

# Chapter 8

## Flow and Leisure

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Leisure has eluded definition by social scientists despite decades of theory, research, and applied work on the topic. According to one analysis (Primeau, 1996), there are three prominent ways of defining leisure: (a) the residual time available outside of productive and maintenance activity (sometimes simply described as nonwork time), (b) the set of activities that people identify as leisure pursuits in a culture, and (c) a positive experiential state whose essence is the experience of being freely chosen and intrinsically rewarding. Each definition has limitations, and the lack of consensus has been a challenge for the field of leisure science.

However we choose to define and delimit the phenomenon of leisure, we probably can agree that we think of the paradigmatic leisure experience as a positive one. Of course, all periods of discretionary time and all normatively defined leisure activities are not positive experientially. For children, adolescents, and adults (Csikszentmihalyi & Larson, 1984; Holder, Coleman, & Sehn, 2009; Kubey & Csikszentmihalyi, 2002), active leisure is generally more engaging than passive leisure, but most of us devote plenty of time to the latter. “Leisure boredom” is commonplace, particularly in adolescence, and is associated with substance abuse and other developmentally ominous behaviors (Wegner & Flisher, 2009). But for most individuals throughout the life course, the enjoyment of leisure is a desideratum and holds potential benefits both immediate and long term. The goal animating a positive leisure science thus may be delineated clearly even if the concept itself remains contested: *to understand the nature and conditions of optimal experience in leisure time/pursuits.*

Many leisure scholars suggest that, optimally, the leisure state is characterized by perceived freedom and intrinsic motivation (e.g., Mannell, Zuzanek, & Larson, 1988). In experiencing freedom, one feels that an activity is being undertaken voluntarily

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(a notion that does not preclude a sense of responsibility or commitment; see, e.g., Stebbins, 1992). In experiencing an activity as intrinsically rewarding, one feels that the activity is being pursued for its own sake, because of the positive experiential state that it can afford rather than for benefits lying outside of the immediate experience (a notion that does not require that every moment is equally pleasant).

Beyond this, some have observed that a distinction should be made between two kinds of positive experience that leisure ideally can provide: one, a state of relaxed receptiveness and the other, a state of engagement in action, physical, or mental. In the psychology of positive emotions, these correspond to low-activation positive affect and high-activation positive affect (Kleiber, 2000; Nakamura & Csikszentmihalyi, 2009). Although other positive leisure states exist (e.g., hedonic pleasure), these two are distinguished by close connection to human development and growth. In this chapter, we will focus on the second, by examining the flow state, which has been studied empirically for several decades and to a significant extent illuminates and also is illuminated by the study of leisure. We will address implications of flow theory and research for each of the three definitions of leisure mentioned at the outset. First, with respect to leisure as a positive experiential state, we discuss the model of flow experience distilled from descriptions of activities pursued for their own sake. Second, we consider how the documentation of this positive state in both work and play problematizes the definition of leisure as discretionary, or nonwork, activity. Finally, we discuss the experience of flow in activities culturally defined as leisure activities, giving special attention to sports and games.

## Flow and the Contribution of Leisure to Its Understanding

Csikszentmihalyi first recognized the deep absorption in an activity later labeled flow while observing full-time artists *at work* (Csikszentmihalyi, 1975). However, his laboratory began systematic research on the subjective phenomenology of activities pursued for their own sake – intrinsically motivated activity – by focusing on adults *at play*. At the heart of that mixed-methods research (Csikszentmihalyi, 1975), from which the flow model derived, was a corpus of interviews with experienced and some novice participants in leisure activities: chess, social dancing, basketball, and rock climbing. A sample of surgeons was also studied, and an important finding both for theory and social action was that the same deep absorption can be experienced in work as well as in play (about which, more later). Still, most of the original research report described what it feels like to be deeply engaged in play. Thus, in articulating the relations between flow and leisure, we might say that first and foremost, the close examination of leisure gave rise to the concept of flow. Given these beginnings, it is unsurprising that the very first scholarly community to see utility in the flow model was the field of leisure studies (Csikszentmihalyi, personal communication, May 2010).

Currently, flow is understood as an experiential state, attainable in many different activities, which can be characterized by nine dimensions. We briefly describe these

dimensions, drawing on the interviews with rock climbers reported in the original study. One hallmark of flow is the experience of total concentration of attention on what one is doing. The past and future, and the environmental stimuli lying outside of the unfolding interaction, recede. As one rock climber put it, "It's a centering thing, being absolutely in the here and now, in the present" (Csikszentmihalyi, 1975, p. 81). A second characteristic of flow is a merging of action and awareness. A climber explained, "You're so involved in what you're doing [that] you aren't thinking about yourself as separate from the immediate activity. You're no longer a participant-observer, only a participant" (p. 86). Related to this complete absorption in the present moment is a third characteristic: loss of the self-consciousness that disrupts immersion in the flow of activity. When in flow, one no longer steps outside of the stream of experience, watching and judging the self. "When you first start climbing you're very aware of your capabilities. But after a while you just do it without reflecting on it at the time" (p. 87), a climber explained.

Three other characteristics of flow describe what might be called proximal conditions of this state of full engagement (Nakamura & Csikszentmihalyi, 2002). First, there are clear goals; one's aims are not in question. In climbing, the goal in one sense is simply to reach the top. More specifically, a climber might be clear that the goal for a climb is to take the most direct path up the rock face, or to make the most economical and elegant series of moves possible. However, as a proximal condition for entering and staying in flow, the goals at any given moment (find the best next foothold to navigate around this obstacle, maintain the other points of contact with the rock) must also be clear. In addition to this clarity of purpose, there is immediate, unambiguous feedback to one's actions. One sees how one is doing (a foot is placed, then slips), adjusts the course of action (another foothold is tried), receives new feedback, and if necessary adjusts again. As a result, a climber could say of the process, "It's self-catalyzing .... The move you're planning to do is also the genesis of the move you're to do after you've done that one" (Csikszentmihalyi, 1975, p. 85). Motivation can be described as emergent (Nakamura & Csikszentmihalyi). Finally, in flow, one's capacities for action are fully employed. One's skills are stretched by the challenges perceived in the immediate situation.

When these conditions are present and the individual is fully engaged, a sense of control is experienced. One climber noted, "Once you're into the situation ... you're very much in charge of it" (Csikszentmihalyi, 1975, p. 81). More precisely, one feels not that one knows and can dictate what will happen, but rather that one will be able to respond to whatever occurs. Furthermore, the sense of time is distorted. Time may dilate, seeming to slow down or stand still. One may lose all track of time and later feel that it has passed very quickly. The climber absorbed in the climb describes experiencing an "eternal moment" (p. 87). Finally, even if it not remarked during the experience itself, after the fact that the experience is perceived as having been intensely enjoyable and is valued for its own sake, it is "autotelic." As stated modestly by a climber, "It's a pleasant feeling of total involvement" (p. 86).

It was clear from these early reports that the flow state is inherently fragile. It depends on a set of conditions that are comparatively rare in most lives: clear goals, immediate and clear feedback, and opportunities for action that stretch one's capacities.

In contrast, much of daily life is characterized by conflicting claims on attention; inadequate, delayed, or ambiguous feedback to one's actions; and either overwhelming demands that encourage anxiety or a dearth of challenge that gives rise to boredom. Rock climbing is not a simple natural act. Rather, like many forms of leisure – organized sports and games, art forms, and hobbies – it depends on a culturally provided system of goals, rules, and tools. The latter features define and structure participants' opportunities for action in a manner that facilitates entering the flow state. Depending on the complexity of the goals, rules, tools, and opportunities for action more generally, these activities can open extended pathways for development and growth. In this way, rock climbing and many other leisure time pursuits are prototypic *flow activities*. One might suggest that they exist to provide experiences of intense absorption. An initial understanding of the nature of flow activities might be viewed as a second contribution of studying leisure to flow theory.

### *Measuring Flow*

In the study of leisure and beyond it, flow has been measured in several ways: by interview, survey, and Experience Sampling Method. This chapter cites studies using each of these methods. The concept of flow emerged from interviews with people about what it feels like when an activity is going well (Csikszentmihalyi, 1975). Although many other well-validated methods are now available, the semi-structured interview remains a useful tool, particularly in exploratory research (Nakamura & Csikszentmihalyi, 2009).

Several well-validated survey instruments exist for measuring flow in specific leisure settings. The most commonly used scales for sports are the Flow State Scale (Jackson & Marsh, 2002), which is given immediately after sports events to measure flow states during the event, and the Dimensional Flow Scale (Jackson & Marsh, 2002), which measures an individual's trait-level tendencies to experience flow in the activity. Each of these instruments has 36 items, or four for each of the nine dimensions of flow, and has been successfully used with musical performance and other nonsport activities. Items include "I do things spontaneously and automatically without having to think" and "the experience is extremely rewarding." Brief, nine-item versions of the FSS-2 and DFS-2 scales have also been validated (Jackson, Martin, & Eklund, 2008). The short scales include one item for each of the established nine dimensions of flow (e.g., sense of control and time transformation). Similarly, in the domain of video games, Kiili's Flow Scale for Games (2006) uses 19 of the FSS-2 items, with additional items evaluating the technology of the video game interface.

One disadvantage of both survey and interview methods is that they require participants to reconstruct an experience retrospectively, a process which may alter the content of the experience being recalled. The Experience Sampling Method (ESM) was developed in order to study experience in situ (for a detailed description, see

Chap. 6 by Bassi and Delle Fave in this volume). In ESM studies, participants are paged at various times during the day throughout the period of study. The page is the cue for participants to describe what they were thinking, feeling, and doing just before being paged. Thus, the ESM is a way of taking random samples from everyday experience. Using ESM, one may rate the degree to which each experience contains the conditions that produce flow and the dimensions of the flow state.

## Flow in Leisure Viewed as Discretionary Time

In general, leisure time is experienced positively (Csikszentmihalyi, 1975). Besides providing the opportunity for rest and relaxation, leisure provides time for engaging activities that develop skills and open new access to enjoyment. “Games like chess, religious rituals, and artistic forms were developed to provide finite enjoyable experiences within the interstices of real life” (Csikszentmihalyi, p. 73).

The study of flow contains interesting implications for the definition of leisure as time spent away from work, in that when activities are intrinsically motivated, the distinction between leisure and work is often blurry. Delle Fave and Massimini (1988) found that among Italian farmers pursuing a traditional way of life, younger and older participants found different activities flow-producing. Older participants did not make a distinction between work and leisure activities; they experienced a high degree of autonomy and enjoyment in such traditional work activities as tilling soil, spinning thread, and tending to farm animals. Younger, modernized participants, on the other hand, found much more flow in leisure pursuits such as skiing, playing soccer, riding motorcycles, or spending time with friends and treated the traditional nonleisure activities described above as distractions. Older participants spent less time in leisure activities (such as playing bocce or cards) and experienced less flow in them than in work activities.

If a distinction is made between work and leisure time, ESM studies have shown that adults spend more time in flow during work than during leisure (Bryce & Haworth, 2002; LeFevre, 1988; Rheinberg & Engeser, 2008), perhaps because work activities tend to have more structure than leisure activities, thereby providing more of the conditions for flow. Mannell, Zuzanek, and Larson (1988) demonstrated that freely chosen structured activities with extrinsic rewards produced the highest levels of flow (cf. Stebbins’ “serious leisure”). Although the phenomenon of flow was originally delineated in leisure contexts, paradoxically, people do not tend to choose high-skill, high-challenge activities with clear goals and unambiguous feedback, even though they are happier while doing them. Instead, people more often choose low-challenge, low-skill activities such as watching TV or talking, thereby choosing rest over stimulation. It may be possible that people cannot consistently maintain the high levels of concentration required in flow-producing activities, even though low-challenge, low-skill activities do not contribute as much to their well-being as flow-producing activities (LeFevre, 1988).

## *Gender Differences*

A difficulty of the definition of leisure as nonwork involves differences in the way men and women experience flow in leisure, based on differences in context (Henderson, 1990). For example, both men and women may consider swimming a leisure activity and may spend equal amounts of time swimming. However, if one examines the context, women may be taking care of children in the process of swimming, while men might be more likely to pursue swimming for its own sake (Henderson). This difference in context may result in differences in flow experiences; those watching children while swimming may experience more interruptions and less intrinsic motivation and therefore less flow, while those who pursue swimming exclusively for its own value may experience more flow.

Allison and Duncan (1988) found that women particularly experienced flow in leisure activities that allowed a sense of autonomy, control, and mastery. Flow was reported in such activities as gardening, leisure travel, golf, concerts, reading books, crafts such as needlework or ceramics, and fixing things around the house. Further, professional women experienced more challenge and creativity in their jobs, leading to more flow experiences, while blue-collar women experienced more mastery and control in their home environments, leading to a meaningful sense of “rootedness” (p. 133). For professional women, work and home life boundaries were blurred, while blue-collar women made a distinction between being “at work” and “at home.”

These gender differences may be an artifact of the distinction between work and leisure time, a distinction that may itself be seen as an artifact of certain twentieth-century expectations around the nature and form of work (Hendricks & Cutler, 2003). Such a distinction serves well to describe mid-twentieth-century jobs in industrialized nations but is problematic when discussing entrepreneurial work, farmwork, housework, child-rearing, and the myriad blends of work and play facilitated by technology in the twenty-first century (Rousseau, 1997). As communications technology such as cell phones and the Internet allows us to be connected to both jobs and leisure activities 24 h a day, it is hard to tell whether the woman knitting handicrafts for sale on her Web site is at work or at leisure.

## **Flow in Leisure Viewed as Engagement in Specific Activities**

Another way to define leisure is by specifying leisure activities, and the field of leisure studies has no shortage of taxonomies of leisure activities (Iwasaki, Mannell, Swale, & Butcher, 2005). For example, Ragheb (1980) developed a leisure behavior inventory that consists of 41 activities grouped into six categories: mass media, sports activities, social activities, cultural activities, outdoor activities, and hobbies, and flow has been documented in activities belonging to each of these categories. However, flow researchers using the Experience Sampling Method have found it useful to categorize leisure activities by their potential for engagement. Therefore, leisure activities are commonly categorized as passive leisure, active leisure, and

social interaction. Activities categorized as passive leisure, which feature consumption of mass media, are considered less flow-producing than active leisure activities, such as making crafts or playing sports and games; we discuss them only briefly. A great deal of the literature on flow in leisure activities focuses on sports and games; these areas will form our focus as well. As for social interaction, several recent studies have contributed to understanding the ways that social roles, norms, and settings influence the experience of flow.

### ***Flow and Passive Leisure***

Watching TV is one of the most common but least flow-producing activities. Turning on the television produces feelings of relaxation. Yet rather than leaving viewers refreshed afterward, viewers report lowered positive affect and more difficulty concentrating after viewing (Kubey & Csikszentmihalyi, 2002). In contrast, reading is also classified as a passive leisure activity, and yet participants often report it as a primary source of flow (Allison & Duncan, 1988; Delle Fave & Massimini, 1988, 2003). Green, Brock, and Kaufman (2004) posit that enjoyment of media stems from the experience of immersion, which they term “transportation into a narrative world.” Being transported in this sense shares several characteristics with flow in that participants shed self-awareness and lose track of time. However, reading is less passive than TV viewing and requires a higher level of skill (Kubey & Csikszentmihalyi, 1990), which may account for the finding that participants identify reading, but not television, as a source of flow.

### ***Flow in the Active Leisure Activities of Sports and Games***

A great deal of flow research on active leisure has focused on sports and games. A sport or game can provide all of the key proximal conditions of flow: clear goals, unambiguous feedback, and high challenge. Sports and games also provide a controlled environment for the quantitative study of experience, in that challenges, rules, and goals can be easily manipulated, standardized, and measured within and between individuals.

Sports psychologist Susan Jackson has made many studies to determine which conditions and factors can help athletes achieve a flow state. She makes a distinction between traits that contribute to an individual’s overall ability to experience flow in an activity and the psychological factors that facilitate achieving a flow state in a given situation. However, she finds that the same three psychological factors are the top contributors to both trait and state flow: perceived ability, intrinsic motivation to experience stimulation, and level of anxiety (Jackson, Thomas, Marsh, & Smethurst, 2001).

Perceived ability is the strongest factor facilitating a flow state. According to the flow model, flow only takes place in situations where both challenge and skill are

high. Athletes who believe their skills are highly developed may be more likely to challenge themselves and to perceive that skills and challenge are in balance, beyond any objective assessment of challenge and skill (Jackson et al., 2001; Jackson & Roberts, 1992).

Another factor is intrinsic motivation to experience stimulation. This occurs when a person's main motivation for performing an athletic activity is to experience the inherent pleasure, excitement, or expressiveness involved in moving the body during the activity itself. As stated earlier, flow theory arose from the study of intrinsically motivated activities. Deci and Ryan (1985) have suggested that people experience more flow in activities that are intrinsically motivated, while Csikszentmihalyi has suggested that experiencing flow repeatedly in an activity leads to intrinsic motivation (in Jackson, Kimiecik, Ford, & Marsh, 1998, p. 375). However, in the above-referenced study (Jackson et al., 1998), none of the other dimensions of intrinsic motivation showed as strong a relationship with flow as the dimension of seeking physical sensation.

According to Jackson, the third major facilitator of the experience of flow is the absence of anxiety. When anxious or worried, an athlete perceives the challenges of the situation to be greater than his or her skills. Jackson et al. (1998) called the psychological state of anxiety "the antithesis of flow." In that study, three dimensions of anxiety were measured: somatic anxiety, or physical manifestations such as butterflies in the stomach; worry, or intrusive thoughts; and concentration disruption. The cognitive components – worry and concentration disruption – showed the strongest negative correlations with flow. Worry, in particular, is associated with self-consciousness and therefore stands as an obstacle to immersion in a situation, a defining dimension of flow. Athletes who perceived their ability as low were more prone to worry and anxiety, further disrupting their ability to experience flow.

In general, people experiencing more flow in athletics make better strategic use of psychological skills relating to regulating arousal, processing information, and managing emotions (Jackson et al., 2001). Training in the use of these psychological processes has often been an integral part of programs designed to enhance athletic performance; it is useful to note that training these skills enhances intrinsic enjoyment as well as the likelihood of extrinsic reward.

### *The Role of Challenge*

Many researchers consider the balance of challenge and skill to be the defining condition of flow. Challenge can be defined subjectively based on a person's assessment of his or her skill relative to the situation, or objectively, based on the skill levels of opponents, as in chess, or the inherent risks of the situation, as in rock climbing. According to the original flow model, a pleasurable game of chess requires competing players to be closely matched in ability. If one player is significantly more skilled than his opponent, neither player will experience the crucial balance of



challenge and skill. Chess players most often report finding enjoyment in the “intellectual challenge” of the game, as well as its social value, yielding opportunities for both competition and camaraderie (Csikszentmihalyi, 1975). In Abuhamdeh and Csikszentmihalyi’s (2009) studies of competitive recreational chess players, intrinsic motivational orientation was associated with the strength of the curvilinear relationship between challenge and enjoyment. Intrinsically motivated players enjoyed a challenge more than players who were focused on the goal of winning, although too much challenge inhibited enjoyment for all. Further, extrinsically motivated players had stronger affective responses to the outcome of the competition than intrinsically motivated players. This study shows that in self-chosen leisure, participants often prefer to be overchallenged rather than underchallenged – indeed, they prefer games in which they have a better than even chance of losing. This preference may be most visible in the naturalistic study of leisure, rather than in experimental conditions or in the study of work.

### *Flow and Danger*

Early research demonstrated that flow can occur in both high-risk activities, such as rock climbing, and low-risk activities such as chess. This illuminates the relationship between flow and arousal. Arousal is related to subjective internal states, such as anxiety, and to objective conditions, such as the level of danger inherent in the activity. Arousal has a curvilinear relationship with flow; some is necessary to produce flow, yet too much arousal inhibits flow by producing incompatible feelings such as anxiety and worry (cf. Jackson & Roberts, 1992; Jackson, Kimiecik, Ford, & Marsh, 1998). ESM studies of flow in adventure sports, however, indicate that because of inherent danger in the activity, flow and anxiety can sometimes coexist in close time proximity. Several studies have shown that an adventure experience is later considered optimal when both flow and anxiety have been high, as when paddling down a dangerous rapid (Jones, Hollenhorst, Perna, & Selin, 2000). The authors followed 52 kayakers of varying levels of expertise as they ran the Cheat River in the course of a single day. Self-reports of flow, affect, activation, and anxiety were collected at the put-in just before each rapid and the take-out immediately following each rapid, for a total of 409 observations. Paddlers experienced the most control in the least dangerous rapids, as well as the most boredom and apathy. In the most dangerous rapids, flow and anxiety were experienced with equal frequency. Anxiety reached its peak just before the first dangerous rapid, and flow reached its peak just after the last dangerous rapid, leading the authors to conclude that anxiety experiences did not necessarily inhibit flow experiences, especially as positive affect was reported even in the presence of anxiety.

Nonetheless, Csikszentmihalyi’s (1975) study of rock climbing belies the notion that danger is a requirement in flow-producing activities. Although the activity is undeniably dangerous, rock climbers take enormous safety precautions and play

down the risks in their self-talk, rather than seeking out risks and playing them up, as one might expect if danger indeed predicated increased enjoyment. These findings were later confirmed in the ESM study on rock climbers reported in Bassi and Delle Fave in this volume (Chap. 6).

### *Flow in the Presence of Extrinsic Reward*

Many flow-producing activities carry extrinsic rewards in certain situations. An athlete, seamstress, or dancer may take up an activity for the inherent love of doing it and later find herself in a position to earn money in exchange for peak performance. Enjoyment, while a factor in peak performance, does not ensure it. According to self-determination theory (Ryan & Deci, 2000), the presence of extrinsic rewards is seen to inhibit intrinsic motivation in experimental situations. Nonetheless, there is also ample evidence that people experience flow in situations where performance may lead to extrinsic rewards (Jackson & Roberts, 1992; Mannell, Zuzanek, & Larson, 1988; Russell, 2002).

Too great a focus on results and rewards during performance can inhibit both optimal experience and peak performance by evoking anxiety, worry, or self-consciousness, each of which is damaging to flow. Therefore, flow experiences are generally considered to be inhibited by highly competitive attitudes (Jackson & Roberts, 1992; Russell, 2002). While some degree of arousal is necessary to experience flow, too much arousal – in this case construed as anxiety about results rather than danger – inhibits it completely.

When competitiveness is associated with anxiety about results, higher trait competitiveness is associated with fewer flow experiences (Jackson & Roberts, 1992). The best-known style of interpersonal competitiveness, often called hypercompetitiveness (Horney, 1937; Ryckman, Hammer, Kaczor, & Gold, 1990), is a desire to demonstrate a trait-based superiority over rivals; the purpose of competition is to reveal one's identity as a winner or a loser. However, other styles of competitiveness treat rivals as teachers, with the outcome of the competition as a benchmark for one's own personal development; the desire to win is still present, but the individual's sense of self does not depend so critically on winning in every situation. Ryckman, Hammer, Kaczor, and Gold (1996) have called this style of competitiveness a personal development competitive attitude. In an international sample of adult runners, cyclists, and triathletes, the personal development competitive attitude was seen to have a positive relationship with trait-level ability to experience flow, while hypercompetitiveness had no relationship (Perkins, unpublished manuscript).

As an alternative to a competitive orientation toward other people, previous studies have considered the impact of a mastery orientation on flow. Jackson and Roberts (1992) found that mastery orientation (as opposed to interpersonal orientation) was positively correlated with flow experiences for college athletes. That is, people who concentrate on mastering the task rather than beating others experience more flow. A general motivation toward outcomes was not correlated with poorer performance, except when the athlete focused on outcomes during the actual competition.

## *Computer-Based Activities*

Computer-simulated worlds including informational and social Web sites, games, chat environments, e-mail discussions, and Internet shopping have become important parts of leisure culture in the past 10 years. From early on, researchers have been interested in using the concept of flow to design computer-based entertainment that will enrapture viewers and encourage repeated uses (cf. the Csikszentmihalyi interview, "Go with the Flow," in *Wired Magazine*, 1996). Many of the "early" uses of flow in computer-based entertainment have been in designing Web interfaces for commerce, information gathering, and socializing (cf. Chen, Wigand, & Nilan, 1999; Hoffman & Novak, 1997). The burgeoning video game industry, especially, has deeply embraced flow as a model of optimal enjoyment (Järvinen, 2007); each of the nine dimensions of flow has received research attention as well. In the last 5 years especially, video game theory and design has drawn interest from doctoral-level scholars and theorists from such diverse disciplines as theater, artificial intelligence, sociology, computer science, humanities, and psychology.

Kristian Kiili (2005, 2006) has sought to operationalize flow for use in designing educational video games to tap the full potential of the video game experience to "foster knowledge construction and deepen understanding" (Kiili, 2006, p. 187). For the purpose of building flow into video games, Kiili (2005) refines the flow construct by dividing the nine dimensions into antecedents and indicators. The antecedents, or stimuli which help create flow, are challenge/skill balance, clearly defined goals and unambiguous feedback (cf. the original flow model), action-awareness merging, and sense of control. The indicators of the degree to which flow is experienced are concentration, loss of self-consciousness, transformation of time, and autotelic experience. It may seem peculiar that Kiili categorizes "sense of control" with the antecedents of flow, rather than with the indicators. Kiili relates sense of control to the player's sense that he or she can learn to play the game well enough to not make any mistakes, a sense which Kiili places within the game designer's sphere of influence.

Kiili seeks to clarify the contributions of negative emotions toward defining challenge. Kiili suggests that it is not realistic or possible to create computer-based environments in which the player can be in flow the entire time. Because each new game requires a period of acclimatizing to the controls, it is expected that there will be experiences of anxiety and frustration, along with whatever flow state the game produces. Kiili postulates that these negative states encountered while mastering a game, rather than dampening the flow experience, can act as motivators toward regaining the initial flow state experienced in the easier levels through increased learning and skill mastery.

Further, perceived challenge is not necessarily a predictor of game performance. In his 2006 study of flow experience within a problem-solving game, Kiili found no significant difference in perceived challenge between those who solved the puzzle and those who did not. Kiili attributes this finding to individual differences: some people are more accustomed to challenge than others, and some people are unwilling to concede that they were insufficiently skilled.

Like many game theorists, Aki Jarvinen takes his original inspiration from Roger Caillois' classic work, "Les Jeux et les Hommes" (1958). Following Huizinga's four-type model of play, Caillois concentrated on two types of involvement within a game, *paidia* and *ludus*. *Paidia*, he wrote, is "tumultuous and exuberant" (1961, p. 31), "an almost indivisible principle, component to diversion, turbulence, free improvisation, and carefree gaiety" (p. 13). *Ludus*, on the other hand, is "gratuitous difficulty," "the pleasure experienced in solving a problem arbitrarily designed for this purpose" (p. 27). Jarvinen views the tension between *paidia* and *ludus* as one of the key sources of pleasure in a video game (Jarvinen, Heliö, & Mäyrä, 2002), one related to the flow attribute of challenge/skill balance. Jarvinen operationalizes the challenge/skill balance as a learning curve and expects the levels of challenge offered and skill required to vary during gameplay.

As for other attributes of flow, Jarvinen argues that the merging of action and awareness depends entirely on a game's "playability": its elements of structure and tempo, its consistency in terms of the actions it allows and the results that it generates, the aesthetic enjoyment resulting from the audiovisual images, and the social interaction, a key part of multiuser and role-playing games. Playability and structure are also related to concentration on the task at hand. Concentration can be broken by inconsistency on the part of the game's rationality, story, or goal structure, through inappropriate noises or messages, or through problems with the user interface. Thus, playability, though lacking a corresponding construct that applies to nonvirtual environments, may be an additional condition of flow in the video game context.

The user interface is also the source of the user's sense of control over the game's events. Being able to exercise control over the game environment "lies at the heart of meaningful and empowering interactivity" (Jarvinen, 2007, p. 25). The sense of control comes from the player's ability level, but also from the level of control the designers give the player to change his environment. In any game situation, certain facets can be influenced and others cannot, and both categories must be consistent and rational in order to enable flow. The game courses the participants deemed the most engaging were those that used players' best skills but required them to play slightly above their skill level. That is to say, players reported the most enjoyment with courses that forced (or allowed) them to be *slightly* out of control.

This finding appears to be inconsistent with the flow-model importance of "sense of control" and "challenge/skill balance" – perhaps even "clear goals" – but it is quite consistent with several other flow-influenced ideas of enjoyment. One element that leaps out is the elegant way this finding captures the tension between *paidia* (which might be the fun of skidding and smashing wildly into walls in a driving simulation) and *ludus* (the rule suggesting one must try not to skid and smash into walls). On a higher order, this finding resonates with Chen et al. (1999) suggestion that video game researchers tend to ignore an original aspect of challenge/skill balance, which is the inducement to stretch one's limits toward increased mastery in order to increase (or remain in a state of) enjoyment. In this sense, the fact that the desire for challenge is a bit at war with the desire for a sense of control may heighten enjoyment of the game.

## *Flow and Social Interaction*

Early research on flow characterized it as an individual phenomenon. Recent work has investigated shared flow experiences in social settings. Two recent studies attempt to delineate social flow, with somewhat contradictory results. Walker (2010) reports that flow can be regulated by different levels of interdependence in an activity. Three levels of interactivity were identified: individual solitary flow, such as painting with watercolors; coactive social flow, in which activities are relatively independent but performed in the company of others, as in taking a mountain hike with an outdoor club; and interactive social flow, in which the task at hand requires cooperation from other individuals, as in ballroom dancing. Both levels of social flow were characterized as more joyful than solitary flow, with activities that were highly interdependent and permitted conversation rated as the most joyful.

Decloe, Kaczynski, and Havitz (2009) examined challenge/skill balance and situational involvement in recreational activities with different partners. Situational involvement is defined as feelings of pleasure and enjoyment having to do with the situation rather than with enduring commitment to an activity as part of one's identity. It is not, therefore, identical to flow, but may be a factor in attaining a flow state. In general, activities performed alone had lower levels of situational involvement than those performed alongside others. Decloe et al. found that compared to activities alone, activities performed in the company of others were not characterized by more frequent flow as measured by challenge and skill levels. Instead, social activity was characterized by higher levels of situational involvement, but also more frequent anxiety, boredom, and apathy. Participation in physical activity alongside an activity-related club or group resulted in the highest levels of situational involvement, while physical activities done alongside coworkers had the lowest ratings, perhaps due to a lack of freedom to choose the parameters of the activity, resulting in activities with suboptimal challenge/skill balance.

Bloch's (2008) qualitative studies of flow and stress reveal several interesting findings concerning how social norms and role expectations regulate the amount of flow reported in leisure activities. When people were assembled around a specific leisure activity, such as playing chess or practicing a dance, experiencing flow was considered normal. The experience required no comment, because all people present are aware of the presence of flow. However, flow experiences are discouraged in settings focused on the development and maintenance of relationships, rather than the development of the activity itself; for example, a highly skilled volleyball player might push the limit of his or her skills at a weekly league game, but hold back from playing hard enough to have a flow experience in a game that takes place at a family picnic lest he or she intimidate the less experienced players. Similarly, Bloch reports that flow experiences at home are often disguised as altruistic projects. Many householders report experiencing flow while performing household maintenance activities that require solitude and concentration, such as sewing or building. A parent may exaggerate the resulting benefit to the family in order to acquire and maintain the space and time for performing the intrinsically rewarding activity.

## *The Future of Flow Research in Leisure*

Flow experiences greatly enhance one's quality of life. Many researchers posit that frequent flow experiences can aid coping and lead to higher levels of life satisfaction (Delle Fave & Massimini, 2003; Mannell et al., 1988). Whether it is defined as nonwork, as specific activities, or in terms of its subjective experience, leisure has proven an important source of flow experiences. Although work also offers opportunities for flow, and leisure also offers opportunities for relaxation, flow experiences in leisure develop our skills and strengths in ways not always found at work and allow us to find new ways to make life enjoyable.

However, a flow state is not necessarily desirable, or possible, at all times. First, although relaxation does not have the same cumulative growth-enhancing benefits as the flow state, it is a strong positive predictor of coping with stress (Iwasaki, Mannell, Smale, & Butcher, 2005). Further, it has been amply noted that the flow state is amoral – one can experience flow in activities that are personally and socially destructive just as easily as in prosocial activities (see Chap. 6 by Bassi and Delle Fave in this volume). Certainly, a great many mountaineers and extreme sports fanatics have lost their lives in pursuit of higher challenges that would yield flow experiences in the face of their ever-growing skills. As the flowless, passive leisure of watching television falls out of favor with a generation that prefers the flow-producing thrills of video games, parents worry that their children may become addicted to cyber-flow experiences. (Wan and Chiou's research (2006), however, suggests that flow is not the culprit; video game players whose behaviors could be classified as addiction displayed lower levels of flow than recreational players.)

Leisure provides us with a context in which to choose activities we find intrinsically motivating. Given this greater perceived freedom, it seems that in leisure, highly challenging experiences are sought after and enjoyed. Intrinsically motivated chess players prefer playing opponents with superior skills. Whitewater kayakers may report experiencing equal amounts of flow and anxiety in the midst of a dangerous rapid and yet enjoy the experience tremendously. Video gamers experience failure, yet are motivated to master increasing levels of difficulty.

Just as challenge and skill are both present in flow experiences, it seems that feelings of anxiety and control are present as well. The two sides are necessary for peak experience; without some anxiety, there would be no indication that a situation is challenging, yet without a sense of control, skills cannot emerge to meet the challenge. Further research is needed to clarify the moment to moment shifts that occur. The study of leisure provides an excellent context for developing new findings regarding the dynamics of positive and negative factors in producing flow experiences in particular and enriching experiences in general.

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