THE CREATIVE PROCESS AS CREATORS PRACTICE IT: A VIEW OF CREATIVITY WITHEMPHASIS ON WHAT CREATORS REALLY DO[1]

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Introduction: Creativity and Psychology

Creativity has been a topic of discussion and of research in the field of psychology for approximately sixty years. Psychology, the scientific study of mental operations and behavior, asks: What makes people creative? How can creativity be measured? How can creativity be enhanced? What can we learn from creative adults that will help us raise more creative children? Is creativity an aptitude? Is creativity ability? Is creativity a domain? Is creativity acquired? Is creativity innate? What happens in the mind while a person is creating? What are the conditions for creative production? What inhibits creative production? What does the social setting contribute to creativity? Is creativity a solitary or community activity? All these, and more, are questions psychologists have sought to study with regard to creativity.

The idea of domain and field is pertinent here (Feldman, Csikszentmihalyi, & Gardner, 1994). A domain is part of a field with special organization, rules of practice, and body of knowledge. Mathematics is a field, but algebra, geometry, number theory, are domains. Literature is a field, but poetry is a domain. Education is a field, but educational research is a domain. Educational psychology is a hybrid domain that crosses two fields, education and psychology. Each domain has ways of knowing and representation that are unique to it. This is done through symbol systems special to the domain, including a special vocabulary and special technologies used only within that domain. A field is transformed through individual creators pushing the boundaries

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[1] This essay is based on principles expounded upon in the author's books*, Understanding Creativity* (2004), and *"My Teeming Brain": Understanding Creative Writers* (2002); in *Understanding Those Who Create* (1992/1998), in *Talented Children and Adults* (1994, 1999/2007); in speeches given at various conferences and taught in various workshops; in articles published in the newsletters of the California Association for the Gifted and the Texas Association for the Gifted; in an entry in the *Educational Psychology Handbook* (Greenwood Press, 2008). While the principles have evolved slightly since their first iterations, with additions and refinements, the biographical examples in this particular essay are different, illustrating that the principles do have credence across the domains.

of their domains. People working within the domain, and connoisseurs of the domain decide what creative products are to be valued. In order to transform a field, the creator, must have mastery of the theory, the rules, the ways of knowing of that field, and also of the domain that is being used to transform it.

Psychology has several threads of research into creativity. Psychometricians (Guilford, Torrance), developmentalists (Feldman, Gardner, Csikszentmihalyi); social psychologists (Simonton, Amabile); personality psychologists (Barron, MacKinnon, Gough, and the other researchers at the Institute of Personality Assessment and Research); humanistic psychologists (Rogers, Maslow, May) cognitive psychologists (Sternberg, Ward, Perkins); psychoanalysts (Freud, Jung, Panter, Rothenberg, Weisberg); domain psychologists (Benbow, Bloom) have all contributed work to psychological research on creativity. Educational psychology, however, has, to its detriment, concentrated on the psychometric approach to understanding creativity, to the exclusion of the others listed above. Following are some basic summaries of the approaches.

Psychometric Approaches to Creativity

In 1950, J.P. Guilford, who was then President of the American Psychological Association, gave a speech that is often called the beginning of the modern interest in creativity as a measurable phenomenon. Guilford was the developer of a theory called The Structure of Intellect (SI), where he theorized that there are 120 kinds of measurable intelligence factored across five operations, four contents, and six products. One of the five operations was divergent intellect.

Guilford differentiated between "convergent" intellect and "divergent" intellect. "Convergent" intellect is a way of thinking that emphasized remembering what is known, being able to learn what exists, and being able to save that information in one's brain. "Divergent" intellect is a mode of cognition that emphasized the revision of what was already known, of exploring what would be known, and of building new information. People who prefer the "convergent" mode of intellect supposedly tend to do what is expected of them, while those who prefer the "divergent" mode of intellect supposedly tend to take risks and to speculate.

Here are Guilford's original psychometric terms: (1) Fluency, (2) Novelty, (3) Flexibility (4) Synthesizing ability, (5) Analyzing ability. (6) Reorganization or redefinition of already existing ideas (7) Degree of complexity, and (8) Evaluation.

He developed ways to measure each of these, and called them divergent production. Divergent production has been confused with creativity. Whole industries of exercise books, curricula, assessment systems, and suggestions have been based on the psychometrically measured Guilfordian "operation" of divergent production.

Taking up Guilford's call, researchers at the University of Chicago did several studies in the 1960s. Among the most frequently cited were those by Getzels, Jackson, Wallach, and Kogan Getzels, & Csikszentmihalyi1976; Getzels & Jackson, 1962; Wallach, 1971; Wallach & Kogan, 1965). They were trying to quantify creativity, to make tests of divergent production. These studies were widely interpreted to mean that those with high creative potential need a certain threshold of intelligence, about one standard deviation above the mean, but not necessarily the highest intelligence (two or more standard deviations above the mean). This separation of creativity and intelligence has led to much confusion. However, by the early 1970s, Wallach said that the most fruitful researches would probably be into the areas of creativity within domains. Bloom, in the 1980s, was one of the first psychologists to study creativity in domains (Bloom, 1985). He and his colleagues explored the patterns in the lives of research neurologists, pianists, sculptors, mathematicians, and tennis players. Likewise, a multitude of studies done at the Study for Mathematically Precocious Youth (SMPY) by Benbow, Brody, and Stanley have exposed the paths that lead to high mathematical creativity and its cousin, scientific creativity. They have also found that literary creativity has precedents in early high SAT scores (Park, Lubinski, & Benbow, 2007).

Another educational psychologist, E.P. Torrance (1968; 1974), set out to create and validate tests that would identify creative potential in children. His Torrance Tests of Creative Thinking (TTCT) have been used in schools, to select students for programs that feature creative thinking. These tests were similar to the Guilford tests of divergent production, and tested the ability to be fluent, flexible, and the like. The higher the score, the more potentially creative the child was. The logical fallacy was engaged. Scoring high on a divergent production test meant that a student was called creative. Torrance and his colleagues continued, until his death in 2003, to publish follow-up studies and refinements on his tests. He also invented many activities and exercises meant to help people be more creative (again, a logical fallacy, for they were mostly exercises in divergent production, which may be a part of creativity, but which was taken for creativity).

Two other psychologists have influenced the education enterprise. Educational psychologist Joseph Renzulli came up with a definition of giftedness, which said that a gifted person had three characteristics: above average intelligence, creativity, and task commitment (Renzulli, 1978). Renzulli insisted that the gifted person must have "creativity," and not simply a high IQ. Renzulli and his colleagues developed a widely used creativity checklist used to identify creative children (Renzulli, Smith, White, Callahan, & Hartman, 1997).   Renzulli's theory is widely accepted and applied and it continues the idea that creators have above average intelligence, but it is not necessary that they have the highest intelligence. [In my own work, I make the statement (considered audacious by some) that, depending on domain, the level of intelligence needed for creative adult production varies; I have constructed a model called the Piirto Pyramid of Talent Development, which calls for the minimum threshold of intelligence necessary for each domain, as well as for other aspects and environments (Piirto, 1994; 1998; 1999; 2000; 2002; 2004; 2008)].

Cognitive psychologist Howard Gardner's theory of multiple intelligences ((1983) and creativity was explicated in a book (1993) illustrating that creativity is possible within each of his first seven intelligences (he has since added an eighth), and he explicated this using case examples of a famous writer (T.S. Eliot), painter (Pablo Picasso), social reformer (Gandhi), scientist (Darwin), dancer (Martha Graham), composer (Stravinsky), and psychoanalyst (Freud). Gardner's intelligences are abstractions that have to meet eight criteria, including being psychometrically measurable. These intelligences are not domains of creativity. For example, bodily kinesthetic intelligence is related to the domain of dance, but it is not dance. However, a dancer needs other types of Gardner's intelligences, for example, spatial intelligence. None of the intelligences exists in a pure form in human creators.

Educational psychology and Creativity

Many books of exercises in fluency, flexibility, elaboration, and the like, exist. When one looks at the content of these books, one notices that they are not domain-specific, but rather seek o enhance creativity generally by applying techniques based on Guilford's cognitive fluency, flexibility, etc. Creativity enhancement programs must modify their tasks to be specific to the domain. For example, brainstorming is a common divergent production fluency technique, but it should be used to enhance creativity within the domain. People in business can brainstorm about business-related problems; people writing a comedy show can brainstorm

about ideas for the next episode; people in a dance troupe can brainstorm with their bodies, ideas for new dances.

A popular technique taught in creativity enhancement classes is SCAMPER (Substitute, Combine, Alter, Modify, Put to another use, Eliminate, Reverse) (Eberle, 1996). They are based on the Guilfordian psychometric model, and they do not go far enough in describing the creative process as practiced by real creators in the domains. Real creators in real domains, as demonstrated in their memoirs, biographies, and interviews, do not talk about fluency, flexibility, elaboration, or SCAMPER. Domain-based creativity emphasizes that the domain itself (literature, visual arts, science, mathematics, music, theater, dance, and the like) defines what products are creative and what people are creative. The creative person is creative in something, not just generally creative. Creativity in domains is task specific, idiosyncratic to the domain.

Successful creators in domains have similar patterns of education and familial influence, depending on the domain in which the creativity is practiced (Kaufman & Baer, 2004; Piirto, 1992; 1994; 1999; 1998; 2002; 2004; 2008). I have studied persons by domain of creativity rather than by general creativity aptitude, with a view to how their life paths can inform the educational process. Studies of creative people within domains of achievement have led to some of the best evidence of what behaviors and situations predict the likelihood of creative productivity in adulthood. Each domain has its own rules of accomplishment and paths to achievement. These biographical materials have also yielded information on the creative process as practiced by creators in domains. There are certain commonalities across domains, and this is what I have chosen to focus on my writing and teaching. I have developed a course that teaches students the creative process as creators have practiced it. The principles of these discoveries are briefly discussed below.

CREATIVITY AS CREATORS IN DOMAINS PRACTICE IT

In their creative process, creators in domains seem to demonstrate several core attitudes (Piirto, 2004; 2008). These are attitudes of (1) naiveté, of (2) self-discipline, of (3) risk-taking, and of (4) group trust if in collaboration. A fifth core attitude is that creators have a high tolerance for ambiguity. I have developed concrete exercises that illustrate these attitudes, and when I teach creativity classes, students strive to practice them throughout the time of the class, so that they can assimilate them into their lives.

Core Attitude of Naiveté

Naiveté means openness. Openness is one of the Big Five personality attributes, and some studies are finding that creators score highest in openness on such instruments as the NEO- PI-R (Costa & McRae, 1992). Naiveté as a core attitude refers to the fact that creative people pay attention to the small things, and are able to view their fields and domains by seeing the old as if it were new. Naiveté is an attitude of acceptance and curiosity about the odd and strange. Naiveté includes the ability to notice and to remark differences in details. The artists Arshile Gorky and Willem de Kooning used to walk the streets of New York at night, pointing out the reflections of the few neon lights in paper thrown on the streets, remarking on the shapes and shadows (Spender, 1999). Igor Stravinsky (1990) called it "the gift of observation." He said, "The true creator may be recognized by his ability always to find about him, in the commonest and humblest thing, items worthy of note" (p. 11).

Core Attitude of Self-Discipline

When one studies the lives of creators, one often finds they have created many, many works, even though they are only known for one, two, or a few (Simonton, 1995). This self-discipline leads to the great productivity of creators. Van Gogh (1937) wrote to Theo, "I am daily working on drawing figures. I shall make a hundred of them before I paint them" (p. 45). Choreographer Agnes de Mille, noted that "all artists—indeed all great careerists—submit themselves, as well as their friends, to lifelong, relentless discipline, largely self-imposed and never for any reason relinquished." (deMille, 1991, p. 124). Most well known creators are known for only a few of their voluminous numbers of creative works, produced through great self-discipline over a period of years. Expertise research says that one cannot contribute anything new to a domain unless one has been working in the domain for at least ten years (Ericsson, 1996).

Core Attitude of Risk-Taking

Risk-taking in creative people has been noticed since creativity began to be studied at the Institute of Personality Assessment and Research in the 1950s (Barron, 1968; Mackinnon, 1978). Risk-taking enables one to try new things. While introverted and shy creators may eschew physical risk-taking, professional risk-taking in creators may be manifested in trying new forms, styles, or subjects. The kind of courage they have is the courage to stumble, fail, and, after rejection, to try again. May (1975)

called it creative courage, which is finding the new, providing the vanguard's warning of what is about to happen in the culture, showing in image and symbol, through their imaginations, what is possible. The creative artists and scientists threaten what is. That is why, in repressive societies, those creators who speak out in image and in symbol are jailed or exiled. This requires courage in the presence of censure and rejection.

Core Attitude of Tolerance for Ambiguity

The term tolerance for ambiguity comes from the research done by the IPAR (Institute for Personality Assessment and Research) group in the 1950s, especially that of the late Frank Barron. Likewise, psychiatrist Albert Rothenberg (1979), in his research, found that creators used a Janusian process in creating, referring to the two-faced god Janus, who was able to face in opposite directions. In fact, few research findings are cut and dried—true without any doubt. The researcher must set out the study's method, participants, and findings according to a prescribed way, and then must take into account the arguments that would be opposing. Tolerance for ambiguity is necessary in order to not focus on one solution too soon. It is related to the "I" of Incubation.

Core Attitude of Group Trust

In collaborative creativity, which is the kind that is usually encouraged in business and manufacturing, theater, dance, athletics, and music, the group doing the creating has to trust each other. Leaders make sure that the people in the group feel comfortable taking risks, being open and naïve, have acceptance for differing views and for incomplete answers, and that they do the work with regularity and discipline. From the raucous team in a closed room writing the jokes for a talk show or situation comedy, to the football team studying the game mistakes after losing the big one, members of a group must be confident enough and have enough trust in the process and in the group to be able to move on, to take criticism, and to do more. Working in a group creates interdependency, as each member has a role to play, and a job to do, and they cannot be egotistical or selfish, or the whole project will suffer. One person cannot dominate; everyone must play and experience together. Trust is necessary among the members of the group. Each team or ensemble has its own culture. One must look for a "good fit." Sawyer (2007) called it "group genius," and he chronicled studies where the creative community had more juice than the individual. However, even when the creator creates alone, he/she is really not alone, for what I have called the "Sun of Community and Culture" is operative;

the work is judged by peers and connoisseurs of the domain; the creator socializes with and learns from other creators in the domain. No creator is isolated from the domain's rules, laws, and members.

The American Abstract Artists group in the 1930s gave each other problems at their meetings, as they experienced rivalry as to who would be the best teacher of abstract art, and who was the best abstract artist:

> Gorky suggested that they all go off and produce a painting restricted to the colors black and red. At the next meeting they would decide whose was the best. Or else they could produce a communal painting, choosing from among themselves who was the beset draftsman, who is the best colorist, who the best in textures, and so forth. They would produce a masterpiece in which each would set his hand to a different task, and they would exhibit the result, naturally, unsigned. Or—craziest idea of all—they should go home to their studios and come back next week with an object made from a light bulb and a piece of string. That would surely determine who was best qualified to teach abstraction. (Spender, 1998, p. 159)

The Seven I's

Here are some further aspects of the creative process as really practiced by real creators in the arts, sciences, and business (Piirto, 2004). I have called them the Seven I's: several types of (1) Inspiration; (2) Imagery; (3) Imagination; (4) Intuition; (5) Insight; (6) Incubation; (7) Improvisation. I have developed exercises for each of these so that my students can themselves teach them in their classes and practice them in their lives.

Inspiration

All creators talk about inspiration. Literally, inspiration is a taking in of breath. In terms of creativity, inspiration provides the motivation to create. Inspiration is a breathing or infusion into the mind or soul of an exaltation. Creators in domains discuss several types of inspiration.

The Visitation of the Muse: The Inspiration of Love

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Being inspired by regard for another has been called the visitation of the muse. Muse originally meant "reminder." Today, when we speak of the muse, we speak of the inspiration that is related to desire. The Muses were inspirations for creators in various domains. Each muse had her own province in music, literature, art, and science. Calliope was the muse of epic poetry; Lyric poetry had Clio (remember the painting of Clio, The Allegory of Painting by Vermeer?), Euterpe inspired tragedy. Thalia inspired comedy. Melpomene inspired choral singing. Terspichore inspired dance. Polyhymnia inspired poetry celebrating the divine. Erato was the muse of love poetry,

The person experiencing desire is inspired by that feeling, and seeks to impress the object of desire, by making something or showing something. The whole industry of greetings related to February 14, is an example of the pervasive inspiration of love. One need only study art history to see the myriads of works dedicated to desire. The paintings of Gerome (the Pygmalion and Galatea series) Tura, Poussin, of Chagall (Apparition: Self Portrait with Muse), of Picasso's many models and several wives; of Dali—the list is infinite. Listening to the popular radio songs also illustrates the power of desire and erotic love to inspire songwriters. The desire inspires longing and the longing leads to the creative work.

Inspiration by the muse also has a mystical aspect. The people who are inspired often say that they are possessed. This idea is an ancient one, with a long literature that is seldom referred to by psychologists working on the creative process. The Platonic view is that the work comes from elsewhere than the intellect. The surrealists elaborated on this idea to theorize that the inspiration is from the unconscious, the unknown within (Maritain, 1953; Plato, Dialogues). Thus, "visitation" of the Muse. Creators often speak as if what they write was sent from something within but afar. Inspirations "come." Some creators feel as if they are go-betweens, mediums. Some mysterious force impels them, works through their hands, wiggles through them, shoots from them. This type of inspiration also applies in theater. For example, some actors speak of being receptacles for their characters' souls, of being possessed. Today actors talk about "getting into" character. Athletes talk of putting on their "game face." They often have pre-performance rituals for entering the state of mind necessary. This might include putting on their makeup, meditating, or being alone for a period of time.

The Inspiration of Nature

The inspiration of the natural world, from mountains, plains, animals, landscapes,

insects, snakes, and all things natural pervades much creative work, and creators are frank in their gratitude to nature. One of the most telling differences between scientists and mathematicians is that scientists are inspired by the opportunity to solve mysteries of nature, while mathematicians seek to solve theorems and abstract problems. Mathematics is a tool for scientists, a tool which helps them understand nature. The inspiration of nature was particularly pervasive in the works of the nineteenth century British and American transcendentalists and romantics, writers such as Wordsworth, Coleridge, Byron, Emerson, Dickinson, and Thoreau. They decried the industrial revolution and sought to return to simpler times when nature was pre-eminent, and not the conquering of nature.

Inspiration through Substances

The use of substances—alcohol, drugs, herbs—has a long and respectable reputation within the literature on the creative process in writers, artists, musicians, and others. Mescaline Aldous Huxley wrote about the influence of mescaline; Samuel Taylor Coleridge about the influence of opium; Jack Kerouac about amphetamines; Edgar Allen Poe about absinthe; the seventh century Chinese Zen poet Li Po about wine; Fyodor Dostoevsky about whiskey; Allen Ginsberg about LSD; Michael McClure about mushrooms—peyote— and also about heroin and cocaine:

The list of substances used could go on and on. The altered mental state brought about by substances has been thought to enhance creativity—to a certain extent. The partaker must have enough wits about self to descend into the abyss to reap what is learned there, but to also be able to return and put it aside. The danger of turning from creative messenger to addicted body is great, and many creators have succumbed, especially to the siren song of alcohol.

After taking drugs, Allen Ginsberg had a vision of William Blake. "I had the impression of the entire universe as poetry filled with light and intelligence and communication and signals. Kind of like the top of my head coming off, letting in the rest of the universe connected to my own brain" (Miles, 1989, p. 79). Ginsberg viewed the initial vision as the most important, most genuine experience he ever had, and he spent many years trying to recapture it through drugs, and, after he gave up drugs, through meditation.

Inspiration by Others' Creativity, Especially Works of Art and Music

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Many creators are inspired by others' creativity, especially by works of art and music produced by other artists. Art inspires. Music also inspires. Friendships between artists of different genres abound in biographical literature.

The Canadian artists called The Group of Seven made history by creating an art that was truly Canadian, of the Canadian landscapes. They were Tom Thomson, Arthur Lismer, F. H. Varley, A. Y. Jackson, Arthur Lismer, and Lawren Harris. Harris was one of the leaders. He had studied in Berlin early in the 20th century, and then returned to Toronto, Ontario, where his family was prominent. Having been away, his return enabled him to re-view the Canadian landscape with naiveté, with new eyes and a sense of openness. A traveling exhibit of Scandinavian art firmed up his resolve to paint Canada (Harris, 1964). Seeing how the Scandinavian artists painted the north was transformational. He was also influenced by the postimpressionists being exhibited at Stieglitz's Gallery 291 in New York. An art movement called synchromism (Chilvers, 1990), which was founded by American artists McDonald-Wright and Russell, whereby colors were treated like sounds (similar to synaesthesia), also influenced Harris' work. The onset of World War I and his brother's death led Harris to a nervous breakdown and early discharge from the army. While recovering he traveled to the Algoma region north of Sault Ste. Marie, Ontario, where he experienced a spiritual reawakening that led him to paint local landscapes, unique to Canada and the north (Murray, 2003).

Several other Canadian artists were feeling the same way. A letter to Harris by A. Y. Jackson, an artist from Montreal, denounced the Canadian art exhibits that featured paintings by Canadians of Europe: "Ye gods, imagine Monet pottering around Jamaica, Pissaro hard at it in Japan, Renoir out in the Rockies, Sisley in Sicily—and the French Impressionists would have have existed" (in Harris, 1964, p. 56). Harris (1964) wrote that creators cannot create without first knowing where they come from, that "a love of the land" was essential to their creativity: "From the cities, towns, and countrysides to the far reaches of the northern ice-fields, it was an ever clearer and deeply moving experience of oneness with the spirit of the whole land." They influenced each other as they painted across Canada, and they admitted one woman to their number, Emily Carr of British Columbia, who also had a passion for painting and writing about western Canada (Carr, 1971; Crean, 2001; Walker, 1990). Carr had felt isolated and persecuted. Harris and Carr met at an exhibition in Toronto in 1927 and they began to correspond. Over the years, they became great friends. Harris called Carr "one of us," and though she was very frank and independent, he encouraged to her in her solitary attempts to paint what she saw in

the West.

In physics, the creation of the Manhattan Project put scientist Neils Bohr, Joseph Carter, Enrico Fermi, Richard Feynman, Hans Bethe, and J. Robert Oppenheimer, among others, together in a remote location in New Mexico, where they inspired each other to perfect the atomic bomb that was later dropped on Hiroshima and Nagasaki. Bird and Sherwin (2005) biographers of Oppenheimer, said, "Wartime compelled some mild-mannered men to contemplate what was once unthinkable" (p. 222).

Inspiration from Dreams

Dreams have inspired many creative works. Dreams often have personal meanings that solve problems that the dreamers are incubating. Dreams can also present images that entice creators to make their works. The Surrealists encouraged creators to use their dreams as inspiration. Freudian psychology had a great influence on the Surrealists. Both Freud and Jung wrote extensively on the significance of dreams. Freud believed that dreams are wish fulfillment and Jung asserted that dreams capture the collective unconscious—the primitive archetypes lost to us in our waking state. The Indian-born and wholly naturally talented mathematical genius, Ramanujan said that his genius came in dreams from a goddess named Namagiri (Hoffman, 1998). Sculptor David Smith said that dream images were "exchange" images; that is, even though he didn't "consciously use either signs or symbols . . . they've arrived in my mind as exchange images," that ism "dream images, subconscious images, after-images" (Kuh, p. 219).

The Inspiration of Novel Surroundings: Travel

Travel makes it easy to maintain openness and naiveté. Being in a new setting, seeing new places, makes everyone burn with the fire of apprehending what is new, novel. Often, the traveler awakens to deep insight about his or her own reality, his or her own life. Oftentimes, the subject of the creative work is the creator's homeland. Picasso and Miró traveled to Paris and painted Spain. The contemporary humorous essays of American David Sedaris about the mores and foibles of his French countryside neighbors have produced some of the most creative writing of the past decade.

Imagery

Imagery is also part of the creative process. The term imagery is psychological, the ability to mentally represent imagined or previously perceived objects accurately and vividly. Imagery is an attribute of imagination. Imagery is not only visual, but also auditory, tactile, olfactory, and gustatory. Three types of studies of creativity and imagery have been done; (1) biographical and anecdotal studies of creators telling about their personal imagery and how it inspired them; (2) studies which compared people's ability to create imagery and their scores on certain tests of creative potential; and (3) studies about creative imagery and creative productivity.

Guided imagery training goes on in schools and in business and industry. This training attempts to help people learn to manipulate images in their minds. Imagery is essentially spatial, and as such, concrete evidence of the mind's power to construct. Coaches teach athletes to image their performances before they do them; they visualize the ski run, the football play, or the course for the marathon. Studies have shown that athletes who use imagery perform better.

Imagination

Imagination in the creative process refers to a mental faculty whereby one can create concepts or representations of objects not immediately present or seen. The philosopher Aristotle, considered works of the imagination such as poetry, drama, and fiction, more true than history because the artist could fabricate truth from the elements of history rather than exhaustively tell all the facts. The artist is able to tell the truth on a deep level, being able to see the patterns, and the overarching themes, using the imagination. Working from the imagination is both stimulating and entertaining. Visual imagination is not the only kind that creators use. Composers imagine works in their "mind's ear," and mechanics imagine problems in their physical, spatial, array. Imaginative thought is also called daydreaming, and may be called night dreaming, as well as being called fantasy.

Inventor Nicoli Tesla had, from his childhood, an imagination that could create images of inventions, without the help of drawings (Cheney, 1981). Tesla wrote in a 1919 essay about his inventions,

> When I get an idea I start at once building it up in my imagination. I change the construction, make improvements and operate the device in my mind. It is absolutely immaterial to me whether I run my turbine in my thought or test it in my shop. I even note if it is out of balance. (in Cheney, p. 12)

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Intuition

Intuition is having a hunch. "Just knowing," having a gut feeling. Creative people trust and prefer to use their intuition. Everyone has intuition, but many don't trust intuition. Intuition is ambiguous, nebulous. Biographical information, testing, historical and archival research, and experimental studies have shown that creative people use intuition in doing their work. For example, skipping steps in mathematics is an indicator that intuition is being used. The great Hungarian-born mathematician, Paul Erdös, frustrated even fellow mathematicians with his tendency to skip steps and then expect that people understand him (Hoffman, 1998). The intuitive also prefer not to read technical manuals, but jump straight to the tasks, using trial and error to solve the problems.

Intuition is not verifiable by scientific or empirical means. Intuition seems to be a personality preference on the Myers Briggs Type Indicator (MBTI) for artists, scientists, and writers, entrepreneurs, mathematicians, actors, inventors, and composers (Myers & McCaulley, 1985). The place of intuition in creating has long been honored. Jung (1971) thought that intuition was a message from the collective unconscious of the archetypes of the deep human experience. He defined intuition as "neither sense nor perception . . . a content presents itself whole and complete, without our being able to explain or discover how this content came into existence" (p. 453). Jung wrote, about introverted intuition that it makes mystical dreamers, creative artists, or cranks: "If he is an artist, he reveals strange, far-off things in his art, shimmering in all colours, at once portentous and banal, beautiful and grotesque, sublime and whimsical. If not an artist, he is frequently a misunderstood genius . . . " (p. 401).

The importance of intuitive perception of the world, of a non-concrete but still tangible apprehension of underlying truth informs the creator's view of life.

Insight

Insight in the creative process is the ability to see and understand clearly the inner nature of things, especially by intuition. Several types of insight have been researched by cognitive psychologists The studies have shown that insight has the appearance of suddenness, requires preparatory hard work, relies on reconceptualization, involves old and new information; and applies to ill-structured problems.

Insight involves restructuring the problem so that it can be seen in a different way. .

Many notable creative works have originated from insights. When insight happens, we just have to say "Aha! So that's how it works. So that's the answer. So that's what it's all about. So that's what the pattern is." The most famous image of insight is that of Archimedes rising from the bathtub, saying "Aha!" and running down the street, after he discovered the principle of the displacement of water. The "Aha!" comes after knowing the field really well, and after incubation.

Physicist J. Robert Oppenheimer was known as an idea man. He would have the insight and publish a small paper, just ahead of the scientists who would develop the elegant solutions to the problems. He published about black holes before anyone, but then moved on to another insight and another, having no patience for developing the problem further (Bird and Sherwin, 2005).

Incubation

Incubation as a part of the creative process occurs when the mind is at rest. The body is at rest. The creator has gone on to something else. The problem is percolating silently through the mind and body. But somewhere, inside, down there below the surface, the dormant problem is arising. A solution is sifting. Incubation was one of the steps in Wallas' four-part description of problem solving. Psychologists speak of an "incubation effect," which may be caused by conscious work on the problem, and after wards, overwhelming fatigue, where what doesn't work has been forgotten. While resting, the mind works on putting unlike things together. All the ideas may be assimilated through this time period. Then awareness comes and the answer is there. Experiments have shown that if people are given a problem and told to solve it right away, they solve it less successfully than if they are given the problem and told to go away and think about it. People often incubate while driving, sleeping, exercising, even showering. Kary Mullis, a Nobel-prize winner, came up with PCR (Polymerase chain reaction) while driving (Mullis, 1997).

Improvisation

The importance of improvisation in the creative process cannot be understated. To play your musical instrument without music in front of you is frightening to some who have learned to trust in their reading ability and not in their intuition and musical memory. The idea of "play" in improvisation is a necessity. Think of children making up the game as they go along, lost in imagination, forming teams and sides in a fluid all-day motion generated by the discourse of the moment.

Improvisation seems to be a key part of the creative process. Although improvisation is a key skill in the domains of music and theater, other creators also use it. Visual artist Edward Hopper relied on improvisation as he painted: "More of me comes out when I improvise" (Kuh, 1990, p. 131). The poet James Merrill used automatic writing as an improvisational technique: William Butler Yeats used automatic writing as inspiration for work. Improvisation underlies all creativity, but in music and theater, the performer cannot revise the work as writers or painters can. Improvisation in theater and music is almost always collaborative, and requires instant communication between people in the improvisation group. Improvisation reveals inner truth. Dance choreographers rely almost universally on improvisation in order to begin to make a dance. Martha Graham would begin to dance, outlining the pattern she wanted, and her dancers would imitate her. Then she would work on fixing the gestures so that the dancers would be moving together.

OTHER ASPECTS OF THE CREATIVE PROCESS

In the studies, biographies, and memoirs, several other aspects of the creative process seem apparent (Piirto, 2002; 2004): (1) the need for solitude; (2) creativity rituals; (3) meditation; and (4) creativity as the process of a life.

The Need for Solitude

The core of the creative process in domains such as creative writing, music composition, mathematics, and visual arts, is solitude. Solitude is not loneliness, but a fertile state where the creator can think and work freely. Poet Amy Clampitt said, "I think the happiest times in my childhood were spent in solitude—reading . . . Socially, I was a misfit" (Hosmer, 1993, p. 80).   Today, those who seek solitude are often looked at askance, for people are supposed to be in society, and to crave companionship. The internet abounds with dating sites, comradeship sites, chat rooms, gaming sites, where for a minimal sum, people can connect with each other. People who don't have human relationships, who are not married, or in love, or in a family, are viewed as somehow sick. In creative people's lives, their work is often the most important thing. The Ipod may be playing, for the need for broadcast noise seems to be omnipresent, but the work is often done while in solitude. Creative people may be solitary, but that doesn't make them neurotic or unhappy. There is something transcendental about such experiences. When the person is suddenly alone and able to concentrate, she is able to decipher what may have seemed too puzzling, and to unite ideas that may have seemed too different. Not being able to achieve solitude frustrates for many creative people. Loneliness often ensues after

the solitude; the creator seeks society.

Solitude induces reverie. The state between sleeping and waking is relaxed, allowing images and ideas to come so that attention can be paid. What is important is a state of passivity and receptivity. Some people achieve this while cooking, cleaning, or sewing alone, walking in the woods, or during a long, boring drive. It is here, in solitude that, as Buber (1985), said, "We listen to our inmost selves—and do not know which sea we hear murmuring" (p. 11).

Creativity Rituals

Ritual is repetitive practice. Ritual involves special places, special procedures, and special repetitive acts during or before creating. Rituals are sometimes personal. The artist Arshile Gorky would, every week, scrub the parquet floor of his studio with lye, keep his hallway dark so he could see who was knocking without being observed. His biographer, Spender, said, "His working day was governed by ritual. A certain state of dreamy exhaustion was necessary, he used to say, to create freely and spontaneously" (p. 83).

Ritual serves to remove the creator from the outer and propel her to the inner. Some people walk or exercise before creating, and they often get their best ideas while doing it. Some people go for a long drive. Some arrange their rooms or desks a certain way. Some like to work at a certain time of day. The approach to the work is ritualistic, and the work itself could be called, perhaps, the ceremony.

Meditation

Meditation is a part of the creative process in all domains. Whether or not it is formal, tied to a religion like Buddhism, or informal, tied to a need for inner quiet, creators meditate. Visual artist Morris Graves said of painting, "The act is a meditation in itself" (Kuh, 1990, p. 116). A 1991 anthology of poetry contained works by contemporary poets who practice Buddhism (Johnson & Paulenich, 1991). In his introduction, poet Gary Snyder stated:

In this world of onrushing events the act of meditation—even just a "one-breath" meditation—straightening the back, clearing the mind for a moment—is a refreshing island in the stream . . . it is a simple and plain activity. Attention; deliberate stillness and silence . . . the quieted mind has many paths, most of them tedious and ordinary. Then, right in the midst of meditation, totally unexpected images or feelings

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may suddenly erupt, and there is a way into a vivid transparency. (p. 1)

The vehicles for discovering one's self are breathing, sitting still, and waiting. Often the creative work follows the meditation, and the meditation is a preparatory ritual for the creative work. Others have embraced the contemplative life of the Christian monastery, for example, the poets Kathleen Norris and Daniel Berrigan.

In fact, many writers, such as poet Gerald Stern consider writing itself a form of meditation: "For whatever else it is, writing for me is also meditation." Stern, as other writers, views poetry as akin to religion: "my poetry is a kind of religion for me. It's a way of seeking redemption for myself, but just on the page. It is, finally, a way of understanding things so that they can be reconciled, explained, justified, redeemed" (Moyers, 1995, p. 383). The idea that the practice of writing itself is meditation is not a new one. The connection of writing to the spiritual resounds since the time of the Greeks.

Descriptions of the creative process among writers often takes on language that is spiritual, mystical. Take this comment by poet Dick Allen: "A sense of mysticism, a complete dissolving into wonder and beauty has been with me through my life. I remember always feeling nearly ecstatic in childhood. I had known I would be a writer since the third grade" (Contemporary Authors Autobiography series, 11, (CAA) p. 4).

Wonder. Beauty. Dissolving. Disintegrating. Ecstasy. What "unscientific" words these are! What language used by those who treasure precision in language. In more prosaic terms, the experimental research psychologists seeking to justify creativity studies as "science," have categorized such responses and examples as the "mystical" approach, an approach that has hampered the study of creativity (Sternberg & Lubart, 1999). However, such examples exist and pervade the discussions of creativity in other domains, and perhaps experimental psychologists would do well to pay a little more attention to these accounts rather than to dismiss them as "mystical" and therefore not scientific.

Creativity as the Process of a Life

In the past few years, the creative process has gained cachet. Best-selling books have detailed how creativity is The Way. Richard Florida (2003) described a "creative class." His book on economic development has sparked interest among foundations, which seek to fund the efforts of cities and regions to retain their youth in local enclaves, which would provide the excitement, and vitality that would attract

development. The Four T's necessary for economic development in such cities are Technology, Talent, Tolerance, and Territory.   The Knight Foundation Creative Communities Initiative (KFCCI) in particular, has awarded grants to such cities as Charlotte, NC, Tampa, FL, and Duluth, MN. These communities are seeking to attract young professionals in the health, business, and finance industries, as well as those who are core to creativity, the innovators in science, engineering, the arts and design, including visual artists, musicians, and writers. This is the creative class, which is predicted to provide the most growth in jobs and salaries for the future.

Others have viewed the creative process not merely as an altered consciousness, an immense concentration, an attainment of solitude, but as more. That is, we can look at the process of a creative person's life. The creative process is viewed these days as the province of every human being, and not just of the Einsteins, O'Keeffes, or Darwins of the world, or of those who make creative products such as music, or poems, or mathematical formulas. People's lives are their creative products.

In enhancing people's creativity, new age teachers sometimes use methods such as visualization, imagery, metaphorization, chanting, and the formulation of affirmations. People hold sacred objects such as quartz crystals and sit beneath pyramids. They go on vision quests and bang drums, chant in tones and dance like dervishes, seeking inner peace and the guidance for living a creative life. Creativity is intertwined in the feeling of awe, of closeness to the essential that results.

Other, less exotic methods such as writing in journals (Cameron, 1990; Goldberg, 1986; Progoff, 1980; —drawing (Edwards, 1979)—crooning and engaging with the Mozart effect (Campbell, 1997), or dancing (Roth, 1992) are also employed in teaching people to be more creative, and thus to enhance the process of their lives. Again, the educational psychology of divergent production is notably absent.

An outgrowth of the humanistic psychology movement and of the work of such humanistic psychologists as Rogers (1976), Maslow (1968), and Perls (Amendt-Lyon, 2001), this quest for inner meaning has even made it to public television stations, where fund-raising is led by former Detroit high school guidance counselor, Wayne Dyer (2006), who recently talked about inspiration. Public television has also hosted the Bill Moyers Creativity series (1982), and the series called The Creative Spirit (Goleman, Kaufman, & Ray, 1992), both of which spoke to creativity as the process of a life. The Open Center and the Omega Institute in New York, offer creativity-focused sessions such as intensive journal workshops, dream, singing,

empowerment, improvisational theater, and dance workshops. Almost all the teachers of these workshops have written books that tell us how to enhance our creativity. All have in common the probing of the inner psyche, making one's life a work of art, and the attainment of inner peace through auto-therapy done by making creative products.

Thus, the postpositivist educational psychological idea that divergent production, the teaching and testing of Guilford's cognitive operations is creativity, has given way to the new educational psychology of creativity, a consideration and practice of what real creators in domains do when they are being creative.

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