Flow Theory and Research.

Nakamura, J and Csikszentmihalyi, M.

In Oxford Handbook of Positive Psychology.
S. Lopez and C.R. Snyder, Eds. Pp 195-206. (2009).
N.Y. Oxford University Press

CHAPTER

18 Flow Theory and Research

Jeanne Nakamura *and* Mihaly Csikszentmihalyi

Abstract

This chapter describes flow, the experience of complete absorption in the present moment, and the experiential approach to positive psychology that it represents. We summarize the model of optimal experience and development that is associated with the concept of flow, and describe several ways of measuring flow, giving particular attention to the experience sampling method. We review some of the recent research concerning the outcomes and dynamics of flow, its conditions at school and work, and interventions that have been employed to foster flow. Finally, we identify some of the promising directions for flow research moving into the future.

Keywords: flow, human development, motivation, optimal functioning, subjective experience

What constitutes a good life? Few questions are of more fundamental importance to a positive psychology. Flow research has yielded one answer, focusing on full involvement in the present moment. From the perspective of flow, "a good life is characterized by complete absorption in what one does." In this chapter, we describe the flow model of optimal experience and development, explain how flow has been measured, discuss recent work in this area, and identify directions for future research.

Optimal Experience and Its Role in Development

Studying the creative process in the 1960s (Getzels & Csikszentmihalyi, 1976), Csikszentmihalyi observed that when work on a painting was going well, the artist persisted single-mindedly, disregarding hunger, fatigue, and discomfort—yet lost interest in the product once it was completed. Flow research and theory had their origin in a desire to understand this phenomenon of intrinsically motivated, or "autotelic," activity—activity rewarding in and of itself (*auto* = self, *telos* = goal), regardless of extrinsic rewards that might result from the activity.

Significant research had been conducted previously on intrinsic motivation (Deci & Ryan, 1985). Nevertheless, no systematic empirical research had been undertaken to clarify the "subjective phenomenology" of intrinsically motivated activity. Csikszentmihalyi (1975/2000) investigated the nature and conditions of enjoyment by interviewing chess players, rock climbers, dancers, and others who emphasized enjoyment as the main reason for pursuing an activity. The conditions for entering flow include:

- perceived challenges, or opportunities for action, that stretch but do not overmatch existing skills;
- clear proximal goals and immediate feedback about the progress being made.

Under these conditions, experience seamlessly unfolds from moment to moment and one enters a subjective state with the following characteristics:

- intense and focused concentration on the present moment;
- merging of action and awareness;
- loss of reflective self-consciousness (i.e., loss of awareness of oneself as a social actor);

• a sense that one can control one's actions; that is, a sense that one can in principle deal with the situation because one knows how to respond to whatever happens next;

• distortion of temporal experience (typically, a sense that time has passed faster than normal);

• experience of the activity as intrinsically rewarding, such that often the end goal is just an excuse for the process.

The reported phenomenology was remarkably similar across different leisure and work settings.

When in flow, the individual operates at full capacity (cf. de Charms, 1968; Deci, 1975; White, 1959). The state is one of dynamic equilibrium. Entering flow depends on establishing a balance between perceived action capacities and action opportunities (cf. optimal arousal, Berlyne, 1960; Hunt, 1965). The balance is fragile. If challenges exceed skills, one first becomes vigilant and then anxious; if skills exceed challenges, one first relaxes and eventually becomes bored. A visual representation of this landscape shows the quality of experience as a function of the ratio between perceived challenges and skills (Figure 18.1). Shifts in subjective state provide feedback about the changing relationship to the environment. Anxiety or boredom presses a person to adjust his or her level of skill and/or challenge, in order to escape the aversive state and reenter flow.

The original account of the flow state has proven robust. The experience is reported in similar terms across lines of class, gender, and age, as well as across cultures (Asakawa, 2004; Delle Fave & Massimini, 2004) and different kinds of activity.

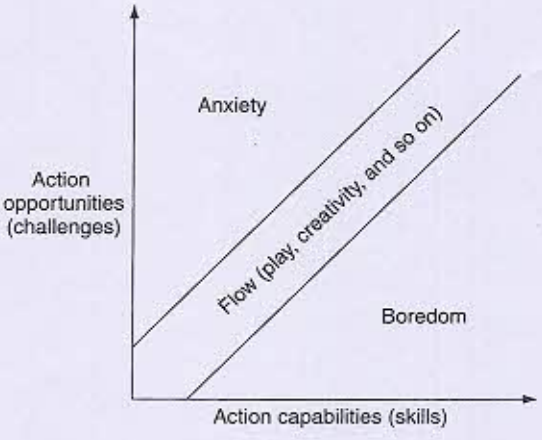

Fig. 18.1 The original model of the flow state. Flow is experienced when perceived opportunities for action are in balance with the actor's perceived skills. Adapted from Csikszentmihalyi (1975/2000).

Flow research was pursued throughout the 1980s and 1990s in the laboratories of Csikszentmihalyi in Chicago and colleagues in Italy (Csikszentmihalyi & Csikszentmihalyi, 1988; Inghilleri, 1999; Massimini & Carli, 1988; Massimini & Delle Fave, 2000). It yielded several refinements of the model of experiential states and dynamics in which the flow concept is embedded.

The flow concept has been employed by researchers studying optimal experience (e.g., leisure, play, sports, art, intrinsic motivation), and by practitioners addressing contexts where fostering positive experience is especially important (in particular, formal schooling at all levels). In addition, the concept has had growing impact outside academia, in such spheres as popular culture, professional sports, and business.

Initially, work on flow was assimilated by psychology primarily within the humanistic tradition of Maslow and Rogers (McAdams, 1990), or as part of the empirical literature on intrinsic motivation and interest (e.g., Deci & Ryan, 1985; Renninger, Hidi, & Krapp, 1992). In recent years, a model of the individual as a self-regulating organism interacting with the environment has become increasingly central in psychology (e.g., Brandstadter, 2006; Magnusson & Stattin, 2006). This is highly compatible with the model of psychological functioning and development associated with the flow concept (Inghilleri, 1999; Rathunde & Csikszentmihalyi, 2006).

Because the flow experience is shaped by both person and environment, it involves "emergent motivation" in an open system (Csikszentmihalyi, 1985): What happens at any moment is responsive to what happened immediately before, rather than being dictated by a preexisting intentional structure located within person (e.g., a trait) or environment (e.g., a role or script). Motivation is emergent in the sense that "proximal goals" arise out of the interaction. The next section introduces the companion notion of emergent long-term goals, such as new interests.

Sports, games, and other "flow activities" provide goal and feedback structures that make flow more likely. But one can find flow in almost any activity, even working a cash register, ironing clothes, or driving a car. It is subjective challenges and skills, not objective ones, which influence the quality of a person's experience. Similarly a person who is involved in a flow activity may not enter flow if

distractions or excessive challenges disrupt the experience.

Flow, Complexity, and Development

When attention is completely absorbed in the challenges at hand, the individual achieves an ordered state of consciousness (see Nakamura & Csikszentmihalyi, 2002a, for fuller discussion of the relations between flow and attentional processes). Thoughts, feelings, wishes, and action are in harmony. Subjective experience is both differentiated and integrated, the defining qualities of a complex phenomenon.

The notion of complexity applies in a second sense, as well. The flow state is intrinsically rewarding and leads the individual to seek to replicate flow experiences; this introduces a selective mechanism into psychological functioning that fosters growth (Massimini & Delle Fave, 2000). As people master challenges in an activity, they develop greater levels of skill and the activity ceases to be as involving as before. To continue experiencing flow, they must engage progressively more complex challenges. The optimal level of challenge stretches existing skills (cf. Vygotsky, 1978), resulting in more complex capacities for action. This factor distinguishes the flow model from theories that define optimal challenge in terms of either a homeostatic equilibrium point to be returned to or a maximum level of challenge to be reached (Moneta & Csikszentmihalyi, 1996). A flow activity provides a system of graded challenges, able to accommodate a person's continued and deepening enjoyment as skills grow.

The tendency of the self toward complexity is a source of new goals and interests as well as new capacities for action in relation to existing interests (Csikszentmihalyi & Nakamura, 1999). Descending a staircase is an almost unnoticed means to an end for the person on foot, but might be a beckoning opportunity for flow to a person on a skateboard. In this second sense, emergent motivation means we can come to experience a new or previously unengaging activity as intrinsically motivating if we once find flow in it.

The Autotelic Personality

As noted previously, flow theory and research have focused on phenomenology rather than personality. The goal has been to understand the dynamics of momentary experience and the conditions under which it is optimal. The capacity to experience flow appears to be nearly universal. Nevertheless, people vary widely in the frequency of reported flow. People also differ in the quality of their experience, and in their desire to be doing what they are doing, when their capacities and their opportunities for action are simultaneously high. This suggests that the latter balance represents an important but not a sufficient condition for flow.

From the beginning, Csikszentmihalyi (1975/2000) recognized the possibility of an "autotelic personality," a person who tends to enjoy life or "generally does things for their own sake, rather than in order to achieve some later external goal" (Csikszentmihalyi, 1997, p. 117). This kind of personality is distinguished by "meta-skills," which enable the individual to enter the flow and stay in it. These meta-skills include a general curiosity and interest in life, persistence, and low self-centeredness, which result in the ability to be motivated by intrinsic rewards.

By adding a temporal perspective to the concept of autotelic personality, Csikszentmihalyi and Nakamura (in press) argued that optimal life-span development involves the formation of "psychological capital" (PK). PK refers to an even broader set of meta-skills or learned habits that allow a person not only to enjoy whatever he or she does at the moment, but at the same time increase the likelihood of enjoying future experiences. Thus a person who experienced flow only when involved in extreme sports, or when playing chess, might not build PK because these sources of enjoyment are likely to dry up later in life. Nor would a person develop PK by spending years in drudgery, hoping to enjoy life later.

Measuring Flow and Autotelic Personality

Researchers have developed several means of measuring intra-individual (e.g., cross-context) and inter-individual differences in flow experiences. In addition, some effort has been made to measure autotelic personality, the disposition to experience flow.

Measuring Flow

Subjective experience has been viewed as falling outside the sphere of scientific inquiry throughout many of the years since the decline of introspectionist psychology. This has recently been changing, however (Richardson, 1999), leading to increased interest in the methods used in flow research. Several self-report tools are being used, including interviews, paper-and-pencil measures, and the

experience sampling method. Other methods have been added to the tool kit in recent years.

INTERVIEW

The flow concept emerged from qualitative accounts of how it feels when an activity is going well (Csikszentmihalyi, 1975/2000). The semistructured interview provides a holistic, emic account of the flow experience in real-life contexts. It was a critical tool in first delineating dimensions and dynamics of the flow experience. It continues to be the approach of choice in exploratory research (e.g., Reed, Schallert, & Deithloff, 2002) and studies directed toward rich, integrated description (Jackson, 1995; Neumann, 2006; Perry, 1999).

QUESTIONNAIRE

Paper-and-pencil measures have been used widely when the goal is not to identify but instead to measure dimensions of the flow experience, and/or differences in its occurrence across contexts or individuals. The Flow Questionnaire presents respondents with several passages describing the flow state and asks whether they have had the experience, how often, and in what activities (Csikszentmihalyi & Csikszentmihalyi, 1988).

The 10-item Flow Scale (Mayers, 1978) elicits an estimate of the frequency with which the respondent experiences dimensions of flow in specified activities (e.g., "I get involved," "I get direct clues as to how well I am doing"). Delle Fave and Massimini (1988) employed the Flow Questionnaire and Flow Scale in tandem to identify flow activities and then compare the person's rating of the flow dimensions for his or her primary flow activity with those for a standardized set of everyday activities. In contrast to these global estimates of the frequency of flow in specified activities, a scale assessing the flow state in the respondent's "current" pursuit was developed for use in German and translated into several additional languages (Rheinberg, Vollmeyer, & Engeser, 2003).

Extensive psychometric work by Jackson and colleagues (Jackson & Eklund, 2002, 2004; Jackson & Marsh, 1996) produced two parallel 36-item scales to measure (a) the frequency of flow in a given activity (Dispositional Flow Scale, DFS-2) and (b) the degree to which flow dimensions characterize a just-completed experience or event (Flow State Scale, FSS-2). While designed to measure flow within physical activities, the scales have been used successfully to study other pursuits such as music, theatre, and computing; two short flow scales for general use have recently been developed (Jackson, Martin, & Eklund, 2008). Finally, researchers continue to develop questionnaire measures of flow in particular activities, such as work (Bakker, 2008).

EXPERIENCE SAMPLING METHOD

Interview and global-rating approaches rely on retrospective reconstruction of past experience, and respondents must average across many discrete experiences to compose a picture of the typical subjective experience when things are going well, and then estimate the frequency or intensity of this experience. The study of flow progressed in large part because researchers in the 1970s developed a tool uniquely suited to the study of situated experiential states, including optimal experience. Descriptions of the Experience Sampling Method (ESM) can be found elsewhere (Csikszentmihalyi & Larson, 1987; Hektner, Schmidt, & Csikszentmihalyi, 2006). Briefly, participants carry paging devices that signal them, at preprogrammed times, to complete a questionnaire describing the moment at which they were paged. The method takes multiple random samples from the stream of actual everyday experience.

ESM studies of flow have focused on the sampled moments when (a) the "conditions for flow" exist, based on the balance of challenges (or opportunities for action) and skills (abilities to deal with the situation); and/or (b) the "flow state" is reported. The latter usually is measured by aggregating reported levels of concentration, enjoyment, and intrinsic motivation. These three dimensions provide a reasonable proxy for what is in reality a much more complex state of consciousness. Fuller discussion of the study of flow with the ESM can be found elsewhere (Csikszentmihalyi & Rathunde, 1993; Hektner, Schmidt, & Csikszentmihalyi, 2006; Nakamura & Csikszentmihalyi, 2002a; Schmidt, Shernoff, & Csikszentmihalyi, 2006). In an adaptation of naturalistic experience sampling, Abuhamdeh studied competition within an Internet chess club; players' ratings provided an objective measure of challenge and skill levels, which was compared with their enjoyment of the game (Abuhamdeh & Csikszentmihalyi, 2008).

OBJECTIVE MEASUREMENT

The ESM yields a corpus of moments in flow, particularly when large numbers of experience samples are collected, but necessarily interrupts the flow experience. Custodero (1998) triangulated interview and observational data to construct a behavioral measure of flow during young children's musical

performance. While her primary motivation was to devise a measure of flow for a population with limited capacity to report inner states, her work represents one of the few efforts to identify behavioral markers of flow. The technique is painstaking and time-intensive, however. With colleagues including Fredrik Ullen, one of our current goals is to identify physiological markers of flow that would permit tracking of the dynamics of flow without disrupting it (Blom & Ullen, 2008). ESM research suggests that enjoyment and involvement are associated with significantly lower salivary cortisol levels than expected for time of day (Adam, 2005), implying lower stress levels and lower blood pressure.

LABORATORY MANIPULATION

With this same aim of studying the dynamics of flow, several researchers have tracked or controlled theoretically key experiential conditions, usually the levels of challenge and skill in an activity such as an online game or learning situation, and elicited self-reports of flow (e.g., Pearce, Ainley, & Howard, 2005; Rheinberg & Vollmeyer, 2003). Moller has developed a computer game procedure that promises to give researchers a standardized laboratory manipulation for controlled study of the dynamics of flow (Moller, Csikszentmihalyi, Nakamura, & Deci, 2007; see also Keller & Bless, 2008).

Measuring the Autotelic Personality

As interest in the autotelic personality has grown, researchers have sought a way to measure it with the naturalistic data generated by the ESM. "Time spent in the high-challenge, high-skill situations conducive to flow" has been the most widely used measure of the general propensity toward flow (Adlai-Gail, 1994; Asakawa, 2004; Hektner, 1996). However, time in flow also reflects the range of action opportunities that happen to be available in the individual's environment during the sampling period. Other researchers therefore have operationalized the disposition as "intrinsic motivation in high-challenge, high-skill situations," reflected in low mean scores on the item "I wish to be doing something else" when subjective challenges and skills are both above average (e.g., Csikszentmihalyi & LeFevre, 1989). We anticipate that measures of psychological capital will encompass what has been known as autotelic personality, such as the possession of "meta-skills" for the regulation of experience (Csikszentmihalyi & Nakamura, 1989, in press; Csikszentmihalyi, Rathunde, & Whalen, 1993).

Recent Directions in Flow Research

Consequences of Flow

According to this model, experiencing flow encourages a person to persist in and return to an activity because of the experiential rewards it promises, and thereby fosters the growth of skills over time. Several studies linked flow to commitment and achievement during high school (Carli, Delle Fave, & Massimini, 1988; Mayers, 1978; Nakamura, 1988). A longitudinal ESM study of talented high school students showed a relationship between quality of experience and persistence. Students still committed to their talent area at age 17 were compared to peers who had disengaged. Four years earlier, those currently still committed had experienced more flow and less anxiety than their peers when engaged in school-related activities; they also were more likely to have identified their talent area as a source of flow (Csikszentmihalyi et al., 1993). In a longitudinal study of students talented in mathematics (Heine, 1996), those who experienced flow in the first part of a course performed better in the second half, controlling for initial abilities and GPA; in studies of two university courses, flow predicted semester-end performance (Engeser, Rheinberg, Vollmeyer, & Bischoff, 2005). Because the self grows through flow experiences, we also might expect time spent in flow to predict self-esteem. Correlational studies with ESM data support this expectation (Adlai-Gail, 1994; Wells, 1988).

In the work domain, several studies connected flow to such positive outcomes as work satisfaction (Bryce & Haworth, 2002). Researchers linked teachers' experience of flow to students' cognitive engagement (Basom & Frase, 2004) and to students' experience of flow (Bakker, 2005).

Longitudinal research suggests that in addition to enhancing positive outcomes, mastering challenges in daily life may protect against negative outcomes (Schmidt, 1999). For adolescents who had experienced high adversity at home and/or school, the availability of challenging activities, involvement in these activities, and sense of success when engaged in them were all associated with lower delinquency 2 years later.

The Nature and Dynamics of Flow

The positive correlates and outcomes of flow undoubtedly account for some of the interest paid to it in recent years. However, this interest, in a sense, misses the point. From the perspective of the individual, the flow state is a self-justifying experience; it is, by definition, an end in itself.

A distinct strand of research can be traced forward from the original study of flow activities. In this work, interviews have yielded domain-specific descriptions of deep flow in diverse activities: elite and nonelite sport (Jackson & Csikszentmihalyi, 1999; Kimiecik & Harris, 1996), social activism (Colby & Damon, 1992), aesthetic experience (Csikszentmihalyi & Robinson, 1990), literary writing (Perry, 1999), and scholarly and creative work more generally (Csikszentmihalyi, 1996; Neumann, 2006). These studies confirm how universal the flow state is across different activities. Research also is yielding nuanced pictures of flow within particular contexts. The dynamics of flow are being studied in domains including sports and games, computer and Web usage, education, and work.

FLOW AT SCHOOL

A growing body of research addresses different educational contexts. Studies of school types, pedagogies, and instructional practices are illustrative. In an ESM study of middle schools, Montessori students experienced more flow, and were more motivated in school, than students attending matched traditional institutions (Rathunde & Csikszentmihalyi, 2005). Regarding classroom activities, active pedagogies such as cooperative learning provided more flow than passive pedagogies such as listening to lectures, both for high school (Shernoff, Csikszentmihalyi, Shneider, & Shernoff, 2003) and college (Peterson & Miller, 2004) students. In a study of instructional-discourse strategies, Turner et al. (1998) identified elementary school math classrooms where students reported challenges and skills that were in balance and above average for the sample; the teachers tended to "scaffold" instruction, negotiating understanding, giving autonomy, and encouraging intrinsic motivation, rather than being highly directive and evaluative and using extrinsic controls. Turner and Meyer (2004) observe that supportive instructional practices are critical if students are to embrace academic challenges rather than finding them threatening, even when the challenges are carefully modulated.

FLOW AT WORK

In addition to the research on learning, several studies have addressed the work experience of teachers. A recent British study suggested that primary and secondary teachers experience flow with high frequency, and that their levels of flow may exceed those of workers in several other professions (Morgan, 2005). Research on teachers also has examined antecedents of flow. Among facilitators identified are self-efficacy (Basom & Frase, 2004) and job resources (Bakker, 2005); some of the latter (e.g., performance feedback) directly provide proximal conditions for entering flow while others (e.g., social support, coaching by supervisors) are thought to function like skills to help workers meet the challenges of their work. Bakker's work suggests that underprovision of resources, like inadequate levels of skill, can lead to anxiety, and overprovision of resources, like excess of skill, can lead to boredom. A longitudinal study (Salanova, Bakker, & Llorens, 2006) offered evidence of a "positive upward spiral": Both personal resources (i.e., self-efficacy beliefs) and organizational resources (e.g., social support) positively affected work-related flow and, in addition, work-related flow positively affected the resources that workers mobilize.

Also in the work context, an intriguing line of research concerns the "paradox of work" first reported by Csikszentmihalyi and Lefevre (1989) in a U.S. sample. ESM studies of Swiss (Schallberger & Pfister, 2001) and German (Rheinberg, Manig, Reinhold, Engeser, & Vollmeyer, 2007) workers have confirmed that flow is higher at work and yet happiness or satisfaction is higher at leisure. Csikszentmihalyi and Lefevre suggested that cultural biases undermine the perception of work as enjoyable despite the positive quality of experience. Schallberger and Pfister's fine-grained analysis of emotional states in the two contexts suggests a second interpretation, that work does indeed provide the positive activation associated with flow and long-term growth, but leisure provides a reduction of negative activation (e.g., stress) that is associated with short-term well-being.

TEMPORAL DYNAMICS

There is growing research interest in the temporal dynamics of flow, across different time frames. The flow model distinguishes between proximal conditions and elements of the flow state, but it does not specify the temporal sequencing of these elements. Several researchers have addressed how these dimensions relate to one another. For example, modeling of ESM data shows that attentional involvement (concentrating and feeling involved) partially mediates the relationship between optimal challenge and the experience of enjoyment (Abuhamdeh, 2008). The full set of conditions and dimensions has been organized in several models of the phenomenology

of flow that start with antecedent conditions and end in outcomes (e.g., Quinn, 2005). Other researchers have examined the process of entering flow (Jackson, 1995; Massimini, Csikszentmihalyi, & Delle Fave, 1988; Perry, 1999; Reed et al., 2002); the fluctuation of flow or involvement over the course of one experience, for example, studying for an exam (Reed, Hagen, Wicker, & Schallert, 1996); and the fluctuation of flow over the course of a series of events, such as rehearsals leading up to a musical performance (Kraus, 2003).

THE EXPERIENTIAL LANDSCAPE

As new ESM studies have been conducted, the general features of the experiential landscape defined by the interaction of challenges and skills have been clarified. Massimini and colleagues recognized that flow is fostered when challenges and skills are in balance and, in addition, both are above average levels for the individual. The Milan group also differentiated the challenge/skill terrain into eight experiential "channels" (Figure 18.2). A simplified version divides the same space into four quadrants defined by whether challenges and skills are above the personal mean (high) or below it (low). The high-challenge, low-skill ("anxiety") quadrant is characterized, as expected, by high stakes but low enjoyment and low motivation. Only in the high-challenge, high-skill ("flow") quadrant are these variables plus concentration and self-esteem simultaneously above the personal mean. In contrast, all the variables are below average in the low-challenge, low-skill ("apathy") quadrant. Concentration, self-esteem, and importance to future goals peak in the "flow" quadrant whereas enjoyment and wish to be doing the activity are actually somewhat higher in the low-challenge, high-skill quadrant (cf. Moneta, 2004). The quality of experience under the latter conditions is partially positive even though stakes are not high and attention is unfocused. The current mapping of the experiential landscape labels this quadrant "relaxation" to capture the mixed nature of the subjective state, which is less aversive than originally thought. A large-scale ESM study of adolescents found schoolwork is prevalent in the "anxiety" quadrant; structured leisure, schoolwork, and work in the "flow" quadrant; socializing and eating in the "relaxation" quadrant; and passive leisure and chores in the "apathy" quadrant (Csikszentmihalyi & Schneider, 2000).

We speculate that two kinds of experiences might be intrinsically rewarding: one that involves conservation of energy (relaxation), the other involving the use of skills to seize ever greater opportunities (flow). It is consistent with current understandings of evolution to suppose that both these strategies for coping with the environment, one conservative and the other expansive, were selected over time as important components of the human behavioral repertoire, even though they motivate different—in some sense, opposite—behaviors. By contrast, the two distinctly aversive situations, which organisms are presumably programmed to avoid, are those in which one feels overwhelmed by environmental

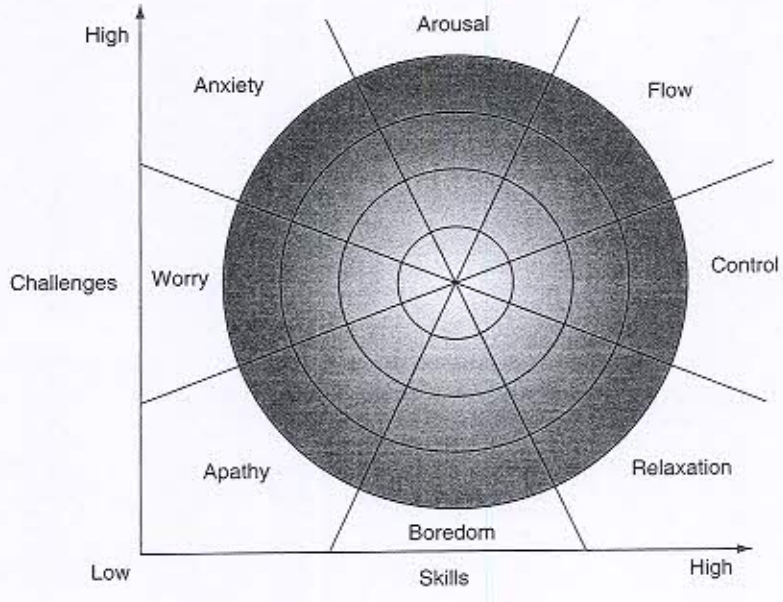

Fig. 18.2 One representation of the current model of the flow state. Flow is experienced when perceived challenges and skills are above the actor's average levels; when they are below, apathy is experienced. Intensity of experience increases with distance from the actor's average levels of challenge and skill. Adapted from Csikszentmihalyi (1997).

demands (anxiety), or left with nothing to do (apathy).

Finally, a growing body of research is examining how dispositions, such as motivational orientation, affect the experiencing of flow. Naturalistic research shows that high trait intrinsic motivation is associated with subjectively faster passage of time, less attention to the time, and more losing track of the time (Conti, 2001), and with a stronger (quadratic) relationship between level of challenge and degree of task enjoyment (Abuhamdeh, 2008; cf. Moneta, 2004). In other studies, success-motivated individuals reported more flow than failure-motivated individuals during a laboratory task (Puca & Schmalt, 1999) and need for achievement moderated the relationship between having a high-challenge, high-skill job, and task enjoyment (Eisenberger, Jones, Stinglhamber, Shanock, & Randall, 2005).

Interventions and Programs to Foster Flow

Flow researchers have discussed how their findings might be applied (Csikszentmihalyi, 1990, 1996, 2003; Csikszentmihalyi & Robinson, 1990; Jackson & Csikszentmihalyi, 1999; Perry, 1999). The relevance of the flow concept is increasingly noted in occupational therapy (Emerson, 1998; Rebeiro & Polgar, 1998) and social policy affecting the disabled (Delle Fave & Massimini, 2005).

Flow principles have been translated into practice in various contexts. Two types of intervention can be distinguished: (a) those seeking to shape activity structures and environments so that they foster flow or obstruct it less; and (b) those attempting to assist individuals in finding flow. The former include interventions to make work a greater source of flow. The Swedish state-owned transportation company, Green Cargo, had been losing money since its founding in 1889. When Stefan Falk joined the executive ranks in 2003, he instituted new techniques based on flow principles. Line managers were trained to identify workers' distinctive strengths; they then met regularly with each worker to set clear goals, find the appropriate level of challenges, and provide timely feedback. In 2004, the firm was profitable for the first time in 115 years and the flow-based program was credited as an important factor in the transformation (Marsh, 2005). In other domains, several museums, including Los Angeles' Getty Museum, incorporated flow principles during the design of exhibits and buildings. Flow principles informed product design at Nissan USA, with the goal of making use of the product more enjoyable.

Educational settings present an important arena for applying an understanding of flow. The Key School in Indianapolis (Whalen, 1999), a K-12 public school, opened in 1987; it seeks to (a) create a learning environment that fosters flow experiences and (b) help students form interests and develop the capacity and propensity to experience flow. In the Flow Activities Center, students have regular opportunities to choose and engage in pursuits related to their own interests. In Denmark, educators are integrating flow principles into the curriculum and pedagogy of schools from kindergarten onward (Knoop & Lyhne, 2006; Kristensen & Andersen, 2004) and schools are assessing student flow experience and other aspects of positive functioning.

The most direct efforts to assist individuals in finding flow lie in the sphere of psychotherapy. The Milan group built on their extensive program of basic research to develop therapeutic interventions aimed at transforming the structure of daily life toward more positive experience. Psychiatric interventions informed by flow theory have been successful in diverse cultural settings, including Nicaragua and northern Somalia (Inghilleri, 1999). In Italy, the ESM, guided by flow theory, has provided a tool for identifying patterns in everyday experience and ways in which these might be transformed (Delle Fave & Massimini, 1992, 2005; Inghilleri, 1999; Massimini, Csikszentmihalyi, & Carli, 1987).

Many therapies focus on conflict, under the assumption that once this is worked through, well-being will automatically follow. The therapeutic approach described here reverses figure and ground. Use of flow principles allows therapy to be reoriented toward building on interests and strengths, taking advantage of the growth of skill and confidence (cf. Wells, 1988) that attends flow experience, and enabling the individual to reduce dysphoric experience as a by-product of this growth.

A common theme of educational and therapeutic applications of flow principles bears underlining. Their goal is not to foster the state of flow directly, but rather to help individuals identify activities that they enjoy and learn how to invest their attention in the work of these activities.

Directions for Future Research

Many current areas of flow theory, research, and application are likely to extend fruitfully into the future. New research directions identified in the

work of Nakamura and Csikszentmihalyi (2002a) also remain promising. Others are just emerging. For example, theory (Dietrich, 2004) and experimentation (Ullen, personal communication, 2006) on the neuropsychology of flow are beginning.

Current societal changes give new urgency to some questions about flow. For example, fundamental questions concern the nature of the attentional processes that foster flow and the way optimal attentional practices are formed (Hamilton, 1983). The ever-increasing pace of life and the proliferating claims on attention due to new technologies—the challenges of so-called multi-tasking, the pervasiveness of "attention robbers" (Metzinger, personal communication, 2004)—highlight the importance of attention regulation and its impact on quality of experience. Understanding the dynamics (Asakawa, 2004) and development (Rathunde, 1997) of the autotelic personality thus gains importance. In Asakawa's (2004) ESM study of Japanese college students, autotelics reported more balanced levels of challenge and skill than did non-autotelics. In addition, they more often reported that challenges exceeded skills than that skills exceeded challenges, whereas the reverse characterized non-autotelics. A related issue is the question of how children and adolescents learn what goals deserve attention. Extended to take into account life-span development, this becomes the study of how psychological capital is formed, allowing the pursuit of meaningful goals that provide flow throughout a person's life.

Other societal changes give new access to standing questions about flow. For example, despite its implication in development and in the positive quality of life, flow's amoral character has always been clear. Past research has shown that fire-setting and other activities damaging to self or others can afford flow, and has suggested that flow activities can become addictive. In recent years, researchers have begun to ask whether experiencing flow can lead to addictive playing of computer games. Cyber-behavior, a domain widely analyzed from a flow perspective, has the advantage of being fairly easily studied. It thus stands to yield more insight than an activity like fire-setting into the evolution, persistence, and consequences, of problem flow. The overarching goals are to compare the dynamics of seeking flow in one activity rather than another, and understand the long-term effects of these choices.

Another fertile direction is the situating of flow within the broader landscape of positive functioning. For example, some positive psychologists (e.g., Ryan & Deci, 2001; Waterman, 1993) posit two models of well-being and conceptualize flow as an aspect of "eudaemonia," or self-realization, viewing this as the counterpoint to "hedonia," or pleasure. Nakamura described the growth of flow experiences into sources of vital engagement through the accumulation of life-historical, interpersonal, and other connections that endow absorbing activities with meaning (Nakamura & Csikszentmihalyi, 2002b). Seligman's (2002) tripartite model of happiness treats flow as the main manifestation of "engaged" lives. Guided by Seligman's model, Peterson, Park, and Seligman (2005) measured adults' orientations toward achieving happiness through pleasure, meaning, or engagement (flow).

Conclusion

Research on flow contributes knowledge to several topics that are of central importance to positive psychology. In the first place, it illuminates the phenomenology of optimal experience, answering the question: What is it like to live fully, to be completely involved in the moment? Second, it leads to questions about the long-term consequences of optimal experience: Does the sum of flow over time add up to a good and happy life? Or only under certain conditions, that is, if the person develops the meta-skills to manage attention and enjoy meaningful challenges? Furthermore, this line of research tries to unravel the conditions that act as obstacles or facilitators to optimal experience, focusing especially on the most prominent institutions such as the family, schools, and the workplace. Although it seems clear that flow serves as a buffer against adversity and prevents pathology, its major contribution to the quality of life consists in endowing momentary experience with value.

Questions

1. What are the long-term effects of different flow activities on the quality of individual lives?
2. How can flow be increased in the major areas of life, for example, education, work, relationships, free time?
3. How does the experience of flow relate to other aspects of positive functioning?

References

Abuhamdeh, S. (2008). What makes an intrinsically motivated activity intrinsically motivating? The role of challenge. Unpublished doctoral dissertation, University of Chicago.

Abuhamdeh, S., & Csikszentmihalyi, M. (2008). The effects of intrinsic and extrinsic motivational orientation in the competitive context. Manuscript under review.

Adam, E. (2005). Momentary emotion and cortisol levels in the everyday lives of working parents. In B. Schneider & L. Waite (Eds.), *Being together, working apart* (pp. 105–133). Cambridge: Cambridge University Press.

Adlai-Gail, W. (1994). Exploring the autotelic personality. Unpublished doctoral dissertation, University of Chicago.

Asakawa, K. (2004). Flow experience and autotelic personality in Japanese college students: How do they experience challenges in daily life? *Journal of Happiness Studies, 5*(2), 123–154.

Bakker, A. B. (2005). Flow among music teachers and their students: The crossover of peak experiences. *Journal of Vocational Behavior, 66*(1), 26–44.

Bakker, A. B. (2008). The work-related flow inventory: Construction and initial validation of the WOLF. *Journal of Vocational Behavior, 72*, 400–414.

Basom, M. R., & Frase, L. (2004). Creating optimal work environments: Exploring teacher flow experiences. *Mentoring and Tutoring, 12*(2), 241–258.

Berlyne, D. (1960). *Conflict, arousal, and curiosity*. New York: McGraw-Hill.

Blom, O., & Ullen, F. (2008). *The psychophysiology of flow during music performance*. Talk presented at the Fourth European Conference on Positive Psychology, Opatija, Croatia.

Brandstadter, J. (2006). Action perspectives on human development. In R. M. Lerner (Ed.), *Handbook of child psychology* (Vol. 1, pp. 516–568). New York: Wiley.

Bryce, J., & Haworth, J. (2002). Wellbeing and flow in sample of male and female office workers. *Leisure Studies, 23*, 249–263.

Carli, M., Delle Fave, A., & Massimini, F. (1988). The quality of experience in the flow channels: Comparison of Italian and U.S. students. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 288–306). Cambridge: Cambridge University Press.

Colby, A., & Damon, W. (1992). *Some do care*. New York: Free Press.

Conti, R. (2001). Time flies: Investigating the connection between intrinsic motivation and the experience of time. *Journal of Personality, 69*(1), 1–26.

Csikszentmihalyi, M. (1985). Emergent motivation and the evolution of the self. *Advances in Motivation and Achievement, 4*, 93–119.

Csikszentmihalyi, M. (1990). *Flow*. New York: Harper & Row.

Csikszentmihalyi, M. (1996). *Creativity*. New York: HarperCollins.

Csikszentmihalyi, M. (1997). *Finding flow*. New York: Basic.

Csikszentmihalyi, M. (1975/2000). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.

Csikszentmihalyi, M. (2003). *Good business*. New York: Viking.

Csikszentmihalyi, M., & Csikszentmihalyi, I. (Eds.). (1988). *Optimal experience*. Cambridge: Cambridge University Press.

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience sampling method. *Journal of Nervous and Mental Disease, 175*, 526–536.

Csikszentmihalyi, M., & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology, 56*(5), 815–822.

Csikszentmihalyi, M., & Nakamura, J. (1989). The dynamics of intrinsic motivation: A study of adolescents. In R. Ames & C. Ames (Eds.), *Research on motivation in education* (pp. 45–71). New York: Academic Press.

Csikszentmihalyi, M., & Nakamura, J. (1999). Emerging goals and the self-regulation of behavior. *Advances in social cognition, 12*, 107–118.

Csikszentmihalyi, M., & Nakamura, J. (in press). Psychological capital. In S. Lopez (Ed.), *Encyclopedia of positive psychology*. Oxford, UK: Blackwell.

Csikszentmihalyi, M., & Rathunde, K. (1993). The measurement of flow in everyday life. *Nebraska Symposium on Motivation, 40*, 57–97.

Csikszentmihalyi, M., Rathunde, K., & Whalen, S. (1993). *Talented teenagers*. Cambridge: Cambridge University Press.

Csikszentmihalyi, M., & Robinson, R. (1990). *The art of seeing*. Malibu, CA: J. Paul Getty Museum and the Getty Center for Education in the Arts.

Csikszentmihalyi, M., & Schneider, B. (2000). *Becoming adult: How teenagers prepare for the world of work*. New York: Basic.

Custodero, L. (1998). Observing flow in young people's music learning. *General Music Today, 12*(1), 21–27.

de Charms, R. (1968). *Personal causation*. New York: Academic Press.

Deci, E. (1975). *Intrinsic motivation*. New York: Plenum.

Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Delle Fave, A., & Massimini, F. (1988). Modernization and the changing contexts of flow in work and leisure. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 193–213). Cambridge: Cambridge University Press.

Delle Fave, A., & Massimini, F. (1992). The ESM and the measurement of clinical change: A case of anxiety disorder. In M. deVries (Ed.), *The experience of psychopathology* (pp. 280–289). Cambridge: Cambridge University Press.

Delle Fave, A., & Massimini, F. (2004). The cross-cultural investigation of optimal experience. *Ricerche di Psicologia, 27*, 79–102.

Delle Fave, A., & Massimini, F. (2005). The relevance of subjective well-being to social policies: Optimal experience and tailored intervention. In F. Huppert et al. (Eds.), *The science of well-being* (pp. 379–402). Oxford: Oxford University Press.

Dietrich, A. (2004). Neurocognitive mechanisms underlying the experience of flow. *Consciousness and Cognition, 13*(4), 746–761.

Eisenberger, R., Jones, J. R., Stinglhamber, F., Shanock, L., & Randall, A. T. (2005). Flow experiences at work: For high need achievers alone? *Journal of Organizational Behavior, 26*, 755–775.

Emerson, H. (1998). Flow and occupation: A review of the literature. *Canadian Journal of Occupational Therapy, 65*, 37–43.

Engeser, S., Rheinberg, F., Vollmeyer, R., & Bischoff, J. (2005). Motivation, Flow-Erleben und Lernleistung in universitären Lernsettings. *Zeitschrift für Pädagogische Psychologie, 19*(3), 159–172.

Getzels, J. W., & Csikszentmihalyi, M. (1976). *The creative vision*. New York: Wiley.

Hamilton, J. A. (1983). Development of interest and enjoyment in adolescence. *Journal of Youth and Adolescence, 12*, 355–372.

Heine, C. (1996). Flow and achievement in mathematics. Unpublished doctoral dissertation, University of Chicago.

Hektner, J. (1996). Exploring optimal personality development: A longitudinal study of adolescents. Unpublished doctoral dissertation, University of Chicago.

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2006). *Experience sampling method*. Thousand Oaks, CA: Sage.

Hunt, J. (1965). Intrinsic motivation and its role in development. *Nebraska Symposium on Motivation, 12*, 189–282.

Inghilleri, P. (1999). *From subjective experience to cultural change*. Cambridge: Cambridge University Press.

Jackson, S. A. (1995). Factors influencing the occurrence of flow state in elite athletes. *Journal of Applied Sport Psychology, 7*, 138–166.

Jackson, S. A., & Csikszentmihalyi, M. (1999). *Flow in sports*. Champaign, IL: Human Kinetics.

Jackson, S. A., & Eklund, R. C. (2002). Assessing flow in physical activity: The Flow State Scale-2 (FSS-2) and Dispositional Flow Scale-2 (DFS-2). *Journal of Sport and Exercise Psychology, 24*, 133–150.

Jackson, S. A., & Eklund, R. C. (2004). *The flow scales manual*. Morgantown, WV: Fitness Information Technology.

Jackson, S. A., & Marsh, H. W. (1996). Development and validation of a scale to measure optimal experience: The flow state scale. *Journal of Sport and Exercise Psychology, 18*, 17–35.

Jackson, S. A., Martin, A. J., & Eklund, R. C. (2008). Long and short measures of flow: Examining construct validity of the FSS-2, DFS-2, and new brief counterparts. *Journal of Sport and Exercise Psychology, 30*, 561–587.

Keller, J., & Bless, H. (2008). Flow and regulatory compatibility: An experimental approach to the flow model of intrinsic motivation. *Personality and Social Psychology Bulletin, 34*, 196–209.

Kimiecik, J. C., & Harris, A. T. (1996). What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *Journal of Sport and Exercise Psychology, 18*, 247–263.

Knoop, H. H., & Lyhne, J. (Eds.). (2006). *Et Nyt Laeringslandskab*. Copenhagen: Dansk Psykologisk Forlag.

Kraus, B. N. (2003). Musicians in flow: Optimal experience in the wind ensemble rehearsal. Unpublished doctoral dissertation, Arizona State University.

Kristensen, R., & Andersen, F. O. (2004). *Flow, Opmaerksomhed og Relationer*. Frederikshavn: Danilo.

McAdams, D. P. (1990). *The person*. San Diego: Harcourt Brace Jovanovich.

Magnusson, D., & Stattin, H. (2006). The person in context. In R. M. Lerner (Ed.), *Handbook of child psychology* (Vol. 1, pp. 400–464). New York: Wiley.

Marsh, A. (2005, August). The art of work. *Fast Company*, pp. 77–79.

Massimini, F., & Carli, M. (1988). The systematic assessment of flow in daily experience. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 266–287). Cambridge: Cambridge University Press.

Massimini, F., Csikszentmihalyi, M., & Carli, M. (1987). The monitoring of optimal experience: A tool for psychiatric rehabilitation. *Journal of Nervous and Mental Disease, 175*(9), 545–549.

Massimini, F., Csikszentmihalyi, M., & Delle Fave, A. (1988). Flow and biocultural evolution. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 60–81). Cambridge: Cambridge University Press.

Massimini, F., & Delle Fave, A. (2000). Individual development in a bio-cultural perspective. *American Psychologist, 55*, 24–33.

Mayers, P. (1978). Flow in adolescence and its relation to school experience. Unpublished doctoral dissertation, University of Chicago.

Moller, A., Csikszentmihalyi, M., Nakamura, J., & Deci, E. (2007). *Developing an experimental induction of flow*. Poster presented at the Annual Meeting of the Society for Personality and Social Psychology, Nashville.

Moneta, G. (2004). The flow model of intrinsic motivation in Chinese: Cultural and personal moderators. *Journal of Happiness Studies, 5*, 181–217.

Moneta, G., & Csikszentmihalyi, M. (1996). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality, 64*(2), 275–310.

Morgan, S. J. (2005). *JobLab: A study into the experience of teaching*. Crawley: CrossLight.

Nakamura, J. (1988). Optimal experience and the uses of talent. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 319–326). Cambridge: Cambridge University Press.

Nakamura, J., & Csikszentmihalyi, M. (2002a). The concept of flow. In C. R. Snyder & S. J. Lopez (Eds.), *Handbook of positive psychology* (pp. 89–105). New York: Oxford University Press.

Nakamura, J., & Csikszentmihalyi, M. (2002b). The construction of meaning through vital engagement. In C. Keyes & J. Haidt (Eds.), *Flourishing* (pp. 83–104). Washington, DC: APA Books.

Neumann, A. (2006). Professing passion: Emotion in the scholarship of professors at research universities. *American Educational Research Journal, 43*(3), 381–424.

Pearce, J. M., Ainley, M., & Howard, S. (2005). The ebb and flow of online learning. *Computers in Human Behavior, 21*(5), 745–771.

Perry, S. K. (1999). *Writing in flow*. Cincinnati, OH: Writer's Digest Books.

Peterson, S. E., & Miller, J. A. (2004). Comparing the quality of students' experiences during cooperative learning and large-group instruction. *Journal of Educational Research, 97*(3), 123–133.

Peterson, C., Park, N., & Seligman, M. (2005). Orientations to happiness and life satisfaction: The full life versus the empty life. *Journal of Happiness Studies, 6*(1), 25–41.

Puca, R. M., & Schmalt, H.-D. (1999). Task enjoyment: A mediator between achievement motives and performance. *Motivation and Emotion, 23*(1), 15–29.

Quinn, R. W. (2005). Flow in knowledge work: High performance experience in the design of national security technology. *Administrative Science Quarterly, 50*, 610–641.

Rathunde, K. (1997). Parent–adolescent interaction and optimal experience. *Journal of Youth and Adolescence, 26*, 669–689.

Rathunde, K., & Csikszentmihalyi, M. (2005). Middle-school students' motivation and quality of experience: A comparison of Montessori and traditional school environments. *American Journal of Education, 111*, 341–371.

Rathunde, K., & Csikszentmihalyi, M. (2006). The development of the person: An experiential perspective. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology* (Vol. 1, pp. 465–515). Hoboken, NJ: Wiley.

Rebeiro, K. L., & Polgar, J. M. (1998). Enabling occupational performance: Optimal experiences in therapy. *Canadian Journal of Occupational Therapy, 66*, 14–22.

Reed, J. H., Hagen, A. S., Wicker, F. W., & Schallert, D. L. (1996). Involvement as a temporal dynamic: Affective factors in studying for exams. *Journal of Educational Psychology, 88*(1), 101–109.

Reed, J. H., Schallert, D. L., & Deithloff, L. F. (2002). Investigating the interface between self-regulation and involvement processes. *Educational Psychologist, 37*(1), 53–57.

Renninger, K. A., Hidi, S., & Krapp, A. (1992). *The role of interest in learning and development.* Hillsdale, NJ: Erlbaum.

Rheinberg, F., Manig, Y., Reinhold, K., Engeser, S., & Vollmeyer, R. (2007). Flow bei der arbeit, doch Gluck in der Freizeit: Zielausrichtung, Flow und Glucksgefuhle [Flow during work but happiness during leisure time: Goals, flow, and happiness]. *Zeitschrift für Arbeits- und Organisationspsychologie, 51,* 105–115.

Rheinberg, F., & Vollmeyer, R. (2003). Flow-Erleben in einem Computerspiel unter experimentell variierten Bedingungen. *Zeitschrift für Psychologie, 211*(4), 161–170.

Rheinberg, F., Vollmeyer, R., & Engeser, S. (2003). Die Erfassung des Flow-Erlebens. In J. Stiensmeier-Pelster & F. Rheinberg (Eds.), *Diagnostikvon Motivation und Selstkonzept* (pp. 261–279). Göttingen: Hogrefe.

Richardson, A. (1999). Subjective experience: Its conceptual status, method of investigation, and psychological significance. *Journal of Personality, 133*(5), 469–485.

Ryan, R., & Deci, E. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52,* 141–166.

Salanova, M., Bakker, A. B., & Llorens, S. (2006). Flow at work: Evidence for an upward spiral of personal and organizational resources. *Journal of Happiness Studies, 7*(1), 1–22.

Schallberger, U., & Pfister, R. (2001). Flow-Erleben in Arbeit und Freizeit: Ein Untersuchung zum Paradox der Arbeit mit der Experience Sampling Method. *Zeitschrift für Arbeits- und Organisationspsychologie, 45*(4), 176–187.

Schmidt, J. (1999). Overcoming challenges. Unpublished doctoral dissertation, University of Chicago.

Schmidt, J. A., Shernoff, D. J., & Csikszentmihalyi, M. (2006). Individual and situational factors related to the experience of flow in adolescence: A multilevel approach. In A. D. Ong & M. H. M. van Dulmen (Eds.), *Oxford handbook of methods in positive psychology* (pp. 542–558). New York: Oxford University Press.

Seligman, M. E. P. (2002). *Authentic happiness.* New York: Free Press.

Shernoff, D. J., Csikszentmihalyi, M., Shneider, B., & Shernoff, E. S. (2003). Student engagement in high school classrooms from the perspective of flow theory. *School Psychology Quarterly, 18*(2), 158–176.

Turner, J. C., & Meyer, D. K. (2004). A classroom perspective on the principle of moderate challenge in mathematics. *Journal of Educational Research, 97*(6), 311–318.

Turner, J. C., Meyer, D. K., Cox, K. E., Logan, C., DiCintio, M., & Thomas, C. T. (1998). Creating contexts for involvement in mathematics. *Journal of Educational Psychology, 90*(4), 730–745.

Vygotsky, L. (1978). *Mind in society.* Cambridge, MA: Harvard University Press.

Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology, 64*(4), 678–691.

Wells, A. (1988). Self-esteem and optimal experience. In M. Csikszentmihalyi & I. Csikszentmihalyi (Eds.), *Optimal experience* (pp. 327–341). Cambridge: Cambridge University Press.

Whalen, S. (1999). Challenging play and the cultivation of talent: Lessons from the Key School's flow activities room. In N. Colangelo & S. Assouline (Eds.), *Talent development III* (pp. 409–411). Scottsdale, AZ: Gifted Psychology Press.

White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66,* 297–333.