think about creative achievements or performances without assuming that they have some basis in cognition. It is also difficult to think about creative people without assuming that they have some special cognitive abilities. Neither of these assumptions need be true, but there is some indication that differences in cognition can play a major role in creativity. Cognitive theories emphasize the creative process and person: process, in emphasizing the role of cognitive mechanisms as a basis for creative thought; and person, in considering individual differences in such processes.

Cognitive theories of creativity are quite varied. Some focus on universal capacities, like attention or memory; others focus on individual differences, such as those indexed by divergent thinking tasks. Some focus on conscious operations (e.g., tactics), whereas others point to preconscious, implicit, or unintentional processes. Some posit that creativity is a kind of problem solving, and others include cognitive processes that are arguably relatively independent of problem solving, such as problem finding.

One venerable cognitive theory argues that creative insights can result from
associative processes. Mednick (1962) described how ideas are chained together, one after another, and how remote associates tend to be original. Associations among ideas may be formed for various reasons, for instance, being functionally or even acoustically related. Apparently some individuals tend to move quickly from obvious associates to remote ones. In this view, more creative individuals tend to have flatter hierarchies of associations than less creative individuals; in other words, more creative people have many more relatively strong associates for a given concept, rather than only a few, which is thought to provide greater scope for the simultaneous activation of far-flung representations.

As noted earlier, another theory that relies on the idea of the unit of cognition is Guilford's (1956) SOI model, which originally contained three different kinds of cognition. Later, Guilford claimed that he had identified 120 different kinds, and not long before his death he proposed 500+ "cells" in the SOI (Guilford, 1980). His statistical methods were questionable, however, and usually it is his distinction between divergent and convergent thinking that is used in studies of creative cognition. Divergent thinking occurs when ideas and associations move in varied directions, and as a result new and original ideas may be found (Mednick, 1962; Torrance, 1993). Convergent thinking, on the other hand, occurs when cognition is used to identify one correct or conventional answer. Divergent and convergent thinking can both be involved in creative efforts, which allows the generation of ideas that are both original and effective (Cropley, 2005).

There is good reason to believe that cognitive research can determine what occurs before creative ideas are conceived. One promising line of research focuses on concepts as the unit of analysis. Concepts can be viewed as rather flexible cognitive structures. Research in the past 10 years or so suggests that conceptual combination—bringing two different sets of information together—is often involved in creative problem solving and ideation (Estes & Ward, 2003; Mobley, Doanes, & Mumford, 1993; Mumford, Baughman, et al., 1997; Sternberg & Lubart, 1993; Ward et al., 1999). Indeed, Estes and Ward (2003) argued that this is how emergent properties and insights arise. They described how original insights are more likely when two disparate features are brought together and how connections between these concepts might be seen only at a very high level of abstraction. This kind of thinking has been called metaphorical logic, the idea being that something like "angry weather" is only comprehensible in a non-literal fashion. Such metaphorical thinking and conceptual combination apparently suggest creative alternatives to trite or common lines of thought.

More generally, research in the "creative cognition approach" tradition (e.g., Finke et al., 1992; Ward et al., 1999), another important contemporary view of creativity, has likewise emphasized ideas drawn from cognitive psychology (e.g., conceptual combination, conceptual expansion, creative imagery, and metaphor) to understand how individuals generate ideas and explore their implications in lab-based invention and design tasks. Such processes are thought to play out in two fundamental regimes of thought: generating ideas and exploring their implications. In practice, the two are strongly interleaved and combined in the "gene pool" model of creative thought (from generate + explore).

Metacognitive processes are also frequently tied to creative thinking. These are entirely under conscious control. For instance, tactical thinking is metacognitive, and not surprisingly dozens of tactics for increasing the probability of creative problem solving have been proposed, including "think backward," "turn the situation upside down," "shift your perspective," "put the problem aside," and "question assumptions." Tactical thinking is especially useful for programs designed to facilitate creative problem solving precisely because they are a function of conscious decisions and can be employed when the need arises (Davis, 1999).

**Theories Based on Problem Solving and Expertise**

A related major category of creativity theories, again drawn primarily from cognitive psychology, emphasizes problem-solving processes and expert knowledge (e.g., Ericsson, 1993; Newell, Shaw, & Simon, 1971; Simon, 1972, 1986, 1989; Weisberg, 1999). This perspective is largely a theory of the creative person and the creative process: person, in emphasizing domain-specific expertise as a necessary condition for significant creative achievements; and process, in emphasizing how traditional cognitive psychological concepts like problem representations and heuristic search through problem spaces explain how people generate creative solutions to problems. Like the creative cognition approach, the problem-solving/expertise view explicitly argues that creative thought ultimately stems from mundane cognitive processes (see also Perkins, 1981), although expertise-based theories often focus on Big-C Creativity, whereas the creative cognition approach more typically addresses little-c creativity.

Problem solving has usually been studied in puzzle-problems like cryptarithmetics (Newell & Simon, 1972), but its principles also apply to ill-defined problems, which are more reflective of reality. Such problems, like writing a symphony or designing a house, have goals and operators that are not pre-specified and that aim to multiple "good-enough" solutions, rather than one "correct" answer (Simon, 1981) argued that ill-defined problems can often be broken into a set of well-defined problems, which can then be solved. This perspective is in line with Big-C Creativity, for example, the creative cognition approach more typically addresses little-c creativity.

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The problem-solving/expertise view has been considered different from many lines of evidence. Many of the processes and structures described in the creative-cognition approach can be straightforwardly related to those of the problem-solving/expertise view (Kozbelt & Durrye, 2007b). Similarly, laboratory studies of insightful problems (e.g., Kaplan & Simon, 1990; Weisberg & Alba, 1981) have demonstrated the importance of generating appropriate representations during creativity, using heuristics like noticing invariant characteristics of unsuccessful solution attempts, and have further demonstrated some of the cognitive processes leading to "aha" moments.

Archival studies also show the key importance of expert knowledge for Big-C Creativity. For instance, Hayes (1986) found that for 73 of 76 great composers, at least 10 years of musical study were required before writing a masterwork; the exceptions occurred in years 8 and 9. The "ten-year rule" has been found in many domains (Bloom, 1985; Chase & Simon, 1973; Gardner, 1993; Kozbelt, 2005, 2008c; Simonton, 1994a). Likewise, Weisberg (1985, 1993, 1999, 2006) has repeatedly demonstrated the ubiquity of expert knowledge for Big-C Creativity, in detail on great creators, ranging from Mozart to the Beatles and from Watt to Watson and Crick. Similarly, the archival study of individual creative episodes, taken from the notebooks of eminent scientists, has generated a number of computational models of the creative process (e.g., Kulkarni & Simon, 1988; Lanyi, Simon, Bradshaw, & Zychlew, 1987), which have replicated many major scientific discoveries.
In sum, the problem-solving/expertise view regards creativity as an essentially rational phenomenon. At the level of the investigator, creativity is amenable to rigorous empirical study; at the level of the creator, it is amenable to meaningful strategic guidance and long-term learning. Thus, another advantage of this view is pragmatic and pedagogical: its focus are strategic, knowledge-based factors that individuals can partly control, rather than factors that are linked to creativity but that are more fixed, like IQ or personality, or undesirable, such as early parental loss. At the same time, the problem-solving/expertise view acknowledges that Big-C problems are difficult; one simply cannot create a good symphony or theory of physics without considerable knowledge.

On the other hand, the problem-solving/expertise view has some limitations. For instance, the explanatory power of expertise view is limited in that it is a necessary but not sufficient condition for Big-C Creativity; in other words, it is only one of a number of factors that contribute to high-level creativity (Eysenck, 1995; Murray, 2003; Simon, 2004). Moreover, some eminent creators appear to have violated the "ten-year rule" (Geladen, 2003, 2005). Along these lines, it has been argued that the expertise view overstates the role of cumulative expertise, assuming that something like the propensity for identifying interesting problems represents a stable personality variable (Perkins, 1981). In terms of creative magnitude, the act of problem finding can often be construed as an instance of mini-c creativity (as problem finding involves the more subjective, novel insights and personally meaningful interpretations of creators), although there is room for higher levels of creative achievement as well (when, for instance, creators are able to share their process and others come to see it as a novel and meaningful way for identifying and exploring problems).

Getzels and Csikszentmihalyi (1976) most influentially articulated the concept of problem finding. They observed 31 college art students in an open-ended task in which they arranged and drew from a set of objects. The researchers were particularly interested in exploratory behaviors, that is, activities that were not pre-determined but that emerged in the course of the task - and that involve formulating a kind of processing rooted strongly in motivational factors and existential concerns. Getzels and Csikszentmihalyi found that the more creative artists more often engaged in behaviors like handling more objects before drawing, manipulating them more, and introducing more changes to the emerging drawing. Simonton's (1998) two-stage mental process of creativity during one drawing session predicted success in the art world years later (Csikszentmihalyi & Getzels, 1989).

Perhaps because the problem-finding view is more subjectively oriented than the problem-solving/expertise view, it is more difficult to cite evidence directly supporting more traditional problem-finding, either pros or cons. This is especially true because the precise nature of problem finding is unclear (Dudek & Côte, 1994). Although a number of studies have claimed to find evidence supporting the notion of problem finding (Moore, 1985; Runco, 1994), it may be possible to reinterpret such results in a more traditional problem-solving framework (Kozbelt, 2008b) or other conceptualizations, like "problem expression" (Dudek & Côte, 1994). The problem-finding view also arguably overemphasizes on-line discovery, at the expense of considering habitatuated processes. For instance, Getzels and Csikszentmihalyi (1976) noted that unusual artistic behaviors as exploratory, although these could well be standard - if idiosyncratic - to some of an artist's approach to art making; this distinction would not be evident unless multiple observations were obtained. As with Simon (1988), observed, many problems in science, such as the nature of universal gravitation in Isaac Newton's time, were widely appreciated and did not have to be "discovered" in any meaningful sense; what counted as creative was solving the known problem.

In sum, the distinction between the problem-solving and problem-finding frameworks may be less a matter of substantive differences between the theories and more a matter of the emphases, goals, and tastes of individual researchers. If one is more interested in creators' subjective experience or their reasons for making art, problem finding may be the more appealing framework; if one is more interested in the cognitive mechanisms by which new ideas arise and are given form, problem solving, applied to ill-defined problems, is probably more appealing. Interestingly, more recent models examining creativity processes have tended to focus less on such labels and more on the nature of the underlying processes. For instance, Mumford and colleagues (e.g., Mumford et al., 1991; Mumford et al., 1992) have typically used the label "problem construction" to encapsulate the constellation of processes involved in making new representations, strategizing to solve, and searching for a creative solution to an ill-defined problem.

Evolutionary Theories

Researchers have proposed a number of theories of creativity drawing on ideas from evolutionary biology, which can be Darwinian (e.g., Albert, in press; Lumsden, 1999; Lumsden & Findlay, 1988; Simonton, 1997, 1999), or Lamarckian (Johnson-Laird, 1993). In nature, of these, a strong candidate for the most comprehensive theory of creativity is the Darwinian (formerly "chance-configuration") model of Dean Keith Simonton (1984, 1988, 1997, 1999, 2003, 2004). To varying extents, Simonton's model covers all of the Ps of creativity: person and potential, in identifying dispositional and developmental idiosyncrasies associated with the realization of initial creative potential into actual creative achievements; process, in laying out a two-step model of ideation and elaboration, in which chance combinations of ideas play a paramount role and whose complexities are hard to control; product, in noting sometimes unlikely initial assessments versus longer-term stable judgments of creative artifacts; and place, in identifying social factors leading to outstanding creativity; and persuasion, in emphasizing how social dynamics establish verdicts of creative outcomes. More than any other theory of creativity, Simonton's Darwinian view aims to understand the nature of genius, eminent, and Big-C achievements.

The basis of Simonton's Darwinian model is a two-stage mental process, involving the
blind generation and selective retention and elaboration of ideas (Campbell, 1960). In this view, ideas are composed in some
blind fashion, typically below the threshold of awareness; the most interesting combinations are then consciously elaborated
into finished creative products; these in turn are judged by other people. Simonton (1988, 1988, 1997, 2004) has developed
Campbell’s argument into a sophisticated quadratic model of how creative productivity unfolds over the life span, with
broad implications for understanding the nature of eminence, the creative process, and creative environments. The model takes
different individuals in “creative potential” as a starting point. Over time, a creator
expends this potential through creation and
recoups a smaller amount through learning. These assumptions permit modeling of the typical inverted, backw ard J-shaped trajectory of career-wise creative productivity via a differential equation with only four parameters (initial creative potential, career age, ideation rate, and elaboration rate), which closely matches observed data
(Simonton, 1997). In general, it is probably fair to say that the model’s highly quantitative basis gives it a rigor that is
unsurpassed by any other major theory of creativity.

Simonton has mustered substantial support for the Darwinian view by pioneering the analysis of archival data. These data
detail variations in career trajectories and landmarks (e.g., first, best, and last hit) that are well explained via individual differences in
creative potential and inter-domain differences in ideation and elaboration rates. For instance, age at best work is unrelated
to eminence, at least after control for potential confounds, just as specified by Simon ton’s model (Murray, 2003; Orom, 1977; Over, 1988, 1988; Simonton, 1990; but see Kozbelt & Duranmisha, 2007a). Moreover, domains like theoretical physics and lyric poetry, which have relatively fast ideation and elaboration rates, show sharper career-wise increases and declines – and earlier peaks – than, say, history or geology, which have slower rates (Simonton, 1997).

Another provocative claim is that creative ideation follows a constant probability of success, the “equal-odds rule” (Denis,
1969). One implication of the rule is in a hypothesized null relation between creators’ lifetime hit ratios and total output,
a result consistent with empirical findings (see Simonton, 2004). Another is its longitudinal aspect, which states that hit ratio – high-impact works divided by total works created in a particular time interval – should show no systematic relation with creator age (Simonton, 1977a, 1985). Simonton (1999) forcefully argued that hit ratio cannot be increased by any known learning mechanism. Thus, in considering career-wide creative productivity, the same basic curves would result if either all works or only high-impact works are analyzed. Indeed, positive correlations have been found between the major and minor work production over the lifespan, indicating that the zenith of a creator’s career includes both the most master works and the most ephemera (Cole, 1979; Simonton, 1997).

The Darwinian view has major psychological implications. First, because of the sheer complexity of the creative process, creators should have little control over guiding the progress of their works; thus, it has been claimed that the creative process is replete with false starts and wild experiments (Simonton, 1990; Weisberg, 2004). Second, creators should not be particularly good judges of their ideas or works, and critical acumen should not improve with age (Simonton, 1977a, 1984; cf. Kozbelt, 2007). Once works are finished, creators have little control over their fates, because this is a social judgment (Galen, 1981; Sawyer, 2006). Thus, mass production is the optimal strategy for those seeking eminence, because producing more works is more likely to yield at least some hits than producing fewer works, all else being equal. Indeed, great creators are almost always very productive (Simonton, 1978b, 1984, 1986, 1997).

Despite its comprehensiveness, the Darwinian view can be critiqued along several lines. For instance, it arguably overemphasizes the role of chance factors in explaining creativity. Recent incarnations of the theory (e.g., Simonton, 2003, 2004, 2006) argue that chance is not the only factor in creative achievement, noting substantial though subsidiary roles for logical and evaluative thinking in creativity. However, some may find it unsatisfying to elevate chance to causal status and to define it to include simultaneously nearly stochastic conceptual combination or search, but virtually any psychological or social factor that is not well understood “presently” (Simonton, 2004). Also, despite the convenience and parsimony of a two-step cognitive process for modeling how life-span creativity unfolds, process particulars are left unspecified (Simonton, 1997).

An array of theoretical arguments has also been offered that dispute fundamental premises of the Darwinian view (e.g., Dasgupta, 2004; Gabora, 2005, 2007; Sternberg, 1998). For instance, one objection is that ideas are not discrete, independent units that exist in some dormant state, waiting to be discovered through other alternatives in a Darwinian manner. An alternative emphasizes the context-driven actualization of potential, that is, simply a change of state in response to a context, which can propel creative thought via a non-Darwinian process (Gabora, 2005).

Still, empirical objections have been raised, particularly regarding the longitudinal aspect of the equal-odds rule and associated claims about the validity of creators’ evaluations. Despite reports appearing to support the longitudinal aspect of the equal-odds rule, its empirical foundation is less secure than other aspects of Simonton’s model, owing to conflicting results. For instance, in contrast to Simonton’s (1977a) null findings, Kozbelt’s (2008b) study of 65 eminent composers found large age effects on hit ratio, including a strong linear increase throughout much of their careers, consistent with an independent analysis by Weisberg and Sturdivant (2005, reported in Weisberg, 2006).

In sum, the Darwinian view is arguably the most ambitious account of Big-C Creativity. It has contributed a very rich repository of results and ideas and numerous specific quantitative predictions, and many (but not all) of its claims boast substantial support. Nonetheless, however well the Darwinian view works as a first approximation to many phenomena in the study of creativity, it explains little of the considerable error variance in relations between productivity and eminence, age and productivity, the production of masterworks versus minor works, or in the varied career trajectories of different creators (Simonton, 1988, 1997). Understanding thorny questions of individual differences, including why some creators appear to improve with age while others get worse, is a focus of the next chapter of theories.

Typological Theories

One approach to understanding individual variation in creators’ personalities, working methods, career trajectories, and so on, has been to posit typologies of creators, who differ in systematic ways in their methodological predispositions (e.g., Epstein, 1991; Epstein, Pacini, Denes-Raj, & Heier, 1996; Gombrich, 1984; Isaksen, Lauer, & Wilson, 2003; Kaufmann, 1979; Kirton, 1976, 1989; Martinson, 1993, 1995; for a review, see Kozbelt, 2008a). Here we focus on a recent typology by Galenson (2004, 2006), whose theory can be conceptualized as bridging the problem-solving/expertise and Darwinian views. This model is a more or less unified theory of creativity, and it touches on aspects of all of the F’s, in each case emphasizing individual differences rather than normative trends. Galenson’s emphasis has been on Big-C Creativity, though other typological theories encompass other levels of magnitude as well. Notably, his typology encompasses two very different levels of analysis: macro-level career trajectories and micro-level descriptions of creators’ working methods.

Galenson argues that there are two fundamental types of creators: aesthetically motivated experimentalists, or “seekers,” and conceptual innovators, or “finders.” The two types differ in how they approach the creative process, as well as in their career trajectories and the basis of their reputations.
For seekers, the creative process is a frustrating struggle. Often eschewing preparatory work, they typically begin without a clear idea of their goals, proceed by trial and error, labor over their decisions, and have a difficult time declaring a work completed, using mainly perceptual criteria to do so. Over time, these creators show great continuity in their stylistic development, tend to improve steadily with age, and are ultimately known for a body of work of fairly even quality, rather than individual standout achievements. Because their approach relies on a large body of expert technical knowledge and perceptual skills that take time to acquire, seekers rarely produce outstanding works early in their careers. In contrast, finders frequently make detailed preparations and clearly know their goals at the outset. They thus typically work very efficiently and can easily decide when a project is finished. Often their careers are marked by abrupt changes of style, each marked by a few capstone works, which form the basis of their reputation. Because finders radically change a domain’s rules, they can largely absorb into Galenson’s model (Kozbelt, 2008c). It is debatable whether such a “unified” theory of creativeness is possible, or even desirable, from the standpoint of moderation and pluralism raised at the outset of this chapter. In any case, any comprehensive account of creativeness ultimately has to take into account the unique and highly varied characteristics of individual creators and the milieu in which they work. These higher-level themes are characteristic of the final category of models we will discuss: “systems” views of creativeness.

**Systems Theories**

Some of the broadest and most ambitious theories of creativeness take the view that creativeness is best conceptualized not as a single entity, but as emerging from a complex system with interacting subcomponents – all of which must be taken into account for a rich, meaningful, and valid understanding of creativeness. Thus, in contrast to most of the theories described earlier, “systems” theories take a very broad and often quite qualitative contextual view of creativeness. A number of such theories have been proposed, almost all of which address each of the P’s, although with different emphases, depending on the relevant level of creative magnitude.

One seminal theory is that of Gruber (1988a; Gruber & Wallace, 1999) and colleagues, who pioneered the evolving systems approach to creativeness. This has mainly been applied to understanding the unique attributes of the creative person, via very detailed archival case studies of Darwin (Gruber, 1988a) and others (Gruber, 1996; Wallace & Gruber, 1985). Often such case studies are motivated by a particular question – for instance, how Darwin devised the idea of evolution by natural selection (Gruber, 1988a), or how it was possible for Herbert Simon to be a twentieth-century Renaissance man (Dasgupta, 2005). Unlike more cognitively oriented case-study methods (e.g., Weisberg, 1999), the evolving-systems approach focuses less on understanding the particulars of a specific creative act than on how those particulars fit into the context of an individual creator’s goals, knowledge, and reasoning, as well as larger social forces and creative paradigms.

The evolving-systems approach is primarily an account of what creators do (Gruber & Wallace, 1999). Its emphasis is on dynamic, developmental processes that play out in complex ways and contexts, over very different timescales. To provide a structural framework for understanding creative indicants in the midst of such complexity, Gruber introduced a number of foundational concepts. One is the notion that great creators likely use an ensemble of metaphors in their thinking, which together characterize a developmental process leading to creative meaning making (Gruber, 1978), rather than relying exclusively on one dominant metaphor. Secondly, many researchers have done when trying to understand these issues. Another key idea is that of a network of enterprise, a system of goals that describes how an eminent creator may work on seemingly disparate topics and projects, consecutively or concurrently, and continually evolve a sense of the relations between the topics. Note that the level of analysis of an enterprise is more general than that of single projects (cf. Weisberg, 1999). Such analyses put a great deal of interpretive pressure on researchers using an evolving systems approach, particularly in absorbing the details and global qualities of a large amount of material and in avoiding pat, hindsight-biased conclusions about a creator’s entire career, which probably do not characterize the creator’s thinking at any given point during that career. However, if used judiciously, the evolving-systems method has the potential to inform not only the big picture about a creator, but to inform it in a dynamic way with a qualitative richness and rigor that is probably unmatched by the methods of any other theoretical approach.

A different systems theory has been advocated by Csikszentmihalyi (1988a, 1999), whose model has influenced many researchers (e.g., Gardner, 1993; Sawyer, 2006; Simonton, 2004). His theory is less focused on the creative person than the evolving systems approach, but it likewise involves multiple factors and takes a broad view of the phenomenon of creativeness – even more so than Gruber’s more complex. Often any other theory of creativeness, Csikszentmihalyi’s systems view emphasizes the ubiquitous role of place (or environment) among the P’s, especially for Big-C achievements; it also elaborates the nature of the creative person by detailing how individuals other than the creator contribute to the emergence of creativeness.

Csikszentmihalyi (1988a) introduced his systems view by reframing the basic question of “What is creativeness?” to “Where is creativeness?” Rather than regarding creativity as an intrinsic attribute of particular artifacts, Csikszentmihalyi argued that creativeness involves relations among domains and processes: 1) the domain, or body of knowledge that exists in a particular discipline at a particular time; 2) the individual, who acquires domain knowledge and produces variations on the existing knowledge; and 3) the field, comprised of other experts and members of the discipline, who decide which novelties produced by all the individuals working in that discipline are worth preserving for the next generation. Each has a say in what counts as creative.

This view deemphasizes intrapsychic processes and individual contributions and
instead places much more emphasis on collaborative creativity - a theme taken up most notably in recent years by Sawyer (2006) - and the societal conditions that can best foster genius, for example, during such cultural peaks as Periclean Athens, Medicean Florence, and fin-de-siecle Paris and Vienna. Csikszentmihalyi's systems view also highlights issues like the importance of "gatekeepers" (e.g., journal editors, art gallery owners, etc.) who play a major practical role in determining which contributions will be given the opportunity to be judged as creative, but who had previously gone almost entirely undiscussed in the research literature.

Csikszentmihalyi's systems view has many advantages, particularly in its conceptual richness, but also potential limitations. First, it acknowledges the immense importance of extrapersonal, sociocultural factors in creativity; it can also be used to generate specific hypotheses about how the domain, field, and individual (and culture, society, and personal backgrounds more generally) impact creativity (Csikszentmihalyi, 1999). In principle, such questions are amenable to empirical study. However, the qualitative nature (i.e., a plurality of perspectives, assumptions, and purposes found in contemporary creativity theories) this dictum may also prove useful in guiding future directions for scholars as they endeavor to develop and refine existing and new theoretical perspectives and make connections between them. With respect to refining existing theoretical frameworks, scholars might ask, "What aspects of this theory seem out of balance or underdeveloped, particularly when viewed in the light of the broader landscape of creativity studies?" Such questions might, for instance, reveal a need to test key assumptions of a metaphorically oriented theory with more rigorous empirical work; or highlight the need for a more Product oriented theory to account for the moderating and mediating influences of Person, Place, Process, and Perspiration; or reveal the possibility of linking a Larger-c theory of creative achievement to smaller-c theories of creative potential.

In suggesting that scholars apply a guiding dictum of "moderation in all things" might serve as a useful guide for considering the plurality of perspectives, assumptions, and purposes found in contemporary creativity theories. This dictum may also prove useful in guiding future directions for scholars as they endeavor to develop and refine existing and new theoretical perspectives and make connections between them. With respect to refining existing theoretical frameworks, scholars might ask, "What aspects of this theory seem out of balance or underdeveloped, particularly when viewed in the light of the broader landscape of creativity studies?" Such questions might, for instance, reveal a need to test key assumptions of a metaphorically oriented theory with more rigorous empirical work; or highlight the need for a more Product oriented theory to account for the moderating and mediating influences of Person, Place, Process, and Perspiration; or reveal the possibility of linking a Larger-c theory of creative achievement to smaller-c theories of creative potential.

In this model, Albert (in press) pointed to families, schools, and cultures in his view of influential systems. Information is shared among the levels of the system and determines how behaviors, including creative behaviors, are interpreted. These interpretations determine what constraints are placed on behavior and, conversely, how much freedom there is for novelty and creativity. For Albert, the actual impact on action and development is apparent in person-environment interactions. Very significantly, the more complex the system, the more freedom there is for individuals. Here again, freedom is necessary for behavioral and ideational variation, originality, and creativity.

Conclusion: Future Directions for Creativity Theories

Where to go from here? At the outset of this chapter we suggested that the ancient dictum of "moderation in all things" might serve as a useful guide for considering the plurality of perspectives, assumptions, and purposes found in contemporary creativity theories. This dictum may also prove useful in guiding future directions for scholars as they endeavor to develop and refine existing and new theoretical perspectives and make connections between them. With respect to refining existing theoretical frameworks, scholars might ask, "What aspects of this theory seem out of balance or underdeveloped, particularly when viewed in the light of the broader landscape of creativity studies?" Such questions might, for instance, reveal a need to test key assumptions of a metaphorically oriented theory with more rigorous empirical work; or highlight the need for a more Product oriented theory to account for the moderating and mediating influences of Person, Place, Process, and Perspiration; or reveal the possibility of linking a Larger-c theory of creative achievement to smaller-c theories of creative potential.

By doing so, they may discover areas of overlap between seemingly contested positions, which not only advance the standing of their own theoretical perspectives, but also enrich our broader knowledge of creativity.

A recent example highlighting how incorporating differing perspectives can advance knowledge in the field - can be seen in the work of two creativity scholars, John Baer and Jonathan Plucker, who held opposing positions on the issue of the domain-specific (creativity differs by discipline and domain) versus domain-general (creativity is trans-disciplinary) nature of creativity. Following a point-counterpoint debate on this topic (Baer, 1998; Plucker, 1998), these two scholars later put forth what might be considered more moderate positions, recognizing both the domain-general and domain-specific aspects of creativity (see Baer & Plucker, 1998) or in developing new, more robust models, all of which hold the potential to yield even richer perspectives on this most fascinating and important topic.

References


Vaihinger, H. (1911). *The philosophy of "as if": A system of the theoretical, practical and religious fictions of mankind.* London: Routledge. (Original work published 1911)


