FLOW THEORY: OPTIMIZING ELITE PERFORMANCE IN THE CREATIVE REALM

Mihaly Csikszentmihalyi, Monica N. Montijo, and Angela R. Mouton

Creativity has long been associated with giftedness and talent (Csikszentmihalyi, 1988; Csikszentmihalyi & Wolfe, 2000; Renzulli, 1986). Subotnik, Olszewski-Kubilius, and Worrell (2011) recently reviewed the psychological literature and concluded that the most important variables associated with giftedness are ability (general and domain specific), motivation and mindset, interest and passion, task commitment, opportunity and chance, and creativity. They suggested that giftedness is multidimensional, and exploring giftedness requires an approach that accounts for characteristics at the societal and individual levels:

> Giftedness (a) reflects the values of society; (b) is typically manifested in actual outcomes; . . . (c) is specific to domains of endeavor; (d) is the result of the coalescing of biological, pedagogical, psychological, and psychosocial factors; and (e) is relative not just to the ordinary . . . but to the extraordinary. (p. 3)

This chapter examines elite performance in the creative realm, at the societal and individual levels, and explores the role that flow, a psychological state of complete absorption (Csikszentmihalyi, 1990a), plays in promoting exemplary creativity.

The first section, creativity at the societal level, is explored through the lens of Csikszentmihalyi's (1988, 1996, 2014b) systems model of creativity. This model posits that creativity is a consequence not of isolated individual brilliance, but of the interaction of three interdependent forces:

(a) domains (symbolic systems and knowledge in a society, e.g., music or math, that comprise culture), (b) individuals who adopt and master the knowledge of a domain and create novelty, and (c) the field of practitioners and gatekeepers empowered to select and transmit the best new ideas presented for inclusion in the domain. Like Subotnik and colleagues' (2011) definition of giftedness, the systems model situates the individual within a social and cultural milieu. This chapter argues against the notion that elite performance in the creative realm is simply an expression of stable, innate traits of extraordinary individuals (see Subotnik et al., 2011, for a recent review). Furthermore, the systems model illustrates how individual creativity, when accepted and transmitted by the field, allows for cultural evolution (Csikszentmihalyi, 1988), whereby novel ideas instigate changes in cultural domains.

With this first caveat in place, the second section examines creativity at the individual level, exploring what motivates individuals to persist in their creative pursuits. Creative individuals frequently expend considerable time and effort to produce their works, often for little or no extrinsic reward. Writing the technical code for a mobile phone application or composing a piece of music typically takes time and energy, and the creative process can be beset with difficulties. The outcome of creative work, by its very nature, is unpredictable, and success is certainly not assured. In addition, creative individuals are not necessarily compensated or rewarded by society for their efforts via money,

fame, prestige, or recognition. Given these potential challenges, and the fact that the chances of success are often slim, creative individuals must tap into an intense, personal motive to continue with their efforts despite the obstacles and often without external rewards.

What is the source of this intrinsic motivation? Four decades of research suggest that the answer may lie in flow theory (Csikszentmihalyi, 1990a). Flow has been described as "an almost automatic, effortless, yet highly focused state of consciousness" (Csikszentmihalyi, 1996, p. 110) where individuals feel fully alive, competent, and creative (Csikszentmihalyi, 1990b; Massimini & Delle Fave, 2000). This chapter argues that the flow experience provides the intrinsic motivation required to pursue creative goals. In addition, because flow is the prototypical experience of intrinsic motivation (Csikszentmihalyi, 1990a, 1990b) that is typically enjoyable, it is an experience that individuals seek to recreate. However, because flow requires a constant matching of skill and challenge, individuals must take on tougher challenges as their skills increase, and must develop new skills through deliberate practice to meet increasing challenges in order to remain in flow. In this way, flow promotes psychological complexity as the individual simultaneously seeks to differentiate from, and integrate with, their environment, gradually developing a more complex self (Csikszentmihalyi & Rathunde, 1998).

Remaining at the individual level, the third section examines the complex, creative personality, which is characterized by a duality of traits that lie at opposites ends of personality spectra. For example, a complex, creative personality may exhibit signs of both uniqueness and originality, as well as stability and continuity (Gute, Gute, Nakamura, & Csikszentmihalyi, 2008). We argue in this chapter that possessing a diverse range of dualistic personality traits promotes elite performance in the creative realm (Csikszentmihalyi, 1996).

The fourth section brings together insights regarding creativity at the societal and individual levels, examining the role of flow in navigating the systems model of creativity. We explore how flow experiences contribute to the evolution of culture

through psychological selection, a process in individual consciousness that involves the integration of biological (genetic) and cultural (memetic) instructions (Csikszentmihalyi & Massimini, 1985). The chapter concludes with practical suggestions for using flow to enhance individual creativity and promote cultural evolution.

CREATIVITY AT THE SOCIETAL LEVEL: THE SYSTEMS MODEL OF CREATIVITY

Most theories of creativity have tended to focus solely on the creative individual, suggesting that creativity is a process occurring in the mind of the creator. However, these theories fail to account for highly talented people who never achieve success, and do not account for individuals with average talent who persevere and eventually succeed in their field (Csikszentmihalyi, 1990b; Csikszentmihalyi & Getzels, 1988; Getzels & Csikszentmihalyi, 1976). For example, in the 1960s, Csikszentmihalyi explored the creativity of fine arts students at the School of the Art Institute of Chicago. At the time of the study, women outscored men on various tests of creativity, and were rated as more promising by their art instructors. However, when these participants were followed up 20 years later, not one of the women was known professionally and none was exhibiting her art, compared with at least six men who were becoming established professionally (Csikszentmihalyi, 2014b). Other studies have found that many very high IQ individuals do not develop into eminent individuals who make a significant contribution to enhancing the human condition (e.g., Subotnik, Karp, & Morgan, 1989). By contrast, Csikszentmihalyi's (1996) study of 91 exceptional people, including 14 Nobel Prize winners, revealed that most had succeeded "without any exceptional talent being evident . . . [and] certainly a person can change the culture in significant ways without being a genius" (p. 27). Why might this be the case?

Theoretical Model

Although genes might predispose an individual to excel in a field, research suggests that excellence is

never a product of individual talent alone. Instead, "talent . . . is a relationship between culturally defined opportunities for action and personal skills or capacities to act" (Csikszentmihalyi & Robinson, 1988, p. 264). The systems model of creativity suggests that because individuals operate within a cultural context, creativity "arises from the synergy of many sources and not only from the mind of a single person . . . a genuinely creative accomplishment is almost never the result of a sudden insight, a light bulb flashing on in the dark" (Csikszentmihalyi, 1996, p. 1). Instead, the model suggests that creativity results from three interacting subsystems: the domain, the individual, and the field (see Figure 14.1).

The domain. The symbolic collection of ideas, tools, goals, values, practices, rules, and symbols, of a particular body of knowledge (e.g., music, politics, science, religion, art, etc.) is referred to as the domain. Culture is comprised of the different domains nested within it, representing the shared symbolic meaning or knowledge in a society (or humanity, collectively).

The individual. The creative individual absorbs and masters ideas transmitted from the domain, and produces novel ideas that may or may not be selected by the field for inclusion in the domain.

The field. The community of practice (i.e., the institutions and individuals who represent the domain at any historical point in time) is referred to as the field. Each domain has gatekeepers (e.g., senior, expert, or otherwise influential individuals in the field) who select the relatively few, rare, novel ideas that will be accepted for inclusion in the domain.

The systems model of creativity argues against the idea that talent, giftedness, genius, and creativity are merely expressions of stable, innate traits. Although acknowledging the role that genes might play, the model suggests that creativity is a social construction (Csikszentmihalyi & Robinson, 1988).
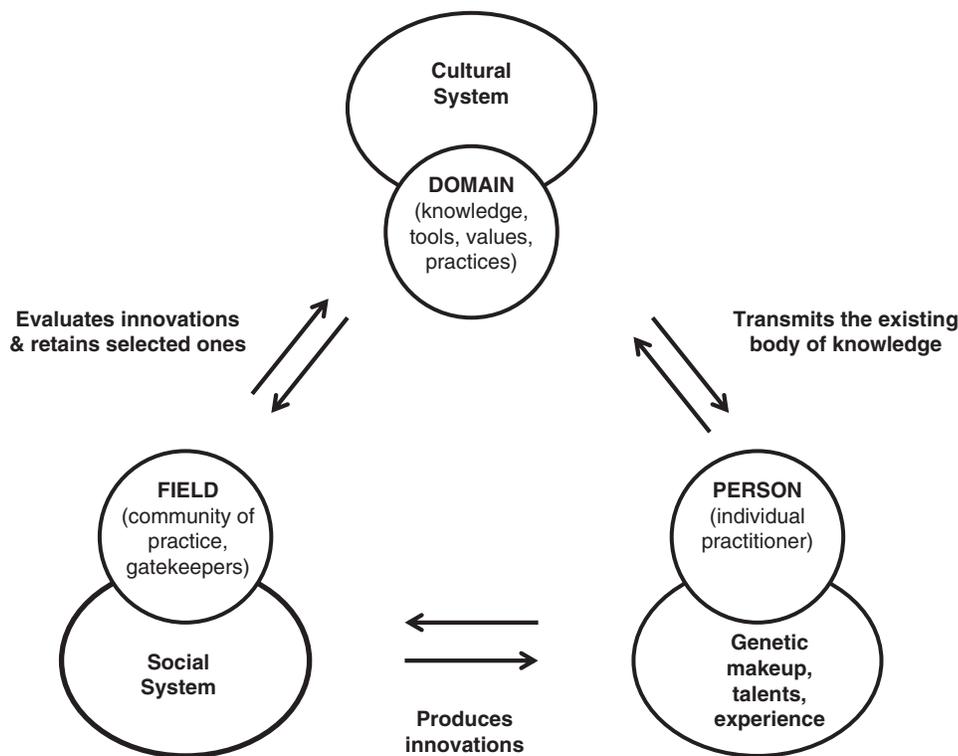

FIGURE 14.1.   The systems model of creativity. From *The Nature of Creativity: Contemporary Psychological Perspectives*, R. J. Sternberg (Ed.), 1999, New York, NY: Cambridge University Press. Copyright by Cambridge University Press. Reprinted with permission.

Although individuals may be *little-c creative* (i.e., able to produce interesting or novel ideas in the course of everyday life), they are considered *Big-C creative* if they master a domain, produce novel ideas that satisfy the selection criteria of a field, and are selected by the relevant gatekeepers for inclusion in a cultural domain. The importance of considering the talented individual within a cultural and social context has been argued by subsequent scholars specializing in creativity and giftedness (see, e.g., Simonton, 2005; Sternberg & Lubart, 1995; Subotnik et al., 2011).

Cultural Evolution

The systems model of creativity describes the cultural equivalent of the process of biological evolution (Csikszentmihalyi, 1996). Both forms of evolution involve "variation, selection, and transmission" (Csikszentmihalyi, 1988, p. 333). In biological evolution, information is intrasomatic. *Genes* (units of biological information) are passed down from parents to their offspring through biological processes. Genetic variations, including new mutations, that provide organisms with a competitive advantage are preferentially selected by the environment via natural selection, and transmitted to the next generation through reproduction.

In cultural evolution, information is extrasomatic. *Memes* (units of cultural information) are ideas or artifacts bundled into discrete domains (e.g., language, music, science, religion, legal systems, etc.). Dawkins (1976) was the first to suggest that memes play a role in cultural evolution equivalent to the role of genes in biological evolution. Each domain has its own symbols, rules, and system of notation, which must be learned intentionally (i.e., passed down from generation to generation), or be lost. New memes that are considered valid and an improvement to the existing domain are preferentially selected by the gatekeepers of a field, and transmitted for inclusion in the domain(s) to which they belong (occasionally novel ideas create a new domain). The next generation encounters the novelty already incorporated in the domains to which they are exposed, and as the process is repeated the domain grows increasingly more complex. In this context, evolution refers to the tendency of systems to increase in complexity over time through the complementary processes of differentiation and integration. The systems model of creativity, therefore, describes the process of cultural, memetic evolution in terms similar to evolution in the biological world.

Empirical Support for the Systems Model of Creativity

Recent studies have emphasized the importance of understanding the interrelationships between the domain, the individual, and the field (including gatekeepers). In the arts, McIntyre (2008, 2011) examined the systems model of creativity in songwriting and record production, as well as in television and film. His case study of the Beatles' hit song, "Yesterday" illustrates the dynamic relationships between the songwriter, Paul McCartney, the access he had to the domain of popular music, and his relationships with gatekeepers in the music industry (McIntyre, 2006). McIntyre argued that, in this case, talent at the individual level was necessary but not sufficient to produce creative novelty. It was McCartney's knowledge of the domain and access to the field that enabled the song to become a creative success.

Cattani, Colucci, and Ferriani (2016) presented similar evidence in a case study analysis of fashion icon Coco Chanel. They argued that an understanding of creative success

> requires more than studying those individuals who are typically associated with a novel product, social movement, or groundbreaking idea. In the end, it is the field participants—most notably, peers, critics, and users—who decide whether a piece of work should be regarded as creative. (pp. 130–131)

Finally, in a longitudinal analysis of creative performance in the Hollywood film industry, Cattani and Ferriani (2008) found that the most creative individuals were positioned between the core and periphery of their social system. In other words, creative performance was enhanced when individuals were exposed to social support from industry gatekeepers yet remained in touch with fresh, new ideas on the fringes of filmmaking.

Implications of the Systems Model of Creativity

The interaction between the domain, the individual, and the field in the creative process has several practical consequences. First, creative ideas need to be acceptable and culturally relevant, as far as the field is concerned, but novel enough to be considered an improvement to the domain. Creative people, therefore, need to absorb, learn, and master existing domain knowledge before attempting to innovate and convince the field that their ideas are worth transmitting. For example, before a musician can compose a new musical piece they must understand and master the rules, principles, and techniques of the domain of music (notation, instrumentation, musicology, etc.), and resolve the history of past musical styles and compositions. Only then will they be ready to produce novelty and present it to the field for consideration. Many talented, creative people falter because of an inability or unwillingness to simultaneously master and improve on the domain (i.e., walk the tightrope between conformity and originality). In fact, some scholars suggested that being too entrenched in the existing domain can stifle innovation and creativity (e.g., Cattani & Ferriani, 2008; Plucker & Beghetto, 2004). Complex, creative personalities may be better equipped to walk this tightrope by capitalizing on their dualities of playfulness and discipline, imagination and reality, extroversion and introversion, and rebellion and respect for tradition (discussed later in this chapter).

Second, creativity depends on novel ideas being selected and transmitted by the field. Big-C creativity is determined by just a handful of influential people. This highlights the importance of having credible gatekeepers because "without the assessment of competent outsiders, there is no reliable way to decide whether the claims of a self-styled creative person are valid" (Csikszentmihalyi, 1996, p. 6). These gatekeepers usually have limited time and attention to pay to the vast number of novel ideas produced. Individuals aspiring to Big-C creativity must find ways to present their work to the gatekeepers of the field, and have their ideas stand out amongst the multitudes of novel ideas presented.

Third, which ideas are selected by the field may depend on luck, perseverance, *kairos* (being at the right place at the right time), or by any number of social, political, cultural, and historical variables present in the environment. For example, Galileo's experimental findings regarding heliocentrism (i.e., the sun is the center of the solar system and the planets revolve around it) were rejected during his lifetime. Galileo was sentenced to house arrest by the Catholic Church for heresy until the day that he died. Today his ideas are accepted universally, but during his lifetime the gatekeepers of the field refused to transmit his ideas to young scientists entering the field. Context (cultural and temporal) is pivotal in the systems model.

Csikszentmihalyi (1996) stressed that the level of creativity in a certain place at a given time depends largely on "how well suited the respective domains and fields are to the recognition and diffusion of novel ideas" (p. 31). Existing domains can promote or hinder creativity depending on their clarity, centrality, and accessibility. Generally speaking a domain that is well organized with clearly defined rules that are easily assimilated, central to the culture in which it is situated, and accessible to the people within the culture (e.g., mathematics) is more likely to facilitate the recognition of novelty and quick diffusion of new memes. Others may take many years to recognize, select, and transmit new ideas (Plucker, Beghetto, & Dow, 2004). Similarly, fields (and their gatekeepers) can promote or hinder creativity. Fields can be reactive or proactive in soliciting or stimulating creativity, too conservative or too liberal in their inclusion criteria for new ideas, and vary in their connection to other domains and wider society. When a field is strong and gatekeepers hold much power (as was the case with the Church during the time of Galileo), there may be little chance for novel ideas to be transmitted, often because such ideas are perceived as threatening to the established field. In these cases, the conventional wisdom is supported, and the same ideas continue to be transmitted and reinforced. However, as a field weakens and begins to lose influence and power, opportunities for the transmission of different, rebellious, or even heretical ideas start to emerge.

It has been suggested that it is easier (although seldom easy) to optimize creativity by addressing conditions in the environment (i.e., domains and

fields) than by attempting to optimize the creativity of individuals (Csikszentmihalyi, 1996).

CREATIVITY AT THE INDIVIDUAL LEVEL: FLOW AS MOTIVATIONAL FUEL

We turn now to creativity at the individual level, first exploring flow as the motivational fuel underlying creative goal pursuit.

Flow: The Psychology of Optimal Experience

Flow theory is the product of decades of work by Csikszentmihalyi, who dedicated much of his time to studying states of optimal experience (Csikszentmihalyi & Csikszentmihalyi, 1988). Csikszentmihalyi's research revealed that the most enjoyable and fulfilling moments in life are characterized by deep involvement and a feeling of complete absorption in the task at hand, a psychological state now known as flow. In short, the flow state is the subjective experience of feeling completely immersed in the present moment because one's capabilities to act can meet, or are stretched by, the opportunities present in the environment (Csikszentmihalyi, 1990b, 2014a). Flow is characterized by (a) a merging of action and awareness, where one has a sense of knowing exactly what needs to be done and how to do it; (b) total concentration on the present moment; (c) the loss of self-consciousness, such that there is an absence of critical self-talk and social comparison; (d) no fear of failure; (e) a sense that time is either speeding up or slowing down; and (f) autotelic motivation, which is the desire to engage in the activity for the joy of doing so, rather than to obtain extrinsic rewards or fulfill obligations (Csikszentmihalyi, 1990b). This set of characteristics has consistently been found in the flow experiences of people across the lifespan, in multiple domains, and across cultures (Csikszentmihalyi, 1996; Delle Fave, Massimini, & Bassi, 2011).

How Does One Achieve Flow?

Flow is precipitated by three conditions: (a) clear and proximate goals, which provide a clear indication as to what a job well done would look and feel like; (b) immediate and unambiguous feedback on how well the individual is doing with respect to those goals; and (c) a perceived balance of challenge and skill, such that the individual perceives that their abilities are being stretched to their full capacity by challenges in the environment. Flow occurs privately, in consciousness, and depends on the investment of psychic energy, namely (a) directing attention to select information in the environment on which to focus; (b) interpreting the meaning of that information through thoughts, feelings, and actions; and (c) the ability to store and recall the information in memory. During flow, the contents of consciousness operate seamlessly, and there is harmony between personal goals and the information present in the environment. In contrast, psychic entropy describes negative experiences such as pain, fear, rage, boredom, or anxiety, during which the contents of consciousness are disordered because there is information that distracts or is at odds with one's intentions (Csikszentmihalyi, 1990b). Csikszentmihalyi (1990b) found that two of the primary obstacles impeding the enjoyment of life are anxiety and boredom. Anxiety ensues in situations where individuals perceive the challenges in the environment to be greater than their ability, whereas boredom occurs when they perceive their abilities to be greater than the challenges provided by the environment. The solution to anxiety and boredom is to learn to control the contents of consciousness so that one is able to attend to and order information in the environment. The quality of experience depends on an ability to direct attention toward challenging goals, which helps to build skills and personal resources that ultimately lead to an increasingly organized and more complex self.

Flow as Motivational Fuel in Creative Pursuits

Any creative endeavor requires the individual to invest psychic energy into the acquisition and application of knowledge, skills, and abilities. Early in his career, Csikszentmihalyi became interested in why people invested so much psychic energy and persisted in activities that offered little to no extrinsic rewards (e.g., money, fame or cultural capital). Interviews with various groups of people (e.g., rock climbers, student artists) suggested that

the interviewees derived deep pleasure from the activity itself. The joy for the rock climber resulted from trying to navigate the body upward in defiance of gravity, and for the artist joy derived from the process of putting color, form, and substance to a blank canvas until the emerging artwork expressed their vision. In fact, early interviews revealed that the outcome of the activity (i.e., successfully ascending a steep cliff face or producing good artwork), had little to do with the enjoyment participants experienced, and almost nothing to do with why they continued to climb and paint (Csikszentmihalyi, 1975).

Similarly, Csikszentmihalyi's (1996) study of creative exemplars found that although these individuals appeared to have little else in common, all shared an absolute love for what they did. For these creative individuals, the will to be creative was generated and sustained from a deep sense of enjoyment in the performance of the task itself. These eminent individuals were not motivated by extrinsic rewards, but instead reported a desire to solve problems because solving them was enjoyable. Consider how historian Natalie Davis selected which historical projects to investigate: "Well, I just get really curious about some problem. It just hooks me very deeply . . . I may not know what is personally invested in it, other than my curiosity and my delight" (Csikszentmihalyi, 1996, p. 53). Inventor Jacob Rabinow, said, "It's fun to come up with an idea, and if nobody wants it, I don't give a damn. It's just fun to come up with something strange and different" (Csikszentmihalyi, 1996, p. 48). In short, these creative exemplars were intrinsically motivated to engage in and persevere with their craft for its own sake.

But what was the source of this intrinsic motivation? Four decades of research suggests that the answer may lie in flow theory (Csikszentmihalyi, 1990a). Studies with thousands of people from around the world—from Japanese motorcycle gangs to Italian farmers to American teenagers—suggest that people are intrinsically motivated to pursue activities that produce experiential rewards through the flow state (Csikszentmihalyi & Csikszentmihalyi, 1988). These rewards are not provided by an outside source, but instead are derived internally from the individual's own positive interpretation of the experience itself. The link between flow and intrinsic motivation has been supported in a variety of contexts, including the workplace (Moneta, 2012), experimental settings (Keller, Ringelhan, & Blomann, 2011), education (Csikszentmihalyi, 1982), and sport (Kowal & Fortier, 1999). In a longitudinal study of 200 talented adolescents, those who had more frequent flow experiences were more likely to persist in acquiring increasingly advanced domain knowledge, which serviced the development of their talent (Csikszentmihalyi, Rathunde, & Whalen, 1997). A clear difference between those teenagers who wasted their talents and those who attained a degree of success in their academic performance was intrinsic motivation and the emergence of psychological complexity. Flow theory has consequently been successfully applied to improve the quality of experience and enhance academic achievement in students at K–12 schools (Cavanagh & Sharnoff, 2014) and universities (Rogatko, 2009). Similar findings have been reported in the workplace (for a review, see Delle Fave et al., 2011). A recent meta-analysis found that matching perceived challenge and skill is robustly related to flow experiences as well as to intrinsic motivation in a variety of domains (Fong, Zaleski, & Leach, 2015). Furthermore, experimental studies have shown that intrinsic motivation can be increased by manipulating the perceived challenge and skill balance in different types of activities (Keller et al., 2011). On a related note, flow has been linked to self-determination, an intrinsic motivation to fulfil the basic human needs for autonomy, competence, and relatedness (Ryan & Deci, 2000), which, when fulfilled, lead to psychological growth (Delle Fave, et al., 2011). For example, a study of over 200 athletes found that the experience of flow while swimming was positively related to perceived competence in swimming, as well as perceived relatedness with other swimmers (Kowal & Fortier, 1999).

Interest in the nexus between flow and intrinsic motivation continues to grow, as researchers and practitioners from around the world investigate and apply flow in disciplines as diverse as psychology, education, business management, human–computer

interactions, athletics, and neuroscience (e.g., Engeser, 2012; Inghilleri, Riva, & Riva, 2014).

Flow, Deliberate Practice, and Elite Performance

The intrinsic motivation provided by the flow experience is pivotal in the development of creativity, in part because of the importance of deliberate practice in achieving expertise and higher levels of performance. Scientists and practitioners routinely estimate that it takes approximately 10,000 hours of deliberate practice to obtain mastery of a given domain (Ericsson, 1999), and there is evidence to suggest that it takes even longer to obtain creative greatness (Kaufman & Kaufman, 2007; Simonton, 1997). One of the great myths of creativity is the notion that creativity is limited to an extremely small proportion of geniuses born with exceptional ability. Although it is true that certain individuals may be more gifted and talented than their peers in a domain, it is also true that developing expertise and mastery in a domain requires more than exceptional ability (Hambrick, Macnamara, Campitelli, Ullén, & Mosing, 2016; Simonton, 2014). Elite performance, whether in the creative realm or elsewhere, requires hard work, persistence, and commitment.

The effort required to commit to deliberate practice is made possible, in part, by the experiential rewards of the flow experience that generate intrinsic or autotelic motivation (see Engeser, 2012, for a recent review). Flow is enjoyable, ensuring that individuals are motivated to recreate the experience. Doing so requires individuals to use their skills to meet challenges in the environment. As their skills increase, more challenging opportunities are required to obtain the experiential rewards associated with flow. Flow is the energizing force motivating individuals to want to practice, perform, and be creative. Today, scholars widely recognize that giftedness (Subotnik et al., 2011), expertise (Hambrick et al., 2016), and creative performance (Simonton, 2014) are developable, and that successful development largely depends on deliberate practice and cultivation of dispositional traits (e.g., personality, interests, values; Simonton, 2014). Csikszentmihalyi and

Nakamura (2014) also make the case that flow is central to the development of goals and the self-regulation of behavior:

> Thus, we would conclude that an optimal experience obtains when a person is maximizing feeling states and is also fully active, which tends to occur when confronting the highest environmental challenge with the fullest use of personal skills. Whenever such an experience occurs, in comparison with past experiences it stands out as better than average, and we want to repeat it. Therefore, it becomes the nucleus of a goal. (p. 204)

The ability to structure goals, activities, deliberate practice, and interactions with the environment in an experientially rewarding way, so as to develop and use the full range of potentialities open to human beings, is a hallmark of psychological complexity (Csikszentmihalyi & Rathunde, 1998).

CREATIVITY AT THE INDIVIDUAL LEVEL: THE COMPLEX CREATIVE PERSONALITY

We turn now to another aspect of creativity at the individual level: the development of the creative personality. Not all talented individuals are willing or able to capitalize on their superior skills, and enjoy successful, fulfilling, and/or Big-C creative careers. The ability to order consciousness by directing attention toward feedback from the environment and away from distractions is of paramount importance for achieving creative eminence, as it is for all elite performance. The development of talent may depend on whether an individual can overcome anxiety resulting from taking a risk or having inadequate skills to confront challenging problems (Nakamura, 1988). Success may also depend on whether individuals can tolerate the solitude required to master the knowledge of a domain (Csikszentmihalyi et al., 1997). Furthermore, "the personality of an individual who is to do something creative must adapt itself to the particular domain and the conditions of a particular field, which vary at different times

and from domain to domain" (Csikszentmihalyi, 1996, p. 56).

Although Csikszentmihalyi has been hesitant to ascribe particular personality traits to creative people, one personality trait appears to be key—psychological complexity. Csikszentmihalyi has defined *complex personality* as "tendencies of thought and action that in most people are segregated . . . contain contradictory extremes—instead of being an 'individual,' each of them is a 'multitude'" (Csikszentmihalyi, 1996, p. 57). Although Csikszentmihalyi acknowledges that such qualities are present in all of us, he suggests that most people develop one quality at the end of each spectrum of characteristics (i.e., either introversion or extroversion, but not both), thinking that one end is good and the other bad. Creative people on the other hand "bring together the entire range of human possibilities within themselves" (p. 57), either at the same time or at different times in their lives. A complex person is not neutral (i.e., engaged in a zero-sum game), but has the ability to move between one extreme and the other, from circumstance to circumstance. Creative personalities are thus able to experience the full repertoire of human emotions and states without any inner conflict.

From his study of creative exemplars, Csikszent-mihalyi (1996) described ten pairs of personality traits that are present and integrated within Big-C creative individuals: energetic and quiet, smart and naive, playful and disciplined, imaginative and realistic, introverted and extroverted, humble and proud, androgynous (i.e., having both sets of traits that the culture deems to be either masculine or feminine), rebellious and traditional, passionate and objective, and suffering and joyful.

- Energetic and quiet: Csikszentmihalyi found that not only did the creative exemplars possess a great deal of physical energy, they were also able to be quiet and rest at a moment's notice. Further, their energy was under their control so that the exemplars were able to choose to focus or recharge depending on the demands of their bodies and opportunities in the environment.
- Smart and naive: Csikszentmihalyi's study suggested that truly creative people appeared smart,

yet naive. Although it is probably true that a certain level of general intelligence is necessary for creative performance, it certainly is not sufficient. Intellectually brilliant minds can easily become complacent and fail to question the status quo. Creative genius requires intelligence to be balanced with an attitude of openness and a lack of preconceived notions. These qualities make it easier to toggle between convergent and divergent thinking.

- Playful and disciplined: Creative exemplars were found to be playful, even irresponsible, and generated new ideas without feeling pressured. However, when the time came to develop those ideas, creative people could switch into a disciplined and responsible mindset.
- Imaginative and realistic: Creative personalities could shift between living in a world of wild imagination and possibility to feeling deeply rooted in the present reality and historical past. In this sense, they were at once rebellious and conservative, revolutionary and conventional.
- Introverted and extroverted: Creative personalities were introverted and extroverted, and just as capable of working long hours alone as they were of learning from others. Mastering domain knowledge and creating novelty often requires hours of solitude, yet unless individuals can build rapport with gatekeepers and peers in the field, it is unlikely that their ideas will be noticed or cared about.
- Humble and proud: Although creative exemplars emanated a sense of self-confidence and ambition, they were also humbly aware of the role luck played in their success. Because creatives love what they do, they are apt to recognize and acknowledge the hard work, sacrifice, and dedication of past and present exemplars. There appeared to be a sense of pride as well as humbleness that arose from contributing to and being a part of a great lineage.
- Androgynous (masculine and/or feminine): In terms of relating with others, creative personalities seemed to defy gender stereotypes of masculinity and femininity, and possessed the strengths of both genders. As psychologically complex

individuals, they were equally able to draw on the strength and aggression associated with masculinity as they were the sensitivity and vulnerability typified by femininity.

- Rebellious and traditional: The exemplars were comfortable taking risks when generating novel ideas because of their commitment to the domain. Creative exemplars routinely expressed a love for what they did. They found incredible enjoyment in the discipline and process of their craft, which enabled them to take risks, and lessened the possibility of negative consequences associated with failure or rejection.
- Passionate and objective: Creative personalities mastered the art of caring deeply about what they did while also remaining objective about the quality of their work. They were equally likely to champion their ideas as they were to critique them.
- Sensitivity to suffering and joy: The creative exemplars demonstrated an openness to experience that facilitated their ability to notice subtle disturbances, as well as revel in the process of creation, often times for its own sake.

Csikszentmihalyi (1996) suggested that a complex person has a number of advantages in terms of creativity in that they are better equipped to master the domain, create novelty, and navigate the gatekeepers of the field. For example, to become an eminent creative, a person needs to be rebellious, generate novel ideas and depart from convention and tradition, but also internalize the rules of the domain and gain credibility within the field. They must be playful in order to detach and be a casual observer of the environment, thereby generating new insights and ideas, but also disciplined enough to undertake the 99% perspiration and deliberate practice required to implement new ideas. Complex individuals are open and curious, allowing for the identification of novel and valuable ideas, as well as opportunities for innovation. However, they are adaptable, and therefore able to accommodate or assimilate to many fields and domains or adapt to changing domains and fields over time. Complex persons are, therefore, able to capitalize on their dualities of playfulness and discipline, imagination and reality, extroversion and introversion, and

rebellion and respect for tradition as they navigate the systems model of creativity. These dualities allow creative persons to walk the tricky line between producing novelty and being acceptable to (and, therefore, selected by) the field's gatekeepers.

However, complex personalities may experience personal challenges, such as being considered an outsider or "odd" (because of their idiosyncrasies) or having strained relationships (complex personalities being difficult to navigate insofar as they are mercurial, leaving those close to them not knowing which extreme of the personality spectrum might emerge at any one time). Creative personalities may also be easily swayed by being too adaptable, and not firm enough in their convictions and views. They may struggle to make decisions easily by always considering the other side of the coin, or suffer emotional and physical fatigue because they swing from one personality extreme to the next. That being said, it has been suggested that it is the ability to draw on this full range of human expression at will that sets apart truly creative individuals (Gute et al., 2015).

PUTTING IT TOGETHER: THE ROLE OF FLOW IN THE SYSTEMS MODEL OF CREATIVITY

As we have seen, there is strong evidence that flow and creative performance are related at the individual level. A person who frequently enters the flow state is intrinsically motivated and therefore, more likely to practice, persist, and succeed in their creative endeavors. However, according to the systems model of creativity, to be considered Big-C creative, individuals must navigate the sociocultural system in which they reside. Therefore, individuals must find flow in their creative activities and produce novel ideas, while drawing on or being informed by existing ideas in the domain, and taking into consideration the field and its gatekeepers. How would they accomplish this complex task? If individuals can create the conditions necessary for flow while navigating the system of domains and fields, they are more likely to succeed in their creative pursuits.

Flow depends on clear and proximate goals. At the individual level, creative pursuits typically

provide such goals, as in the case of a musician knowing precisely the correct note to play next. At the societal level, goals may be obvious in the existing domain, suggested by the creative individual who has mastered the domain, or may be mandated by the field. Creative goals might include solving a problem (e.g., finding a cost effective renewable energy source), addressing a gap in a domain (e.g., discovering how to attract more women to the field of mathematics), addressing a contradiction in a domain (e.g., reconciling conflicting findings regarding fat in the diet), discovering meaning (e.g., uncovering the intended meaning in a piece of music), or discovering problems (e.g., the unhealthy consequences of "fracking" as a method for extracting oil). The important point is that, from the perspective of the systems model, clear and proximate goals should not be conceived solely as existing in the mind of the individual, but rather should be informed by the domains and field in which individuals are situated.

Flow also requires immediate feedback regarding progress against clear and proximate goals. At the individual level, feedback is often readily available in creative pursuits. For example, a musician can hear immediately whether he has struck the intended note. However, at the societal level, feedback may be more difficult to come by. The creative process does not typically lend itself to immediate feedback from external sources. Creative endeavors often take a long time (e.g., writing an academic article or composing a piece of music), and the cycles of peer feedback or critical response are protracted. As such, to receive immediate feedback at the societal level, creative individuals need to provide it to themselves by internalizing the field's criteria of judgment. This requires an understanding of the existing domain as well as an appreciation of the novel ideas that the field is likely to select and transmit. Big-C creative people have a strong internalized picture of what the field considers "good" and "bad" at any point in time, and adjust their performance accordingly.

Finally, flow requires a perceived balance of skill and challenge. At the individual level, creative tasks often provide this balance, hence their tendency to facilitate flow. For example, a ballet

dancer will draw on her existing skill but seek to achieve ever greater levels of performance to remain in the flow state. At the societal level, Big-C creative people must seek to develop their skills regarding the challenges provided by their environment. Because they must pass muster with the gatekeepers of the field, much of the challenge will involve meeting and surpassing the field's criteria for selection and transmission. Research suggests that complex personalities tend to achieve this balance of skill and challenge more often: they are willing to draw on the existing domain and other areas of interest to inform their ideas, but are also willing to step out of the mold and risk occasional failure in producing novelty (Csikszentmihalyi, 1996, 2014b).

In short, the antecedents of flow (e.g., clear and proximate goals, immediate feedback, and a perceived balance of challenge and skill) can be created while simultaneously navigating the process described by the systems model of creativity. If an individual can enter flow at the individual level while recognizing that they are situated in a spatial and temporal context (that is just as important as their individual gifts), they are more likely to succeed in their chosen field. Indeed, the flow state can assist creative individuals in navigating the systems model, which takes substantial time and energy. Flow provides complete focus, absorption, and intrinsic motivation for the individual who must immerse himself or herself in the existing domain, learn all of its rules, absorb its criteria for excellence, and then produce novelty that is accepted and transmitted by the gatekeepers of the field.

APPLICATIONS

Navigating the systems model of creativity is important not only for the success of the creative individual but also for the evolution of culture. As Csikszentmihalyi (1996) has said, "workable new solutions to poverty or overpopulation will not appear magically by themselves. Problems are solved only when we devote a great deal of attention to them, and in a creative way" (p. 11). Subotnik and colleagues (2011) concur:

> We assert that aspiring to fulfill one's talents and abilities in the form of transcendent creative contributions will lead to high levels of personal satisfaction and self-actualization as well as produce yet unimaginable scientific, aesthetic, and practical benefits to society. (p. 141)

Thinking about creativity as a systemic process, rather than as an individual quality, opens a variety of possible directions for enhancing this increasingly important tool for human survival and flourishing. One clear implication, for instance, is that the more accessible we make domain knowledge to the broadest segment of the population, the more likely it is that potentially creative individuals will learn enough to come up with viable innovations. However, unless the field responsible for the domain is selecting new ideas well, and is encouraging the production of novelty, creativity is likely to diminish in society. Finally, if domain knowledge is not taught in ways that young people can enjoy using it, fewer and fewer people will take the trouble to play with existing knowledge and explore what lies beyond its limits, and will instead be satisfied to learn just what is needed to meet the requirements of the present. If this happens, society will cease to grow, and will be left out of the future. A few ideas for how to avoid stagnation are presented next.

Using Flow to Enhance Individual Creativity and Performance

How can individuals create the conditions for flow and creativity in their life? First, they must acquire clear goals by discovering a problem to solve. Csikszentmihalyi's (Getzels & Csikszentmihalyi, 1976) first investigation of creativity at the School of the Art Institute of Chicago had the goal of operationalizing the process of "problem finding." His research found that experts rated student drawings as more original, interesting, and valuable when the image emerged naturally, and in a sense was "*discovered* rather than *re-presented*" (Csikszentmihalyi, 2014b). The next steps are to train the mind to attend to immediate feedback, to facilitate a balance of skill and challenge by developing a love of approaching problems, to adopt multiple ways of solving

problems, including learning knowledge and skills from other domains, and to acquire a thick skin that is tolerant of risk and resilient to failure.

Although each person has the potential to summon the psychic energy required to be creative, Csikszentmihalyi (1997) identified common obstacles to overcome in daily life. The first is learning to focus attention. Most of us learn to pay attention to stimuli that we are genetically programmed to attend to, either because they might be dangerous, or because they are attractive. This is very helpful to our survival. But if we only pay attention to what worked for us in the past, we are likely to miss what might be useful in the future. A second obstacle is succumbing to the influence of the social environment. Again, listening to our elders and following the dictates of our peers is necessary, but not sufficient if we want to go beyond what made sense in the past. Finally, it is important to become strategic about the allure of extrinsic rewards. It is crucial that in the development of talent, individuals learn how to cultivate curiosity and interest by investing attention in activities for their own sake rather than the extrinsic rewards they may produce.

Instead of following mechanically the dictates of the past, individuals can strive to create the conditions to experience flow in everyday life by setting goals, investing attention on actions aligned to those goals, and ultimately increase the complexity of the self. Learning from emerging conditions of an ever-changing reality, one can begin to build habits and routines to save energy, exploit new opportunities, and stave off entropic forces.

Using Flow to Promote Cultural Evolution

Human beings are more than the behavioral proscriptions to survive and reproduce encoded in genes and the cultural scripts inherent to memes. Through consciousness and psychological selection, humans are constantly integrating biological and cultural instructions to become active agents of their development (Csikszentmihalyi & Rathunde, 1998). Because psychological selection is a subjective experience occurring in private consciousness, the preferential focus of attention in flow makes it a core component of this process (Csikszentmihalyi & Massimini, 1985). Psychological selection ensures that "each

person in her lifetime becomes both the object and the subject in the selective process, both the sculptor and the block of stone" (Delle Fave et al., 2011, p. 48). Through this process, humans reproduce and transmit biological and cultural information and have a role in determining the survival and replication of their biological and cultural legacies.

Psychological selection is an evolutionary process of "experiences tending to replicate themselves within the life cycle of individual consciousness" (Csikszentmihalyi & Massimini, 1985, p. 132). When the experiences replicated in consciousness produce order, enjoyment and growth ensue. But if they engender disorder resulting in a mismatch of personal goals and capabilities to act, anxiety, boredom, and stagnation threaten to take over. Flow is an autotelic experience and provides a feeling of engagement with the environment that is rewarding in and of itself. Because flow orients attention toward the full use of personal skills and abilities to meet the challenges present in the environment, it requires either the improvement of skills or access to greater challenges to replicate the positive subjective experience. This is how individual and cultural development arise, because to repeat the flow state and maintain order in consciousness, novelty in the form of new skills (biological information) and/or increased challenges (cultural information) must be replicated and transmitted in the individual and the culture.

For the culture to evolve beyond genetic and memetic scripts for power, dominance, pleasure, and the avoidance of pain, individuals and social institutions must invest attention in endeavors that continually provide opportunities to stretch capabilities to the fullest extent. Environments must be structured so that the work required to master the knowledge and rules of an existing domain and create a novel innovation is structured to produce intrinsic rewards. Furthermore, mentoring within fields can be used to help individuals straddle the line between core principles and fresh ideas.

SUMMARY AND CONCLUSIONS

This chapter argued that talent, giftedness, creativity, and elite performance are not solely the products of innate genetic gifts resulting in superior abilities. Instead, we agree with other scholars in these fields (e.g., Simonton, 2014; Subotnik et al., 2011) that what is most important is to understand the dynamic interplay between individual abilities and environmental opportunities. The experience of flow is influential in the development of the individual and of society because it requires an ongoing balance of challenge and skill, immediate feedback, and clear and proximate goals, and serves the development of an increasingly complex self, which is capable of expressing the full range of human potentialities. By providing opportunities for these types of optimal experiences in daily activities, parents, teachers, gatekeepers of social institutions, and policy makers can serve the development of creative individuals and the evolution of culture.

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