THE CONSTRUCT AND CRITERION VALIDITY FOR BEING “IN-THE-ZONE” LEADING TO OPTIMAL ACADEMIC AND JOB PERFORMANCE

by

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(Under the Direction of Leonard L. Martin)

ABSTRACT

Flow is a state of complete focus and immersion with the activity at hand. It is commonly referred to as “being in the zone.” Flow has been a key component of the recent positive psychology movement and the downstream effects of flow include greater happiness, more creativity, and reduced defensiveness. An overview of the research on flow and more specifically, an overview of the research on flow at work is provided. Previous research, however, has failed to illustrate why flow produces positive outcomes. This paper outlines the origins of the flow experience using anthropological evidence consistent with I-D Compensation Theory. Next, the results of two studies are presented to demonstrate that optimal experience (i.e., flow) leads to optimal performance. Study one surveyed undergraduate students and clarified the construct of flow, established discriminant validity from engagement, and showed flow as a significant predictor of academic performance and citizenship behavior. Study two surveyed an adult working population and established the criterion validity of flow to job performance and organizational citizenship behavior. More specifically, higher levels of flow in dockworkers and drivers lead to fewer costly accidents and greater productivity over and above engagement alone. Also, flow mediated the relationship between engagement and organizational
citizenship behavior. Theoretical and practical implications for flow in academics and in the workplace are discussed.

INDEX WORDS: flow, engagement, academic performance, job performance
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by

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CHAPTER 1
INTRODUCTION

While people are built to work, most jobs are not built for people.

(Csikszentmihalyi, 2003, p.85)

Americans spend over half their weekday waking hours at work-related activities and the amount has been increasing in recent years (American Time Use Survey, 2013). Therefore, it is important to study work, especially the factors that give rise to a positive workplace experience. Work should be an enjoyable experience, but that is not always the case. In Japan, the term karoshi literally translates to “death from overwork.” The major medical causes of these deaths are heart attack and stroke due to stress (Nickerson, 1991). On the other hand, many people have had the same job for most of their life and report being happy and satisfied with their career. What accounts for the difference?

In this paper, I explore the factors that cause work to be a laborious activity that some people dread going to everyday. I also discuss some factors that could lead to work being an enjoyable activity to which people look forward to engaging in everyday. More precisely, I provide an overview of the existing research on flow and the conditions that give rise to it (match between skill and challenge, clear goals, and feedback). Then, I make the connection between this research and optimal functioning in the workplace.

I will also address an important question that has never been fully investigated before: Why is flow fundamental for an optimal experience in the workplace? The answer I suggest, in short, is that people are evolutionarily predisposed to function optimally under the conditions for
flow. The reason for this can be found in I-D compensation theory (Martin, 1999). According to this theory, people at the biological level are immediate-return hunter-gatherers. This means they are fine-tuned by evolution to live life in an immediate-return society (i.e., inherently containing match between skill and challenge, clear goals, and feedback). To make this case, I discuss aspects of immediate-return hunter-gatherer societies and contrast them with aspects of modern, complex delayed-return societies. I also integrate research from anthropology and social psychology to explain how the features of flow (and immediate-return societies) can be used to improve people's experience in the workplace. Finally, I propose two studies to deconstruct the flow experience and to test the hypothesis that optimal experience can lead to optimal performance. The studies offer empirical evidence that being in flow leads to greater productivity and fewer work accidents. These outcomes are of great importance to organizations for their impact on employee well-being and productivity.

The Flow Experience

Flow is a psychological state people experience when they perform under optimal conditions (Seligman & Csikszentmihalyi, 2000). What does it feel like to be performing optimally? To answer that question, Csikszentmihalyi (1975) interviewed a diverse range of people including athletes, artists, and musicians, and asked them what it felt like to get lost in their work. Although the people he interviewed were performing very different activities, they reported very similar states of mind when they felt they were performing optimally. Many even used the same terms. They said they felt as if a current of water was carrying them down a river, or as if they were “flowing” down a river. Thus, “flow” has become the term used to describe the state people experience when they are functioning optimally, regardless of the activity.
Experientially, flow encompasses a high degree of involvement with and focus on the activity at hand. The person in flow feels in control and experiences a sense of competency with regard to his or her performance. During flow, people experience minimal off-task thoughts and are very present focused. They are not concerned about the distant past or the impending future, but rather value the right here and now. A distorted sense of time is also commonly reported during a flow experience. Hours can pass by and yet it feels like only half the time has elapsed. In addition, people’s thoughts, intentions, and feelings are focused on a single task and they experience a sense of harmony that is known colloquially as being “in the zone” (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2002).

The experience of flow is also intrinsically rewarding. When people are in flow, they adopt an autonomous motivational orientation and they find their performance rewarding in and of itself. It is not surprising, therefore, that people can find flow addictive (Schüler, 2012). After they experience it, they become highly motivated to experience it again.

Flow also has a paradoxical feature. While in flow, people are not focused on the self, but after having been in flow, they experience a growth of the self. It seems that when people successfully perform a behavior at the limit of their skill, they learn new skills and gain information about their abilities (Nakamura & Csikszentmihalyi, 2002). Thus, they become more competent and develop a new view of their self, a view that matches their new competence. Their self becomes both more differentiated and more integrated.
CHAPTER 2
CONDITIONS FOR FLOW

Match Between Skill and Challenge

What gives rise to the experience of flow? One factor appears to be a match between the challenge provided by the task people are facing and the skill they use to respond appropriately to that task. People are most likely to experience flow when they perform a highly challenging task, one that may seem right at the limits of their skills, but they in fact have the skill to perform the task. The high challenge stretches the person's existing skills or abilities (Nakamura & Csikszentmihalyi, 2002). When a person performs a task in which his or her skill is much higher than the challenge presented by the task, the person may experience boredom. When the challenge of the task is much higher than a person's skill, the person may experience anxiety. For example, if moderately skilled rock climbers are asked to walk up a small hill, they are likely to experience boredom. If they are asked to scale Mr. Everest, however, then they are likely to experience anxiety. If they are asked to ascend a moderately difficult rock-climbing wall, then they may be more likely to experience flow. In this case, their skill is most likely to match their challenge (Csikszentmihalyi, 1990).

Consider an example of a boy learning to play tennis. When he is initially starting to learn he has very few skills and faces minimal challenges that will probably be limited to simply getting the ball over the net. However, he may still experience a low level of flow because the challenge is just right for his beginner skill level. If he keeps practicing, his skills are likely to improve and he will become bored with the simple task of hitting the ball over the net. Or it may
be that he faces a better opponent, in which case he has to do more than just hit the ball over the net and the increased challenge would result in some anxiety. The boy will be motivated to get back into the flow state because boredom and anxiety are aversive states. If he is bored and wishes to return to the flow channel, he must increase his challenge and then meet it. Conversely, if he is anxious and wishes to return to the flow channel, he must increase his skill level to meet the greater challenge.

Clear Goals

How do clear goals foster flow? Clear goals are essential to become completely involved in an activity because a person must know exactly what needs to be accomplished. This adds direction and structure to the task. Because the experience of flow is interactive, based on the dynamic relationship composed of person and environment, it is appropriate to discuss the unfolding experience as emergent motivation. What happens at any moment is directly responsive to what happened immediately before within the interaction. In other words, motivation is emergent because proximal goals arise out of the interaction (Csikszentmihalyi, 1985; Nakamura & Csikszentmihalyi, 2002). For example, the immediate goal of the rock climber is not to reach the apex, but rather make his next move without falling. If he is not completely focused on the present goal, it could result in disaster. Likewise, the tennis player is not constantly concerned about winning the match, but rather with winning the current point at hand. If he focuses only on the final result, his opponent is likely to consistently serve winners right past him. The primary concern of an individual in flow is not the success or failure of the performance, but the quality of the present moment-by-moment experience during performance. The enjoyment derived from flow comes as a result of the experience during the activity itself rather than the final product (Csikszentmihalyi, 2003).
Immediate Feedback

How does receiving immediate feedback contribute to the flow experience? Immediate feedback allows a person to stay completely absorbed in the current activity, and offers the opportunity to update behavior contingent on the information about how well he or she is performing. Feedback is the mechanism that allows individuals to assess their progress towards a goal (Jackson & Ecklund, 2004). In the example of the tennis player, he is constantly receiving feedback by whether his shot landed in or out and about the current game score. Depending on how he feels he is doing, he is able to update his behavior by choosing his next shots based on the immediate feedback. For example, he may continue serving to the same location if it has been working well or he could change the placement if he feels as though the serve has been ineffective. Similarly, the surgeon receives feedback during an operation as to how much blood has been lost, the precision of the incision, and in some cases if the diseased organ has been removed. Each of these steps provides feedback toward the end goal. The psychiatrist also receives immediate feedback in the way the patient expresses his emotions, the tone of the patient’s voice, and the content of the material discussed in the session. The surgeon focuses on the bodily feedback whereas the psychiatrist considers the state of the patient’s mind as feedback. The specific kind of feedback a person receives is unimportant. What makes feedback valuable is the symbolic message it contains. It is a marker of progress towards the goal (Csikszentmihalyi, 1990).
CHAPTER 3

EMPIRICAL EVIDENCE

In addition to having people describe their experiences in interviews, researchers have also explored flow using the experience sampling method (Csikszentmihalyi & Larson, 1987; Csikszentmihalyi, Larson, & Prescott, 1977; Hektner, Schmidt, & Csikszentmihalyi 2007; for an overview of the ESM and other methods see Moneta, 2012). The ESM involves having participants fill out a questionnaire at various times as they go about their usual daily activities. Participants in the original studies were asked to carry pagers throughout the day and were paged at random intervals. When paged, participants were asked questions about “what was the main activity they were doing, what they were thinking about, and where they were” (Moneta, 2012). They were also asked to rate their perceived level of skill and challenge, how well they were concentrating, and how engaged they were in the activity. Participants reported more of the features of flow if they also indicated a match of skill and challenge in their activity (Csikszentmihalyi & Larson, 1987).

Asakawa (2010) studied flow in Japanese college students and found that flow was related to higher levels of positive affect. Flow was measured using the ESM and spending more time in flow was related to higher levels of concentration, enjoyment, and satisfaction. Similarly, Rogatko (2007) randomly assigned university undergraduate students to either a high flow induction group or a low flow induction group. The high flow participants were asked to perform one of their top three “in the zone” activities that they listed earlier. The low flow participants were asked to perform one of the three lowest “in the zone” activities. In line with previous
research, participants in the high flow condition reported more features of flow and higher positive affect than did those in the low flow condition.

Flow has also been studied in different populations. Optimal experience was recently examined in older adults in relation to fluid ability (Payne, Jackson, Noh, & Stine-Morrow, 2011). Fluid ability involves being able to think and reason abstractly and solve problems independent of learning, experience, and education (Horn & Cattell, 1966). Young participants have reported greater levels of flow when engaged in intellectually challenging activities rather than participating in passive and easy activities (Csikszentmihalyi, 1990). However, Payne et al. found that more cognitively-demanding activities elicited flow for older adults with higher fluid ability, but lower levels of flow for older adults with lower fluid ability.

Rheinberg and Vollmeyer (2003) had participants play a computer game called Roboguard. In this game, participants were asked to control a spaceship to avoid being hit by incoming missiles. Rheinberg and Vollmeyer manipulated challenge by varying the number of approaching missiles and the rate at which the missiles appeared. They found, consistent with previous research, that participants reported higher flow when they played the game at a moderately difficult level than at an easy or a difficult level.

Keller and Bless (2008) manipulated flow by having participants play a version of the computer game Tetris. In that game, participants are asked to manipulate a series of geometric figures as the figures descend on a computer screen. The participants' task is to arrange the figures so that they completely fill in lines at the bottom of the screen. For some participants, Keller and Bless had the figures descend very slowly. For others, they had the figures descend very quickly. For participants in the flow condition, Keller and Bless linked the speed of descent to the participants' performance. If participants were able to fill five lines or more, then the speed
of descent increased. If they filled three lines or less, then the speed descent decreased. Consistent with previous research, Keller and Bless (2008) found that participants playing in the dynamic condition (challenge linked to skill) reported higher involvement, enjoyment, and intrinsic motivation than participants playing in the fixed slow condition or the fixed fast condition.

Kulkarni, Anderson, Sanders, Newbold, and Martin (2015) manipulated flow by having participants click on white squares against a black background on the computer screen. The presentation rate was either very slow to induce boredom, very fast to induce anxiety, or at a moderate speed to induce flow. As expected, participants reported more of the features of flow after playing in the moderate presentation speed. Further, Kulkarni et al. explored downstream effects of the flow experience. That is, previous research has established the flow state as a positive phenomenon, but failed to examine what happens after being in flow. They found that participants showed reduced defensiveness by assigning less blame to an innocent victim (Hafer, 2000) after being in flow.

In sum, flow has positive implications for happiness, creativity, and increased productivity (Myers & Diener, 1995). In fact, Csikszentmihalyi's work on flow has been described as “The Classic Work on How to Achieve Happiness” (Csikszentmihalyi, 2002). If an activity has a match of skill and challenge, clear goals and immediate-feedback, it is likely to result in flow.
CHAPTER 4
FLOW AT WORK

Flow can happen almost anywhere if the right conditions are met. Although leisure may be the first domain people consider when they think of experiencing flow, there is research showing that people tend to experience more flow at work than at leisure (Csikszentmihalyi & LeFerve, 1989). In fact, organizations and managers can promote flow and experience the benefits that come with it by incorporating the conditions of flow into the workplace.

Indeed, the concept of flow has already been applied to organizations. Positive Organizational Behavior (POB) research is defined as “the study and application of positively oriented human resource strengths and psychological capacities that can be measured, developed, and effectively managed for performance improvement in today’s workplace” (Luthans, 2003, p.179). Consistent with this idea, flow has been shown to enhance organizational effectiveness and improve employee well-being (Csikszentmihalyi, 2003; Salanova, Bakker, Llorens 2006). Employees who truly enjoy their work are happier and report their work life as being more positive (Veenhoven, 1984). Naturally, one may ask, how does flow happen at work?

Matching Skill and Challenge

Flow is most likely to occur if an employee’s abilities meet their job demands. However, a mismatch between skill and challenge can lead to either boredom or anxiety at work, and the job can seem too confining or too daunting. Deborah Besemer, trustee at The Commonwealth Institute, described a way of dealing with a mismatch:
“Balance is one of the issues that goes up and down a lot. You’re unhappy in your job because you don’t have time for anything else—it has become all encompassing. And I watch that really hard because of the things I’ve seen over the years is the number of people that burn out. And what can we do about that? Is this a temporary situation that because we’re about to get a product out that you’re working nights and weekends and crazy hours, or is it a culture that we have set at this company that we expect everybody to work those hours, or is it that your skill set really isn’t up to the job so that you’re having to work that many hours to get the job done?” (Csikszentmihalyi, 2003 p.132)

If a firm gives entry-level employees too much responsibility (challenge is greater than skill) it could result in frequent turnover or premature burnout. Burnout is characterized by long-term exhaustion and diminished interest in work. It is related to a wide variety of negative outcomes including decrease in job performance, increase in the stress hormone cortisol, coronary heart disease, and depression. Engagement, a feature of being in flow, is the antithesis of burnout. An engaged employee is characterized by energy, involvement, and efficacy (Maslach & Leiter, 1997). In order to prevent burnout and promote engagement, organizations must seek to appropriately match skills of their employees with their job demands.

Matching a person’s skill to an appropriate level of a challenge in a task is key for flow to occur on the job. This balance can be studied from a personnel fit perspective. At work, employees are most likely to experience flow when their professional skills are aptly suited for their job demands (Bakker & Demerouti, 2007).

Flow can also be examined under the broad Person-Environment Fit Theory. The theory is defined as the degree to which individual characteristics match environmental characteristics. Individual characteristics can include biological or psychological needs, knowledge, skills,
abilities, and other characteristics (KSAOs) whereas environmental characteristics can include demands of the job, extrinsic rewards, and cultural values (Dawis, 1992; Kristof-Brown, Zimmerman, & Johnson 2005). Similar models such as the person-environment fit perspective (French, Caplan, & Harrison, 1982) and the situational congruence model (Diener, Larsen, & Emmons, 1984) argue that the match of personality dispositions and situational demands [challenges] will be related to positive outcomes, including increased positive affect and reduced distress, with a mismatch resulting in the opposite effects.

A subset of person-environment fit is person-organization fit (P-O fit), and is defined by Kristof (1996) as, “the compatibility between people and organizations that occurs when (a) at least one entity provides what the other needs, (b) they share similar fundamental characteristics, or (c) both.” An optimal person-organization fit results in reduced turnover, increased organizational citizenship behavior, and organizational commitment (Andrews, Baker, & Hunt, 2010). Another subset is person-job fit (P-J fit), and is defined as the compatibility between a person’s characteristics and those of a specific job (Kristof-Brown et al., 2009). This perspective emphasizes the matching of employee KSAOs to job demands. In personnel selection, this match allows organizations “to choose from among a pool of applicants those people best suited to the work” (Brannick, Cadle, & Levine, 2012). Providing employees high in need for achievement with achievement-related opportunities can lead to positive consequences. Eisenberger, Jones, Stinglhamber, Shanock, and Tenglund (2005) found that the experience of high skill and high challenge was related to a greater positive mood, task interest, and organizational spontaneity only among employees high in need for achievement.
Implementing Clear Goals

Goals are among the most important concepts studied in organizational psychology, and are found at every level of business, ranging from the specific individual to a more macro level of the organization as a whole. Clear goals, an antecedent of flow, are an integral component of goal setting theory. In fact, goal setting theory integrates the principles of clarity, challenge, task complexity, and feedback as the basis for the theory (Locke, 1968; Locke & Latham, 2002). Feedback has been widely studied for improving the quality of the work experience, and it is used to optimize performance and facilitate advancement within organizations (Levy & Williams, 2004). In addition, feedback ensures continuity of organizational goals, increases creativity, promotes trust, and energizes motivation (Mulder, 2013).

Clear goals also foster flow in the workplace. Locke (1968) said that effective employees were motivated by clear goals and appropriate feedback. Working toward a clear goal provides a source of motivation to actually reach the goal, which, in turn improves performance. The five principles of goal setting theory include clarity, challenge, commitment, feedback, and task complexity. For the purposes of this paper I will focus on goal clarity and feedback.

Goals have a widespread influence on employee behavior and performance in organizations. Employees show reliably higher performance when asked to meet a specific high-performance goal. In other words, this occurs if there is a match in the level of specificity in predictor and criterion (Judge & Kammeyer-Mueller, 2012). Research has shown that it is not helpful to ask employees to improve, work harder, or to do their best because these types of goals do not provide a focused target to aim for. In other words, employees are asked to take specific actions towards a general goal and this mismatch is a set up for failure. Specific goals, however, allow employees to know exactly what they need to accomplish and enable them to
track their own progress. Brown and Latham (2000) found that unionized telecommunication workers showed high performance and reported higher job satisfaction with their performance appraisal process when specific, rather than general high goals were set. Quantifying specific goals also helped to objectify measures of performance. In addition, setting specific goals reduces absenteeism, tardiness, and turnover (Locke & Latham, 2002).

Goals can also be examined from a more macro perspective of the organization as a whole. In order for employees to focus on achieving the company’s goals, the goals must be communicated in an effective and clear fashion. The most often mentioned trait of healthy organization is communication based on trust. It is the duty of the CEO or other leaders to ensure that the values, goals, and purposes of the organization are clearly defined. Simply having clear organizational goals is not sufficient. Management must be able to effectively relay these goals to their direct subordinates. There are several reasons why the mission of the organization may be unclear to one’s subordinates. Just because we understand a situation clearly does not mean that it is clear to others as well. Newly selected recruits could be completely unaware of the goals of the organization, and it is the responsibility of management to reach out to them. Richard DeVos, founder of Amway, describes a strategy for ensuring company goals are clearly understood throughout the organization:

“I make sure [the staff is] informed. All the years we ran the company, for example, we had an employee meeting every month. [We did so] out of respect for employees, [and because we wanted] them to be a part of the company. Once a month, we have a meeting—it takes about an hour- and inform them of how business was, whether it was up or down, what the conditions were. We’d answer their questions about why we did or didn’t do certain things, why we had this benefit and not that benefit. So, that’s showing respect for
people. When you communicate with people, you show respect for them.”

(Csikszentmihalyi, 2003 p.118)

The set of core values expressed by the leaders of an organization must be transmitted along the chain of command, and it is imperative that effective communication be a foundation of the message.

Clear organizational performance goals help employees experience flow at work. Clearly defined performance goals allow employees to take specific actions toward reaching the goal. They help an employee know, moment by moment, what exactly needs to be accomplished. Some jobs, such as an assembly line, provide every step that needs to be completed in the process. However, many jobs are more flexible in their performance of day-to-day activities. A university professor must have a lecture prepared for class, but must also be ready to answer unexpected questions from students. Therefore, it is important to have a job that offers the subjectively appropriate level of goal clarity that is likely to result in flow. An assembly-line worker who experiences flow at work might not enjoy the uncertain flexibility a university professor may have to deal with. Likewise, a university professor who is in flow while addressing novel questions is not likely to find the repetitive tasks of an assembly line enjoyable. It is important for organizations and managers to keep in mind the necessity of clear goals in order to foster flow.

Incorporating Immediate Feedback

Similarly, successful CEOs and other leaders of organizations take measures to ensure they receive feedback from others. They do so by consulting their peers in related businesses and with their relevant personnel within their organization. These leaders also check their progress by
asking their clients about the work they are doing. J. Irwin Miller of the Cummins Corporation invokes Greek antiquity to emphasize the importance for a leader to seek feedback:

“The very best leaders have always been enablers. That goes even back to classical times. I don’t know if it was in Thucydides or not, but there was a Greek general… who was beloved by his soldiers because he behaved exactly as present-day business consultants are advising CEOs to behave… He knew all his people. He talked to them. He asked their advice. He seriously considered it. And he reported back to them. He sounded like the way Peter Drucker [author of *The Practice of Management* and founder of “management by objectives] is advising today, and that was 2,500 years ago.” (Csikszentmihalyi, 2003 p.125)

In fact, employees identified the ability to give frequent, transparent feedback as the number one key characteristic of a great leader. The use of proactive feedback was rated as more important and influential than leadership experience and technical expertise (Sullivan, 2013). Leaders must evaluate each person’s strengths and weaknesses in order to give feedback for improvement. Companies often use yearly evaluations due to convenience. These delayed evaluations do not offer employees immediate feedback that they need to succeed. Even a quarterly or monthly evaluation does not suffice. By giving their employees immediate, specific feedback leaders allow employees to update their behavior and improve their job performance. Immediate feedback lets employees know that what they are doing is meaningful and consequential (Csikszentmihalyi, 2003).

Too often feedback is given only for negative performance. Overlooking positive performance and failing to recognize its merit also has consequences for performance. If managers fail to reinforce positive behaviors an employee is unsure that he or she is heading in
the correct direction and it becomes that much more difficult to reach the goal. The kind of feedback varies from the traditional scheduled mentor/novice assessment (Rai & Singh, 2013), the 360 degree feedback procedure (Brett & Atwater, 2001), and the ongoing coaching method (Baker, 2010). Once again, the importance is not on the kind of feedback, but on the symbolic meaning the message carries. Meaningful and effective feedback is clear, specific, and task relevant to either proximal or distal goals (Baker, Perreault, Reid, & Blanchard, 2013).

Baker et al. (2013) also advocate a feedback-friendly culture within organizations. This refers to organizational practices and interventions that highlight the importance of feedback, provide support for using feedback, and take a stand on quality feedback. A feedback-friendly culture has shown evidence for better receptivity to feedback, increased behavior for seeking feedback, and greater motivation to update behavior as a result of feedback. This culture increases the perceived meaning of feedback and in turn, promotes a greater use and implementation of feedback. It is important for organizations and leaders to consider relatively immediate feedback as essential for optimal experience in the workplace.

Mike Murray of Microsoft describes the three “common things” that determine the success of a business team:

“[Number one:] If the manager makes sure that every team member has very clear goals that line up to what the company needs to be doing… Number two: if the manager is really good at planning all the incremental activities that need to get done so that work flows smoothly through the team. And number three, if the manager is really good at keeping communication and feedback…” (Csikszentmihalyi, 2003 p.114)

Murray had no prior knowledge of the three conditions for flow, but as a successful manager he recognized these features as being key for optimal experience for his employees.
Work Engagement

How does flow relate to work engagement? Are they entirely different constructs or do they share dimensional overlap? Work engagement has been heavily marketed by human resource consulting firms as being able to increase employee well-being as well as higher productivity, leading to a better bottom line for companies. It is only relatively recent that academic researchers have started to explore this concept.

First, it is important to define work engagement. Kahn (1990) proposed that personal engagement is a state in which employees “bring in” their personal selves during work role performances, invest personal energy, and experience an emotional connection with their work. Erickson (2005, p.14) articulated a view consistent with these thoughts:

“Engagement is above and beyond simple satisfaction with the employment arrangement or basic loyalty to the employer-characteristics that most companies have measured for many years. Engagement, in contrast, is about passion and commitment- the willingness to invest oneself and expend one’s discretionary effort to help the employer succeed.”

Christian, Garza, and Slaughter (2011) defined work engagement as a relatively enduring state of mind referring to the simultaneous investment of personal energies in the experience or performance of work. However, they agree with Dalal, Brummel, Wee, and Thomas (2008) that engagement is likely to contain both trait-like and state-like components. Christian et al. (2011) also found that engagement exhibits discriminant validity from and criterion related validity over job attitudes. They conceptualized engagement as a higher-order construct and did not include flow as a single dimension in their conceptualization because it did not fit their definition.
Macey and Schneider (2008) define work engagement as a desirable condition that has an organizational purpose and connotes involvement, commitment, passion, enthusiasm, focused effort, and energy. They include both attitudinal and behavioral components in their conceptualization. They also indicate that work engagement has both trait-like and state-like components. Trait engagement, or positive views of life and work, is characterized by a proactive personality, an autotelic personality, trait positive affect, and conscientiousness. State engagement, or feelings of energy and absorption, is characterized by affective satisfaction, involvement, commitment, and empowerment.

Macey and Schneider (2008) liken the autotelic personality, the tendency to engage in activities for their own sake rather than for specific gains or rewards (Nakamura & Csikszentmihalyi, 2002), to trait engagement. Accordingly, I believe that state engagement is the closest analogy to the experience of flow in the workplace. By definition, psychological states have distinct boundaries set in time (Weiss & Kurek, 2003). From a temporal perspective, trait engagement would be the most enduring, followed by state engagement, and flow being the most short-lived. I conceptualize flow as having an even stronger positive affective tone and higher levels of involvement in an activity than state engagement. A person may not always be intensely in flow while at work, but it is certainly possible to ebb and flow while in a steady state of engagement. That is, if there is a close to perfect match of skill and challenge, almost perfectly clear goals, and almost perfect immediate feedback, the probability of flow is very high. Along this line of thought, if there is a moderate match of skill and challenge, moderately clear goals, and moderately immediate feedback, the likely result is state engagement. It is during the rare moments, when all the conditions for optimal experience are present in an almost perfect combination that the flow experience will occur.
Although it is nearly impossible to be in flow every minute while at work, it is certainly possible for the ephemeral experience to occur repeatedly. Even though the experience itself may be short-lived, it can occur at a high frequency if the correct conditions are present. For example, a manager may experience trait engagement in his job when feeling positive about his place of work or satisfied with the results of a completed project. He or she may experience state engagement on a day-to-day basis when resolving a dispute between his subordinates or when making a tough decision about which business plan to pursue. These instances are likely to be associated with an engaged manager’s typical performance. I argue that flow is likely to be correlated with instances of maximal performance. For example, the manager may experience flow while giving an important business presentation to a client with a large account on the line or while coming up with a creative solution to solve an important issue that the company deems complex.

I believe it is likely that flow shares conceptual space with work engagement and it is most closely related to state engagement. However, flow also has unique dimensions, namely the intensity of experience and its relatively short temporal timeframe. Macey and Schneider (2008) used the analogy of engagement not simply being “old wine in new bottles” to demonstrate its uniqueness. I believe the same idea applies to flow. Although flow shares dimensional overlap with engagement, it also offers distinct features of its own.

Empirical Evidence of Flow at Work

Flow has also been studied at work using the ESM. Fullagar and Kelloway (2009) tracked architectural students over 15 weeks while they engaged in studio work. Hierarchical linear modeling indicated that 74% of the variance in flow was attributable to situational characteristics compared to dispositional factors. This demonstrates the importance of setting up
opportunities for flow in the workplace. Consistent with the job characteristics model (Hackman & Oldham, 1975), academic work that was high in skill variety and autonomy was related to flow experiences. They also found, consistent with previous research, flow was correlated with positive mood.

To measure flow at work using a novel method Bakker (2008) created the work-related flow inventory (WOLF). Flow is operationalized with a set of 13 items on the dimensions of absorption (4 items), work enjoyment (4 items), and intrinsic work motivation (5 items). There is support for factorial validity and reliability of the WOLF. Research was conducted from seven samples of workers ranging from employees at an insurance company to human service professionals and included 1,346 participants. The WOLF provides a method for measuring flow at work and can be used to further understand the experience.

Demerouti (2006) examined the relationship between flow at work and job performance in occupational health psychology. In line with previous research, motivating job characteristics were positively related to flow at work. In addition, conscientiousness moderated the relationship between flow and other ratings (in-role and out-of-role) performance. This study demonstrated that it is possible to promote employee well-being and effectiveness by experiencing flow at work. However, this and previous research failed to explain why certain job characteristics were motivating. In other words, why is it that feedback or autonomy has a motivating effect?

So far I have discussed the phenomenological experience of flow and the conditions that give rise to flow. In addition, I have integrated these elements in the context of the workplace. I have depicted flow as a positive experience with several psychological and physical benefits. Central to the discussion have been the conditions of the flow experience. I have highlighted the
importance of a match between skill and challenge, need for clear goals, and necessity of immediate feedback.

In the next section I attempt to answer why flow is fundamental for optimal experience in the workplace and more specifically, why the conditions that give rise to flow themselves “optimal.” By answering these questions, we may be able to learn more about flow and the features that give rise to optimal experience in the workplace.

I will argue that most individuals today do not live in a culture that humans first evolved, and it is this primitive culture for which we are best adapted to function optimally. I raise the possibility that people are most often in flow when they behave in ways that are compatible with the predispositions they inherited from their hunter-gatherer ancestors. I will frame these ideas in terms of I-D compensation theory (Martin, 1999).
CHAPTER 5
CONNECTION TO EVOLUTIONARY PAST

Evidence suggests that genetically modern humans emerged at least 200,000 years ago (Wilson & Cann, 1992). Although human beings have undergone many genetic changes since then, most of these changes relate to immune system functioning (Fu & Akey, 2013), and there is no evidence for changes at the psychological level. Therefore, it is reasonable to assume that the inherent features of human nature, that we possess even today, were established when our ancestors lived as mobile, non-storing hunter-gatherers (Marlowe, 2002; Shultziner, Stevens, Stevens, Stewart, Hannagan, & Saltini-Semerari, 2010).

From the archeological record we can infer certain aspects of hunter-gatherer life. This record indicates that our ancestors lived in small, mobile groups in which sharing and egalitarianism were the norm. They made tools and other artifacts, yet they remained immersed in nature rather than the artificial human-made world. They did not practice farming or herding, and they seemed to have lived in relatively short temporal windows (i.e., not overly concerned with the past or with long-term future plans) (Martin, Kulkarni, Anderson, Sanders, Newbold, & Knowles, 2014).

We can also make inferences from certain contemporary hunter-gatherer societies. Although the comparisons are not perfect, they can be useful because “some documented societies of nomadic foragers share sufficient material and organizational similarities with
archeological entities to allow inferential insights” (Shultziner et al., 2010, p.332). Marlowe (2005, p.65) states that “contemporary foragers are not living fossils, but because they are pre-agricultural they are the most relevant analogs for at least Late Pleistocene humans.” As a result, we can cautiously examine features of contemporary hunter-gatherers to further understand the adaptations that have been built into human nature (Smith, 2007). It is these adaptations we need to understand if we are to answer why flow is fundamental for optimal experience at work.

Before I begin to describe the features of hunter-gatherer societies, it is important to raise several caveats. First, there are various types of hunter-gatherer societies and not all of them reflect the conditions under which our Paleolithic ancestors evolved. The societies that best reflect that life are referred to as immediate-return societies (Cummings, 2013; Marlowe, 2005; Woodburn, 2007). These societies obtain almost 100% of their subsistence from hunting and gathering. Their resources are obtained through daily foraging. Immediate-return hunter-gatherers do not farm crops or herd domestic animals and they engage in little, if any, storage.

Although all immediate-return societies live by hunting and gathering, not all hunter-gatherers live in immediate-return societies. Some hunter-gatherers live in complex, delayed-return societies. These societies consist of higher levels of farming or herding, permanent settlements, storage, and social as well as political complexity. Delayed-return societies are more similar to the complex, technological societies in which most people currently live than they are to immediate-return societies (Woodburn, 1982). Thus, the most defensible analogy to the life of our Paleolithic ancestors, under which the inherent adaptations of human nature evolved, is with immediate-return societies (Marlowe, 2005).

People often find the features of immediate-return societies to be surprising, even unbelievable (e.g., Greenberg, 1999; Kenrick, 1999). These features (e.g., peaceful, egalitarian,
few religious rituals) often contradict commonly held stereotypes of hunter-gatherers and even human nature more generally (e.g., warlike, sexist, superstitious). As Burch (1994) noted, "immediate-return or generalized hunter-gather societies are so unlike all others that ... it is difficult even for anthropologists who have not personally experienced one to conceive how they can exist; it is almost impossible for non-anthropologists to do so” (p. 453). However, there is substantial evidence for some of the features of immediate-return societies (Woodburn, 2007) and certain hunter-gatherer societies today, such as the Hadza and M’buti, still exhibit these characteristics.

Finally, I want to emphasize that I am not advocating all humans return to living life in the forest and become hunter-gatherers. There are certainly advantages to a delayed-return lifestyle, but I argue that they have come at a psychological cost. I believe it is important to learn from immediate-return societies so that we can live our current lives more optimally. It is by studying these societies we can learn about the conditions that are evolutionarily fundamental for the flow experience. So, what are some features of immediate-return hunter-gatherers (for a detailed overview see Martin et al., 2014), and what can they tell us about flow?

Some Features of Immediate-Return Hunter-Gatherers

Immediate-return hunter-gatherers live in small, temporary, mobile, and autonomous camps spread out in the landscape as part of a larger population (Woodburn, 1979). There is so much movement of individuals in and out of the camps that it's possible for camp membership to change on a daily basis. When members from one camp arrive at another camp, they are allowed to share equally in the new camp’s resources. There are no special criteria for acceptance in an existing camp. Although the people in a given local camp will be familiar with one another, on
any given day, less than 10% of the members in a camp are likely to be primary kin (Hill, et al., 2011).

Bird-David (1994) analogized immediate-return societies to drops of oil floating on water. When the drops come together, they coalesce into a larger drop. This larger drop, however, can split easily into smaller ones, which, in turn, may coalesce to form other larger drops. Likewise, members of immediate-return societies "perpetually coalesce with, and depart from, each other" (Bird-David, 1994, p. 597). Bird-David describes this movement by using the formal terms of fission and fusion. They can choose which relationships to pursue and which relationships to abandon. Members of immediate-return societies use visits, meal sharing, cooperative work, and even the positioning of their huts to choose which relationships to pursue and which to abandon.

Although members of immediate-return societies move frequently, they do not see this movement as a burden. They see it as a gift because it allows them to maintain their autonomy. It is important to note, though, that their autonomy is not the isolated individualism often seen in modern Western cultures. It is much more relational. It grows out of a history of continuing involvement with others in contexts of joint, practical activity. Each member of the society acts with the other members in mind, and can assume that the others will do the same (Bird-David, 1992; Ingold, 1980). Each actively avoids infringing on the autonomy of the others and can be confident the other members will actively avoid infringing on his or her autonomy.

One way immediate-return societies promote autonomy is through the intentional avoidance of long-term binding commitments. The members know that such commitments entail dominance and inequality. The first party holds power over the second party until the latter delivers on his or her end of the deal. By avoiding such commitments, members of immediate-
return societies maintain their autonomy. As a result, in immediate return societies, there is less formalized top-down pressure to think and behave in certain ways.

Members of immediate-return societies also receive relatively immediate feedback regarding the effectiveness of their behavior. They know within hours, for example, if their hunt has been successful. If it has, they return to the camp to share their catch. If their hunt has not been successful, they can search for an alternative source of food. This immediacy allows them to live in small temporal windows (Bird-David, 1994). As Forde and McDouglas (1956) put it, immediate-return hunter-gatherers “are bound to the momentary present, scarcely ever striking out new lines for themselves, never forecasting the distant future, and seldom making provisions for the near future. Capable of anticipating its future needs only for a very brief span. Accumulation is difficult, long-term planning is impossible” (p. 322). In immediate-return societies, individuals seem to live by the motto “If it is not here and now what does it matter where (or when) it is?” (Turnbull, 1983, p. 122).

Immediate-Return and Flow

How do the features of immediate-return societies foster flow? I argue that these societies inherently have built into them the conditions necessary for the flow experience. That is, they naturally contain a close match of skill and challenge, clear goals, and immediate feedback.

Immediate-return hunter-gatherers experience an effective person-environment fit (Martin, 1999; Wicklund, 1986). Humans have evolved to live in immediate-return societies and the adaptions built into human nature are fit for these societies. For the first 90% (or more) of its existence our species lived in small groups of closely related individuals who subsisted as nomadic, non-storing hunters and gatherers (Lee & DeVore, 1968, Sahlins, 1972). As a result, there was congruency between our immediate-return biology and the immediate-return
environment. In flow terms, this compatibility can be viewed in terms of a match between skill (i.e. immediate-return biology, evolved adaptations of human nature) and challenge (i.e. immediate-return environment). On a daily basis a hunter-gatherer was required to perform tasks that were in accord with his or her skills. I argue that immediate-return hunter-gatherers experienced flow frequently because of this consistent match of skill and challenge.

Hunter-gatherers living in immediate-return societies also have clear goals. Their simple lifestyle facilitates flow by having built-in clear goals. For example, when hunting for an animal the objective is straightforward. One must use a weapon (often a bow and arrow or a trap) to kill the intended prey. At any moment a hunter-gatherer knows exactly what must be done to accomplish the goal. This, in turn, allows for complete absorption and focus on the activity at hand. Immediate-return hunter-gatherers are likely to experience flow on a daily basis because they are able to immerse themselves in their activities that have clear goals.

Immediate-return hunter-gatherers also receive frequent feedback regarding their goal progress. It is important to note that immediate-return does not signify immediate-gratification. The immediate-return lifestyle allows individuals to live in the phenomenal present and receive almost immediate feedback regarding the efficacy of their efforts. Their hunting and gathering, for example, is composed of a series of discontinuous undertakings of relatively short duration (e.g. hours) that are independent of one another and in which the outcome is known immediately at the end of each venture (Meillassoux, 1973). This frequent feedback also contributes to the flow experience as a hunter-gatherer makes progress towards his or her goal. For example, when hunting an animal it is possible that the animal may disappear from view. However, a keen hunter can use cues from the environment (e.g. animal tracks, disturbances in the foliage) as feedback to continue onward. This does not necessarily mean that the hunter will be successful
100% of the time. Immediate feedback does, however, allow the hunter to update and make an informed decision on whether to persist relatively quickly. So, if being in flow is natural and effortless, why do most of us of today have difficulty in finding optimal experience? I argue the answer can be found in the features of the contemporary world in which we live in today.

I previously stated that it is important to understand immediate-return societies because they inform us of the conditions in which the inherent adaptations of human behavior evolved. I also stated that we are biologically (i.e. genetically) immediate-return hunter-gatherers because human nature has not significantly evolved psychologically or physically in the last 200,000 years (Fu & Akey, 2013; Shultziner, 2010; Wilson & Cann, 1992). However, the world we live in today is very different from the immediate-return societies in which we evolved. The societies we live in today can be described as delayed-return (Woodburn, 1982; 2007). These societies are characterized by an exertion of immediate effort for an uncertain delayed payoff. So, how did the world become predominantly delayed-return? If life was optimal in immediate-return societies, why did people trade it for a more complex delayed-return lifestyle? The answer, I believe, lies in the Natufian period (13,000 - 9800 years ago) when our nomadic ancestors began to settle down (Martin et al., 2014).

Transitioning to a Delayed-Return World

There is no single agreed upon explanation for why our Paleolithic ancestors gave up their mobile lifestyle, but there is general agreement on the major factors. One is climate change (Bar-Yosef, 2011; Fellner, 1995; Zeder, 2006). During the Paleolithic era (2.5 million to 20,000 years ago), the global climate was extremely cold, dry, and variable, and the level of atmospheric CO₂ was extremely low. Thus, farming was impossible, leaving our Paleolithic ancestors to survive exclusively by hunting and gathering (Richerson, Boyd, & Bettinger, 2009).
Around 13,000 years ago, however, the global climate became significantly warmer and wetter. This change led to an increase in the human population as well as a shift in their location. Specifically, it increased the lushness of the central foraging lands and decreased the land along the coasts (because of rising sea levels resulting from polar warming). As a result, more people moved to the central areas to compete for the same resources (Bar-Yosef, 1998; 2011). Some people addressed this problem by broadening and intensifying their hunting and gathering. Others addressed it by becoming less mobile and intensifying their reliance on the existing plant resources in specific territories. They were not yet farming, but they were spending more time around local fields of wild grains and eating those grains.

Around 11,000 years ago the cold, dry climate of the Paleolithic returned briefly. Although some people continued to hunt and gather, others further intensified their sedentism and their reliance on wild grain (Bar-Yosef, 2011). There was still no farming, but there was a growing split in the population (Goring-Morris & Belfer-Cohen, 2011).

Finally, around 10,000 years ago, the climate stabilized and warmed to present temperatures. As before, the warming led to an increase in the human population and to more people competing for the same resources in a smaller area. This time, though, the population was already divided into those who had started to become sedentary and those who were still highly mobile. When the wild grains began to proliferate in the warmer, wetter climate, the people who were already settling down started building permanent settlements and began storing grains (Bar-Yosef, 2011).

Humans made the transition from hunter-gatherer life to a more sedentary life in densely populated communities over the course of thousands of years. For simplicity sake, though, anthropologists point to 10,000 years ago as the time when things changed. It is around this time
that humans were forced into domesticating plants and animals in a widespread and irreversible way. It was also around this time that humans began domesticating themselves (Harris & Hillman, 1989).

By settling down, humans changed their societies in ways that had significant effects on their psychology -- not all of them good. Diamond (1987) calls the transition to agriculture the worst mistake in the history of the human race. It is "a catastrophe from which we have never fully recovered" (p. 64). The problem, in short, is that the transition resulted in the development of delayed-return societies and these societies often demand their members to perform behaviors that are discordant with their immediate-return nature (Martin, 1999). This psychological effect is central to the discussion of why flow does not occur more often in our society today.

For example, in modern, complex societies, people are often required to exert immediate effort for delayed, uncertain payoffs (Martin, 1999; Woodburn, 1979). They may plant crops, work for a paycheck, or save for retirement. In each case, people work toward an outcome they will not receive for days, weeks, months, or even years -- if then. This input-outcome disjunction may lead people to experience a great deal of uncertainty, possibly over long stretches of time.

An example that illustrates life in a delayed-return system is attaining a PhD. Although not everyone chooses to pursue an elaborate goal such as this one, the general features of this goal are similar to most pursuits in a delayed-return culture. To obtain a PhD, individuals have to undergo many years of preparation (i.e. schooling), during which they exert immediate effort for a delayed and uncertain outcome. During this period they also find themselves in formal, long-term binding commitments, most notably with their advisors. Favorable evaluations by one’s superiors lead to new uncertainties and further delayed feedback. Will I get a job? Will I be able to attain tenure? Will my manuscript be accepted for publication? In short, the pursuit of an
academic lifestyle (like most pursuits in a delayed-return system) requires an individual to cope with long-term binding commitments to specific individuals, repeated evaluations of performance, and most importantly an investment of immediate effort for delayed and uncertain outcomes. This raises the possibility that life in today’s delayed-return culture may be asking humans to rely on abilities that were used differently or at least not to the same extent in our evolutionary past (Maryanski & Turner, 1992). So, why is flow today viewed as a special phenomenological state that we must strive to get into? I believe the answer lies in the structure of our delayed-return culture.

Flow in a Delayed-Return World

Csikszentmihalyi (2003, p.85) noted, “while people are built to work, most jobs are not built for people.” While performing their routine daily activities hunter-gatherers were able to acquire food for themselves and these natural behaviors did not feel at all like what we call “work.” Hunting and gathering was simply a part of life and there was no reason for them to think of these as distinct from leisure. Flow was likely not difficult to achieve because each individual used whatever skills he or she had, goals were clear, and feedback was immediate (Csikszentmihalyi, 2003).

However, the conditions for flow are not inherently built into the workplace today. An indicator of the mismatch between skill and challenge often occurs at jobs in which people experience boredom or anxiety. It is much more difficult and time consuming to find an ideal person-job fit in a delayed-return culture and even more challenging to find a job that results in flow. For example, highly-skilled young lawyers are often subjected to years of tedious library research or ambitious young consultants are given projects that demand eighty hour weeks that burn them out. One of the ostensible benefits of industrial production has been increased
efficiency. However, this specialization of functions also had the negative effect of only requiring a limited number of skills from a worker (Csikszentmihalyi, 2003). A job that only asks for a fraction of an employee’s skills quickly becomes a tedious responsibility because skills are not being fully utilized. Gavin and Axelrod (1977) identified skill utilization as an additional task characteristic that may contribute to job motivation and job satisfaction.

Few jobs today provide workers with clear goals. Employees may be asked to do specific tasks for which the purpose is apparent at the organizational level, but remains unclear to them. It is often the case that a worker understands what he or she is doing, but it is not known why. It is impossible to become completely absorbed at work if goals are not well defined. In contrast, a hunter-gatherer had clear goals on a daily basis. Every move of the hunt was derived from the simple, clear goal of killing the animal. Because a hunter could pursue an animal for hours fully knowing that his or her immediate efforts were directly aligned with the goal. In modern, delayed-return societies this is often not the case. Humans today are asked to pursue goals for which both the short-term and long-term outcome is unclear. In the context of work, when an employee is not fully engaged, he or she often seeks flow from other sources and involvement in the job falters (Csikszentmihalyi, 2003).

As I previously discussed, a delayed-return society requires immediate effort for an uncertain, delayed payoff. People today often have to put in days, weeks, or even months of work into a project and remain unaware of their progress. A common example of this discord is receiving a monthly paycheck. Employees work for an entire month and receive the payoff only at the end.

Contrast this with the immediate effort exerted by a hunter-gatherer. He or she usually knows within a few hours if progress is being made towards the goal and behavior can be
updated accordingly. Today, even if feedback is provided, it is usually ineffective (Baker et al., 2013). Employees are simply told that what they are doing is or is not working. Missing from this type of feedback is specificity that the employee can benefit from to guide future behavior. Lack of quality feedback is not only a problem for the employee, but also has implications at the organizational level. Effectively communicating useful feedback down the chain of command ensures that an organization’s key values are apparent to everyone. Cambridge Incubator founder Timothy Rowe noted, “A lot of problems in business are not because the CEO doesn’t have the right values. It’s because the CEO isn’t effective at communicating them throughout the entire organization.” (Csikszentmihalyi, 2003 p.125).
So far, I have summarized the features of flow and the conditions that give rise to the experience, described features of optimal experience at work and distinguished between immediate-return and delayed-return societies. I also noted that some of the features of flow are more often seen in immediate-return societies and that for the vast majority, we are biologically immediate-return beings living in a delayed-return world. If this is the case, how do humans reconcile living in a word discord with their inherent dispositions?

These observations can be coherently integrated by using I-D compensation theory (Martin, 1999). It is useful to start by unpacking the name of the theory. The I stands for the immediate-return nature of human beings, the D stands for the delayed-return nature of the societies in which most people live now, and compensation stands for the steps people take to reconcile their immediate-return nature with the constraints placed on them by their delayed-return societies. The general idea is that when people experience discord between their immediate-return biology and their delayed-return culture, they take steps to reconcile the two.

More specifically, the theory starts with the assumption that humans possess a set of sensitivities and predispositions that helped their distant ancestors survive and reproduce in the context of immediate-return societies. This is one reason people function optimally when they experience a match between skill and challenge, have clear goals, and receive frequent feedback that they are progressing toward their goals. These are the features toward which our biology is attuned.
People may experience psychological difficulties, however, when they live in delayed-return societies. These societies can lead people to behave in ways that are not compatible with their immediate-return biology. There are incompatibilities, for example, in our diet, economics, and population pressure (Cohen, 1985; Diamond, 1987). The main incompatibility on which I-D compensation theory focuses is that between people’s efforts and the feedback they receive with regard to those efforts.

I want to extend I-D compensation theory by making an analogous comparison to flow. That is, I argue that humans function optimally, or are in flow, when they act in accord with their immediate-return biology. Further, delayed-return societies today do not inherently foster flow and people in these societies are more likely to experience boredom or anxiety. Here compensation refers to activities people undertake in order to experience flow in a delayed-return world. Are people today able to find flow in a society that is incompatible with their immediate-return biology? Can some individuals find flow even in seemingly unlikely situations such as work? In some ways we already know the answer.

I argue that people today find flow in activities that are seemingly compensatory. By compensatory I mean that they are not the exact activities for which our immediate-return biology evolved to undertake. For example, people today find flow when running marathons. I contend that the reason people are likely to be in flow while running a marathon is because they are partaking in an activity that has a similar immediate-return analogue. Hunters would often pursue prey for hours when engaging in persistence hunting, and our bodies function optimally when preforming such an activity. Today, however, there is no need to chase prey for hours on end as a source of food. Nonetheless, runners engage in a similar activity that fulfills their immediate-return biological imperative as a source of flow. A similar analogy can be extended
A person today does not have to be playing a sport to be in flow. The opportunity for flow is available in any activity if the person is able to recognize it (Csikszentmihalyi, 1990). For example, examine the daily activities of a university professor. He or she is likely to hold office hours, lecture in class, and work on manuscripts. These activities could not be any more foreign for a hunter-gatherer. However, these are the tasks we are asking our immediate-return biology to perform. Fortunately, we are not completely unequipped to take on these challenges. Humans have an amazing ability to adapt to their environments and our species seems to have thrived in a delayed-return society when asked to perform delayed-return activities. But this success has come at a psychological cost.

Rather than routinely performing activities for which our immediate-return biology is adapted to handle (i.e. hunting, gathering), today we are asked to sit behind a desk for hours and repeatedly push buttons on a box. But it appears that we have successfully adapted to the challenge. We are able to send emails, the university professor is able to lecture, and the marathon runner is able to run the race. Although sometimes rewarding, delayed-return activities do not themselves promote optimal experience. We must find opportunities for flow by ensuring that there is a close match of skill and challenge, goals are clear, and feedback is immediate.

In fact, another term for receiving pay at the end of the week or end of the month is compensation. That is, we are being compensated with pay for adapting our immediate-return biology in a delayed-return world. We effectively get rewarded for making compensations that help to reduce the discord between our immediate-return biology and the delayed-return world.

We can use the same principles for finding flow at leisure to finding optimal experience at work. Although the features of most delayed-return jobs do not promote flow, we can
compensate by incorporating features learned from our hunter-gatherer heritage. We can promote a match between skill and challenge by taking into consideration person-job fit and person-organization fit. We can ensure clear goals by stressing the importance of clear employee and organizational performance goals. We can incorporate immediate feedback into the workplace by giving employees timely and useful feedback and advocate a feedback-friendly culture within organizations. These immediate-return compensations promote flow in a delayed-return job setting.
CHAPTER 7

EMPIRICAL IMPLICATIONS OF FLOW

Previous conceptualizations have viewed flow as a multidimensional state-trait variable. Jackson and Marsh (1996) and Jackson and Csikszentmihalyi (1999) described flow as a state characterized by nine components: focused concentration on the present activity (concentration), sense of control over one’s actions (control), merging of action and awareness (merging), autotelic experience (autotelic), loss of self-consciousness (self-consciousness), loss of time awareness or time acceleration (time), clear proximal goals (goals), unambiguous feedback (feedback), and dynamic balance between challenge and skill (balance). If each of the components is at the highest level, the result is a maximal, intense flow experience. However, if some components are not at their highest level, the result is a less-than-maximal, less intense flow experience (Moneta, 2012).

Previous research has also demonstrated good construct validity for the computational model of flow using the Dispositional Flow Scale 2 (DFS-2) (Jackson and Eklund, 2002, 2004). Originally, there were two models subjected to confirmatory factor analysis (CFA) to determine goodness of fit. The first classical test theory (CTT) model is the nine-factor model. This model hypothesized nine intercorrelated latent facets of the construct of flow cause responses on the measured indicators. In other words, the nine latent facets are individually captured by the behaviors described by each of the items of the questionnaire.

The second CTT model is the single-factor model. In this model, the latent construct of flow itself causes responses on the measured indicators. That is, each of the behaviors described
by the items on the questionnaire are indicators of a single latent construct of flow (Moneta, 2012).

Jackson and Eklund (2002, 2004) discovered that both models have good statistical fit, but the nine-factor model fits better than the single-factor model. Therefore, they recommend using nine individual subscale scores, each measuring a somewhat distinct component of flow.

However, the computational model as proposed by the DFS-2 has a major weakness. It fails to separate the antecedents (i.e. conditions necessary for the flow experience) of flow and the indicators of flow (i.e. experiences and behaviors as a result of flow). For example, according to previous research, a balance of skill and challenge has been categorized as an antecedent of flow in the Flow Questionnaire and Experience Sampling Method (Csikszentmihalyi, 1990). In the computational model, a balance of skill and challenge is considered a component of flow itself. Although CFA may indicate good model fit, I believe the computational model proposed by DFS-2 needs additional theoretical refinement. To overcome this weakness, I propose separating the antecedents and consequences of flow using a hybrid-computational approach.

Theoretically, positioning the conditions for flow (match of skill and challenge, clear goals, and immediate feedback) as antecedents is more logical than including the conditions with the indicators as consequences. Doing so would help identify which of the conditions of flow are orthogonally contributing factors to the experience of flow. As a result, researchers will be able to better identify the conditions that give rise to the flow experience in different situations. For example, clear goals may be the most important factor for warehouse workers in order to experience flow, but immediate feedback could be the most important factor for employees in an office setting to be in flow. Further, managers are able to have some control over the working conditions that could give rise to the flow experience for their employees. This is in contrast to
the indicators of flow that cannot explicitly be modified due to their internal properties being the result of flow. By identifying the conditions for flow, managers will be able to take actionable behaviors to directly impact their employee’s flow. For example, if an employee reports receiving relatively low immediate feedback, a manager can then focus on implementing that particular behavior in order to make work a more optimal experience.

_Hypothesis 1: A hybrid-computational model of flow, separating antecedents and consequences, will exhibit better model fit than all nine factors loading onto a single global flow factor._

So, how does flow relate to the popular organizational psychology concept of engagement? Are they entirely different constructs or do they share dimensional overlap? First, it is important to define engagement. Kahn (1990) proposed that personal engagement is a state in which employees “bring in” their personal selves during work role performances, invest personal energy, and experience an emotional connection with their work. Christian, Garza, and Slaughter (2011) defined engagement as a relatively enduring state of mind referring to the simultaneous investment of personal energies in the experience or performance of work. However, they agree with Dalal, Brummel, Wee, and Thomas (2008) that engagement is likely to contain both trait-like and state-like components. Christian et al. (2011) also found that engagement exhibits discriminant validity from, and criterion related validity, over job attitudes. They conceptualized engagement as a higher-order construct and did not include flow as a single dimension in their conceptualization because it did not fit their definition.

Macey and Schneider (2008) define engagement as a desirable condition that has an organizational purpose and connotes involvement, commitment, passion, enthusiasm, focused effort, and energy. They include both attitudinal and behavioral components in their
conceptualization. They also indicate that engagement has both trait-like and state-like components. Trait engagement, or positive views of life and work, is characterized by a proactive personality, an autotelic personality, trait positive affect, and conscientiousness. State engagement, or feelings of energy and absorption, is characterized by affective satisfaction, involvement, commitment, and empowerment.

Accordingly, I believe that state engagement is the closest analogy to the *experience* of flow in the workplace. By definition, psychological states have boundaries set in time (Weiss & Kurek, 2003). From a temporal perspective, trait engagement would be the most enduring, followed by state engagement, and flow being the most short-lived. I conceptualize flow as being distinct by having an even stronger positive affective tone and higher levels of absorption in an activity than state engagement. A person may not always intensely be in flow while at work, but it is certainly possible to ebb and flow while in a state of engagement.

I believe it is likely that flow shares conceptual space with engagement and it is most closely related to state engagement. However, flow has unique dimensions of its own, namely the intensity of experience and its relatively short temporal timeframe. Macey and Schneider (2008) used the analogy of engagement not simply being “old wine in new bottles” to demonstrate its uniqueness. I believe the same idea applies to flow. Although flow shares dimensional overlap with engagement, it also offers distinct features of its own.

*Hypothesis 2: There will be discriminant validity between the concepts of flow and engagement.*

There has been a well-established relationship between engagement and in-role and extra-role job performance (Christian et al., 2011; Macey & Schneider, 2008). Engaged employees are more likely to show increased performance in specific and explicit requirements
of the job (in-role) as well as an increase in organizational citizenship behavior that promotes effective functioning of the organization (extra-role). Further, Christian et al. (2011) found engagement provided incremental validity for predicting task and contextual performance over job attitudes such as job satisfaction. So, where does flow fit into this conceptual framework?

I believe that flow acts as a mediator of the relationship between engagement and job performance. This is because flow is characterized by a short-term intense peak experience that is likely to result in instances of maximal job performance. Therefore, the more frequently an employee has flow experiences, the greater positive effect engagement will have on job performance.

*Hypothesis 3a: Flow will account for variance above and beyond engagement in predicting in-role performance.*

*Hypothesis 3b: Flow mediates the relationship between engagement and extra-role performance*

I wish to propose studies using different populations to establish validity for the hybrid computational model, discriminant validity between flow and engagement, and examine flow as a moderator of engagement and performance.

Study 1 will use a sample of undergraduate students to examine flow and engagement in the context of an undergraduate’s studies to explore hypothesis 1, hypothesis 2 and hypotheses 3a and 3b. Previous studies have examined the link between engagement and academic performance in undergraduates (Hu & Kuh, 2002). Shernoff and Hoogstra (2001) found that greater engagement predicts increased motivation, additional commitment, and greater likelihood of completing college. However, there is a gap in the research demonstrating validity for the link between flow and college academic performance and citizenship behaviors. Study 1 hopes to
establish and clarify this relationship. Study 2 will sample employees at a large company to examine flow and engagement in order to explore the same hypotheses in the context of the workplace. Greater generalizability for the flow experience and performance will be established by conducting multiple studies with differing populations.
CHAPTER 8
STUDY ONE

Participants

Participants were 355 undergraduate students receiving partial course credit in an introductory psychology course. The survey was administered through the Qualtrics online platform. Participants were 69% females. Participant ages ranged from 19 to 58 with a mean age of 19.64 years. The class standings of the participants were 49.0% Freshman (1st year), 23.9% Sophomore (2nd year), 17.2% Junior (3rd year), and 9.6% Senior (4th year). The race demographics of the participants were 72.1% white, 13.0% Asian/Pacific Islander, 8.7% African American, 3.1% Hispanic or Latino, and 3.1% other.

Measures

The conditions for flow while studying were measured using a modified subset of items from the Dispositional Flow Scale-2 (DFS-2) (Jackson & Eklund, 2002). These items were modified to specify the context of studying. Student participants were asked to complete an assessment about the frequency of thoughts and feelings they may or may not have experienced while studying. They were asked to evaluate how frequently they experienced the thoughts and feelings while studying (from a scale of 1 to 5).

To assess the balance of skill and challenge while studying, student participants were asked to evaluate modified items DFS 01, DFS 10, DFS 19, and DFS 28. More specifically, they were asked to evaluate the following, “I am challenged, but I believe my skills allow me to meet the challenges of my studies,” “My abilities match the high challenge of my studies,” “I felt I am
competent enough to meet the high demands of my studies,” and “The challenge of my studies and my skills are at an equally high level.”

To assess clear goals while studying, student participants were asked to evaluate modified items DFS 03, DFS 12, DFS 21, and DFS 30. More specifically, they were asked to evaluate the following, “I know clearly what I should be doing while studying,” “I have a strong sense of what I need to do to perform well while studying,” “I have a clear idea of what I want to achieve while studying,” and “My goals are clearly defined while studying.”

To assess immediate feedback while studying, student participants were asked to evaluate modified items DFS 04, DFS 13, DFS 22, and DFS 31. The original feedback items from DFS-2 were worded so as to place the emphasis on unambiguous feedback. I believe the unambiguous conceptual space is already being captured using the clear goals items and it is more important to focus on the immediacy of feedback in terms of the proposed theoretical model to test the implications of satisfying immediate-return needs in a delayed-return world. More specifically, participants were asked to evaluate the following, “It is immediate to me when I am doing well while studying,” “I am immediately aware of how well I am doing while studying,” and “I have an immediate idea while I am studying about how well I am doing,” and “While studying, I can immediately tell how well I am doing.”

To assess flow, student participants were asked the remainder of the items from the modified DFS-2. More specifically, they were asked to evaluate items regarding the factors of merging of action and awareness (DFS 02, DFS 11, DFS 20, and DFS 29), concentration (DFS 05, DFS 14, DFS 23, and DFS 32), control (DFS 006, DFS 15, DFS 24, and DFS 33), consciousness (DFS 07, DFS 16, DFS 25, and DFS 34), altered sense of time (DFS 08, DFS 17,
DFS 26, and DFS 35), and autotelic personality (DFS 09, DFS 18, DFS 27, and DFS 36) (See Appendix A for specific items of each factor and full modified DFS-2 for students).

Next, to assess engagement, student participants were asked to evaluate items from the Utrecht Work Engagement Scale for Students (UWES-S) (Schaufeli & Bakker, 2003). This is a modified version of the Utrecht Work Engagement Scale (UWES) used to measure workplace engagement. The UWES-S uses the factors of vigor, dedication, and absorption to conceptualize student engagement. Student participants were asked to evaluate 14 statements about how they feel while studying and how frequently they feel that way (from a scale of 0 to 6).

To assess vigor, student participants were asked to evaluate items UWES-S 01, UWES-S 02, UWES-S 03, UWES-S 04, and UWES-S 05. More specifically, they were asked to evaluate the following, “When I’m studying, I feel mentally strong,” “I can continue for a very long time when I am studying,” “When I study, I feel like I am bursting with energy,” “When studying I feel strong and vigorous,” and “When I get up in the morning, I feel like going to class.”

To assess dedication, student participants were asked to evaluate items UWES-S 06, UWES-S 07, UWES-S 08, UWES-S 09, and UWES-S 10. More specifically, they were asked to evaluate the following, “I find my studies to be full of meaning and purpose,” “My studies inspire me,” “I am enthusiastic about my studies,” “I am proud of my studies,” and “I find my studies challenging.”

To assess absorption, student participants were asked to evaluate items UWES-S 11, UWES-S 12, UWES-S 13, and UWES-S 14. More specifically, they were asked to evaluate the following, “Time flies when I’m studying,” “When studying, I forget everything else around me,” “I feel happy when I am studying intensively,” and “I can get carried away by my studies” (see Appendix B for full UWES-S).
To assess in-role student performance, participants were asked to report their college Grade Point Average (GPA). A majority of the research pool participants are first-year freshman students taking an Introductory Psychology course and their reported GPA will be a relatively current measure of their recent performance in college. Participants will also be asked to report their SAT score. Although this will be a more distal measure of academic performance, the main advantage of obtaining a SAT score is to use a standardized measure of in-role performance.

To assess extra-role student performance, participants will be asked to evaluate modified items from the 10-item Organizational Citizenship Behavior Checklist (OCB-C) (Spector, Bauer, & Fox, 2010). Student participants were asked how often they have done the listed behaviors during their college career (from a scale of 1 to 6). Examples of behaviors include, “Took time to advise, coach, or mentor a fellow student” and “Worked weekends or other days off to complete a school project or task” (see Appendix C for full OCB-C).

Results

An Exploratory Factor Analysis (EFA) was conducted using SPSS version 21 to examine the dimensionality of the flow items on the DFS. More specifically, a Maximum likelihood extraction with a Varimax rotation was performed on the 36 items of the DFS. The Varimax rotation allowed the factors to remain orthogonal. This extraction method was used because an initial oblique solution, with the factors being allowed to correlate, did not demonstrate correlations among the factors.

A Kaiser-Meyer-Olkin Measure of Sampling Adequacy Value (ranging from 0 to 1) of 0.87 was above the suggested minimum of 0.60. A Bartlett’s Test of Sphericity value resulted in a significant chi-squared and rejected the null hypothesis that the correlation matrix is an identity
matrix. Passing these two tests indicated that subsequent factor analysis procedures could proceed.

The Maximum likelihood extraction with a Varimax rotation resulted in a 9-factor solution explaining 65.15% of total variance. The 9-factor solution was expected and was consistent with previous research (Jackson & Eklund, 2002; Moneta, 2013). Next, factor loadings were examined from the rotated factor matrix. Factor 1 (26.13% of total variance) was labeled Concentration and all four DFS concentration items loaded onto factor 1. Factor 2 (8.59% of total variance) was labeled Clear Goals and all four DFS clear goals items loaded onto factor 2. Factor 3 was labeled Autotelic (5.89% of total variance) and all four DFS autotelic items loaded onto factor 3. Factor 4 (5.19% of total variance) was labeled Balance and all four DFS balance items loaded into factor 4. Factor 5 (5.13% of total variance) was labeled Merging and all four DFS merging items loaded onto factor 5. Factor 6 (4.63% of total variance) was labeled Feedback and three of the four modified DFS feedback items loaded onto factor 6. Factor 7 (3.74% of total variance) was labeled Self-Consciousness and three of the four DFS self-consciousness items loaded onto factor 7. Factor 8 (2.99% of total variance) was labeled Time and three of the four DFS time items loaded onto factor 8. Factor 9 (2.81% of total variance) was labeled Control and three of the four DFS control items loaded onto factor 9. There were 32 out of 36 items from the DFS-2 remaining after the dimension reduction procedure.

An EFA was also conducted to examine the dimensionality of the engagement items on the Utrecht Work Engagement Scale for Students (UWES-S). A Maximum likelihood extraction with an Oblimin (oblique) rotation was performed on the 14 items of the UWES-S. An oblique rotation, which allowed the factors to correlate, was appropriate based on the observed factor correlations and consistent with previous research (Schaufeli & Bakker, 2003). A Kaiser-Meyer-
Olkin Measure of Sampling Adequacy Value of 0.89 was above the suggested minimum of 0.60. A Bartlett’s Test of Sphericity value resulted in a significant chi-squared and rejected the null hypothesis that the correlation matrix is an identity matrix.

The Maximum likelihood extraction with an Oblimin rotation resulted in a 3-factor solution explaining 61.98% of total variance. The 3-factor solution was expected and consistent with previous research (Schaufeli & Bakker, 2003). Factor 1 (40.54% of total variance) was labeled Dedication and four of the five UWES-S dedication items loaded onto factor 1. Factor 2 (12.55% of total variance) was labeled Vigor and four of the five UWES-S vigor items loaded onto factor 2. Factor 3 (8.89% of total variance) was labeled Absorption and all four of the UWES-S absorption loaded into factor 3. There were 12 out of 14 items from the UWES-S remaining after the dimension reduction procedure.

A similar EFA procedure was performed on the 10 items of the Organizational Citizenship Behavior Checklist (OCB-C). A Maximum likelihood extraction with an Oblimin rotation was performed. A Kaiser-Meyer-Olkin Measure of Sampling Adequacy Value of 0.84 was above the suggested minimum of 0.60. A Bartlett’s Test of Sphericity value resulted in a significant chi-squared and rejected the null hypothesis that the correlation matrix is an identity matrix.

The Maximum likelihood extraction with an Oblimin rotation resulted in a 2-factor solution explaining 47.12% of total variance. Factor 1 (35.79) was labeled OCB and 9 of the 10 OCB-C items loaded onto factor 1. Only one item loaded positively on factor, but it loaded more strongly on factor 1. As a result, the OCB-C scale was treated as a single factor. There were 9 out of 10 items from the OCB-C remaining after the dimension reduction procedure.
Hypothesis One: Testing the Hybrid-Computational Model

The main purpose of hypothesis 1 was to determine the factor validity of the DFS-2 and compare the hybrid-computational model to previous conceptualizations of flow. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were done using Mplus version 7.3.

It is important to begin with a brief overview of commonly reported model fit indices prior to evaluating and comparing models. The significant $\chi^2$ value demonstrates that the model is not an exact fit of the data. This is due to $\chi^2$ being a representative of fit based on the fact that the model holds exactly in the population. A consequence of this assumption is that models with close fit (i.e., hold approximately true in the population) will be rejected in large samples and with larger degrees of freedom. As a result, it is more appropriate to include measures of model fit that take into account the error of approximation in the population and the precision of the fit measure itself (Browne & Cudeck, 1993).

Brown and Cudeck (1993) recommend using Striger’s (1990) root mean square error of approximation (RMSEA) as a measure of lack of fit per degree of freedom. They suggest that an RMSEA value of 0.05 or less indicates a close fit in the population and that values up to 0.08 represent reasonable errors of approximation in the population. The authors also state that a 90% confidence interval for the RMSEA value can be calculated and model fit can be determined if an acceptable value is included in the 90% confidence interval.

Hu and Bentler (1999) suggest using the standardized root mean square residuals (SRMR). The SRMR value is the average difference between the predicted and observed variances and covariances in the model, based on standardized residuals. Recommended cutoff values of less than 0.05 indicate good fit and values less than 0.08 indicate adequate fit.
Another goodness of fit index is the Tucker-Lewis Index (TLI). The TLI can be viewed as an index of the reduction in badness of fit of the substantive model to the worst possible fitting model (null model). The TLI is insensitive to model size but especially sensitive to model misspecifications. It also penalizes model complexity and favors model parsimony. The TLI has values ranging from 0 to 1. Hu and Bentler (1999) recommend a TLI value of 0.95 or higher for good model fit and values greater than 0.90 indicate an acceptable fit.

The Comparative Fit Index (CFI) compares the covariance matrix predicted by the model to the observed covariance matrix. Then the observed covariance matrix is compared to the null model to gauge the percentage lack of fit. The CFI has values ranging from 0 to 1. Hu and Bentler (1999) recommend a CFI value of 0.95 or higher for good model fit and values greater than 0.90 indicate an acceptable fit. This can be translated as meaning that 95% or 90% of the covariance in the data can be reproduced by the model.

First, the fit of the nine-factor model was compared to the fit of a nine-factor model loading onto a single global 2nd order factor of “Flow.” This allowed the initial testing of the hypothesis outlined in Jackson and Eklund (2002) that the nine-factor model, with nine separate factors, best conceptualized the flow experience. This model was then compared to a model in which the same nine factors loaded onto a single, global 2nd order “Flow” factor (see Figure 1 and Figure 2).

First, all variables were standardized prior to starting CFA analyses. This allowed comparison across constructs that were each measured using differing scales. Results showed that the global flow model ($\chi^2 = 973.13$, df = 455, $p<.001$) had a worse fit than the nine-factor model ($\chi^2 = 768.40$, df = 428, $p<.001$) with a significant difference in fit ($\Delta \chi^2 =204.73$, $\Delta$ df=27, $p<.001$) The fit indices for the nine-factor model were also improved with RMSEA of 0.047
and a 90% confidence interval that RMSEA is in between .042 and .053. The nine-factor model also had CFI of 0.930, TLI of 0.919, and SRMR of 0.053 (see Table 1 for model fit summaries and comparisons). These results were consistent with previous research (Jackson & Eklund, 2002).

However, even with a worse model fit, Jackson and Eklund (2002) acknowledge the theoretical parsimony of a global flow factor. Researchers often discuss flow as a single-dimension concept and it has been utilized as such when studying the relationship between the construct and other constructs using a between-network approach. For example, when examining the relationship between flow and happiness (Csikszentmihalyi & LeFerve, 1987) or intrinsic motivation (Keller & Bless, 2008), flow has always been treated as a single-dimensional construct. This is in contrast to the conceptualization by Csikszentmihalyi (1990) that flow can be segmented into the antecedents (i.e., conditions necessary for the flow experience) of flow and the indicators of flow (i.e., experiences and behaviors as a result of flow). A hybrid-computational model, separating antecedents and indicators, was constructed to test the hypothesis that model fit would be improved over a single, global flow factor.

Results showed that the hybrid-computational model (see Figure 3) had an improved fit over the global flow factor model (see Table 2 for model fit summaries and comparisons). There was improved model fit when the factors of balance, clear goals, and immediate feedback were loaded onto a separate 2nd order factor labeled antecedents. However, the best hybrid-computational model fit occurred when only the factors of balance and clear goals loaded onto antecedents and immediate feedback remained an indicator of flow. It is possible that immediate feedback is an indicator of flow itself rather than a precursory condition for the experience to
occur. As a result, this hybrid-computational model was retained and compared to the global flow factor model.

Results showed that the hybrid-computational model ($\chi^2 = 924.02$, df = 454, $p<.001$) had an improved fit over the global flow factor model ($\chi^2 = 973.13$, df = 455, $p<.001$) with a significant difference in fit ($\Delta \chi^2 = 49.11$, $\Delta$ df = 1, $p<.001$) The fit indices for the hybrid-computational model were also better with RMSEA of 0.054 and a 90% confidence interval that RMSEA is in between 0.049 and 0.059. The hybrid-computational model also had CFI of 0.904, TLI of 0.895, and SRMR of 0.071 (see Table 2 for model fit summaries and comparisons).

Despite the evidence for the multidimensionality of flow, researchers typically focus on the single-dimension construct and provide scores for overall “flow.” Although using a global composite score in itself is not problematic, ignoring the multidimensionality of flow is problematic from conceptual and operational standpoint. The exclusive use of an overall score may result in the loss of important information with respect to the multiple components of flow, as well as their relations to other constructs. As the evidence from Hypothesis 1 has shown, novel research and practical findings can arise when taking into account the multiple dimensions of flow and in particular, separating the indicators of flow from their antecedents.
Figure 1: Nine-Factor Model of Flow
Figure 2: Global Factor Model of Flow
Figure 3: Hybrid-Computational Model of Flow
Table 1: Model Fit Summaries and Comparisons of Nine-Factor and Global Flow

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
<th>$\Delta \chi^2$</th>
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<td>.894</td>
<td>.884</td>
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<td></td>
<td></td>
<td></td>
<td>204.73***</td>
<td>27</td>
</tr>
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</table>

RMSEA= Root Mean Square Error of Approximation, CFI= Comparative Fit Index, TLI= Tucker Lewis Index, SRMR= Standardized Root Mean Square Residual, *** $p<.001$

Table 2: Model Fit Summaries and Comparisons of Hybrid-Computational and Global Flow

<table>
<thead>
<tr>
<th>Model</th>
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<th>df</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>SRMR</th>
<th>$\Delta \chi^2$</th>
<th>$\Delta df$</th>
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<td>.054</td>
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<td>.895</td>
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<tr>
<td>Global Flow</td>
<td>973.13</td>
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<td>Comparing Hybrid-Computational and Global</td>
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<td></td>
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<td>49.11***</td>
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</table>

RMSEA= Root Mean Square Error of Approximation, CFI= Comparative Fit Index, TLI= Tucker Lewis Index, SRMR= Standardized Root Mean Square Residual, *** $p<.001$
Hypothesis Two: Establishing Discriminant Validity

The main purpose of hypothesis 2 was to show that the concepts of flow, as measured by DFS-2, and engagement, as measured by UWES-S, were empirically differentiable. A successful evaluation of discriminant validity shows that the test of a concept is not highly correlated with other tests designed to measure theoretically different concepts. It is possible to calculate the extent to which the two scales overlap by using the correction for attenuation formula outlined in Campbell and Fiske (1959). The formula states that the correlation of the two scales \( r_{xy} \) is divided by the square root of the product of each scale’s reliability, \( \sqrt{r_{xx} \cdot r_{yy}} \). If the value is less than .85, there is minimal overlap with the two constructs and there is evidence for discriminant validity. This procedure was applied to the 32 items from the DFS-2 and 12 items from the UWES-S to test for discriminant validity between flow and engagement.

The reliability of the 32-item DFS-2 scale used to measure flow was 0.90. This indicates a very internally consistent and highly reliable scale. The reliability of the 12-item UWES-S used to measure engagement was 0.89. This value also indicates very high internal consistency and reliability. The correlation between the DFS-2 and UWES-S was 0.71. This indicates that the two scales are highly correlated and there is substantial overlap. However, the correction for attenuation formula resulted in a value of 0.79. This value was less than the standard cutoff value of .85 and there was evidence for discriminant validity between flow and engagement. In other words, the two scales measure theoretically different constructs.

Hypothesis 3: Flow, Engagement, OCB, and Student Performance

Hypothesis 3A: Student Performance

The main purpose of hypothesis 3A was to examine the relationship between flow, engagement, and the outcome of student GPA. First, all variables were standardized prior to
starting hierarchical regression analyses. This allowed for comparison across constructs that were each measured using differing scales. To examine the relationship with GPA, three hierarchical regression models were created and then compared for differences in R-squared.

First, student GPA was regressed on engagement with the student’s SAT as a covariate. The student’s SAT score was used as a covariate to account for previous academic performance. It could be argued that a student’s GPA could vary, not by factors such as student engagement or flow, but by the courses a student chooses to take (i.e., act as an unstandardized metric). A SAT score serves as a suitable covariate because it is inherently a standardized measure of performance used to overcome a potential shortcoming of using student GPA as a measure of student performance.

The model of student GPA regressed on engagement and SAT score as a covariate was overall statistically significant ($p<.001$), but engagement was not a significant predictor ($p=0.37$) (see Table 3). The next step was to add flow as a predictor and determine if it would predict variance in student GPA over and above engagement. Model 2 was student GPA regressed on flow added as a predictor, along with engagement, and SAT score as a covariate. Model 2 was overall statistically significant ($p<.001$) and flow was a significant predictor ($p=.056$) of student GPA while controlling for engagement and SAT score. The change between model 1 and model 2 in R-squared (.012) and change in $F$ (3.69) was significant $p=.056$ (see Table 3).

However, in previous research (Jackson & Eklund, 2002; Moneta, 2013) and hypothesis 1, it was determined that a 9-factor solution is the best model for conceptualizing the items on the DFS-2. Based on the previous empirical findings, it was important to determine which of the 9 factors was the most significant individual predictor of student GPA. Individual factor correlations with GPA, as well as a multiple regression model regressing GPA on all 9 factors
were conducted. Both approaches showed that balance [of skill and challenge] was the most significant predictor of GPA ($p<.001$).

Next, a similar approach was taken as in the earlier two models used for predicting GPA. Model 3 was constructed by regressing student GPA on balance as a predictor, along with engagement, and SAT score as a covariate. Model 3 was overall statistically significant ($p<.001$) and balance was a significant predictor ($p<.001$) of student GPA while controlling for engagement and SAT score. In fact, balance was a more significant predictor ($\beta=0.31$) than the student’s SAT score ($\beta = 0.22$). Model 3 was then compared to Model 1 to determine if a significant change in R-squared was present in adding balance as an additional predictor to engagement. The change between model 1 and model 3 in R-squared (.081) and change in F (30.30) was significant $p<.001$ (see Table 3).
Table 3: Hierarchical Regression of GPA on Engagement, Flow, Balance, and SAT

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>SE of the Estimate</th>
<th>$R^2$ change</th>
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<tr>
<td>DV: GPA Model 1: Engagement and SAT</td>
<td>.276</td>
<td>.076</td>
<td>.069</td>
<td>.938</td>
<td></td>
</tr>
<tr>
<td>DV: GPA Model 3: Engagement, Balance, and SAT</td>
<td>.403</td>
<td>.162</td>
<td>.154</td>
<td>.887</td>
<td>.086***</td>
</tr>
</tbody>
</table>

*** $p<.001$
Hypothesis 3B: Organizational Citizenship Behavior

The main purpose of hypothesis 3B was to validate the relationship between engagement and OCB while examining flow or a factor of flow as a mediator of the relationship. First, all variables were standardized prior to starting mediation analyses. This allowed for comparison across constructs that were each measured using differing scales. Models were created using procedures as described by Baron and Kenny (1986).

The first model tested for flow as a mediator for the relationship between engagement and OCB. The first step regressed OCB on engagement to confirm that the independent variable is a significant predictor of the dependent variable. The relationship between OCB and engagement was significant ($\beta = .345, p<.001$). The second step regressed flow on engagement to confirm that the independent variable is a significant predictor of the mediator. The relationship between flow and engagement was significant ($\beta = .705, p<.001$). The third step regressed OCB on both engagement and flow to confirm that the mediator was a significant predictor of the dependent variable, while controlling for the independent variable. This relationship did not demonstrate that flow was a significant predictor of OCB while controlling for engagement ($\beta = .046, p=.566$). As a result, evidence for flow as a mediator for the relationship between engagement and OCB was not established.

The second model tested for balance as a mediator for the relationship between engagement and OCB. The first step was exactly the same as the previous procedure. OCB was regressed on engagement to confirm that the independent variable is a significant predictor of the dependent variable. The relationship between OCB and engagement was significant ($\beta = .344, p<.001$). The second step regressed balance on engagement to confirm that the independent variable is a significant predictor of the mediator. The relationship between balance and
engagement was significant (flow $\beta = .385, p < .001$). The third step regressed OCB on both engagement and balance to confirm that the mediator was a significant predictor of the dependent variable, while controlling for the independent variable. This relationship was marginally significant and showed that balance was a significant predictor of OCB while controlling for engagement (balance $\beta = .083, p = .150$). As a result, evidence for balance as a partial mediator for the relationship between engagement and OCB was established.

Finally, bootstrapping was conducted to test for the significance of mediation (Preacher & Hayes, 2008). The bootstrapping method provides some advantages to the Sobel Test, primarily an increase in power and does not have assumptions of normality for the data. Bootstrapping involves repeatedly randomly sampling observations with replacement from the data set to compute the desired statistic in each resample. For the current procedure 10,000 resamples were used. The direct effect of engagement on OCB was statistically significant (engagement $\beta = 0.62, p < .001$). In the model, balance was approaching significance (balance $\beta = .048, p = .17$) for predicting OCB while controlling for engagement. The 95% confidence interval to test for the indirect effect through balance was -.0033 to .0232. The 95% confidence interval included 0 (albeit just slightly) and the test did not indicate evidence for mediation.
CHAPTER 9

STUDY TWO

The results of study one supported the conceptual framework of flow being separated into antecedents and indicators, exhibiting discriminant validity from engagement and being a significant predictor of academic performance and academic citizenship behavior. Study two seeks to further the external validity and generalizability of the results found in study one by surveying a working adult population. The main goal of study 2 is to establish the criterion validity for flow and job performance and organizational citizenship behavior.

Participants

Participants were 6794 employees in a large organization in the United States. The main job function of the employees was in operations and two job groups were surveyed. The first group surveyed was dockworkers (n= 2,184). The main tasks of a dockworker involve using a forklift to maneuver bills (i.e., pallets) around the warehouse or to load and unload the bills off trucks. The second group surveyed was drivers (n=4,610). The main tasks of a driver are to drive trucks to move shipments between warehouses or to the shipment’s destination.

Measures

In Study 2, flow was measured by creating items for several of the factors identified in Study 1. The goal was to maximize efficiency while keeping the total number of items to a minimum. This was done to incur minimal cost to the organization administering the survey. There were 12 flow items created to be used in a work context. More specifically, participants
were asked to evaluate the following to measure a balance of skill and challenge, “I feel I have the necessary skills to perform well at work” and “I feel my work is challenging.”

Participants were asked the following to measure immediate-feedback from the tasks they perform, “While working, I receive immediate feedback from the task itself that tells me how well I am doing.” They were also asked the following to measure immediate-feedback that they receive from their manager, “While working, I receive immediate feedback from my manager that tells me how well I am doing.” These two items were used to determine which source of immediate-feedback, from the task itself or from the manager, is most important for job performance.

Participants were asked the following to measure clear goals from the tasks they perform, “The tasks I perform have clear goals so I know exactly what I need to do to perform well.” They were also asked the following to measure clear goals that they receive from their manager, “My manager makes sure my work goals are clearly defined so I know exactly what I need to do to perform well.” These two items were used to determine which source of clear goals, from the task itself or from the manager, is the most important for job performance.

The remainder of the items were intended to measure the indicators or the experience of flow itself. More specifically, participants were asked to evaluate the following, “My attention is focused entirely on what I am doing while at work,” “I really enjoy working,” “I am able to concentrate while at work,” “While working, it feels like time goes by quickly,” “At work, I am completely focused on the task at hand,” and “At work the experience is extremely rewarding.”

Engagement was measured by selecting nine items from the Utrecht Work Engagement Scale (UWES) consistent with the three sub-factors of vigor, dedication, and absorption as identified in Study 1 (Schaufeli & Bakker, 2003). To measure vigor, participants were asked to
evaluate the following, “I am motivated to go to work,” “When I am working, I feel strong and energetic,” and “At work I always keep going, even when things are not going well.”

To measure dedication, participants were asked the following, “I am dedicated to my job,” “I am motivated to do my best at work,” and “I am proud to say that I work for this organization.”

To measure absorption, participants were asked the following, “When I am working, I am completely focused on my job,” “I am deeply involved in my work,” and “I am engaged while at work.”

Organizational Citizenship Behavior (OCB) was measured by selecting five items from the Organizational Citizenship Behavior Checklist (OCB-C) (Spector, Bauer, & Fox, 2010). More specifically, participants were asked to evaluate the frequency of the following, “Took time to advise, coach, or mentor a co-worker,” “Helped a co-worker learn new skills or shared job knowledge,” “Listened with care when someone had a work problem,” “Offered suggestions to improve how work is done,” and “Helped a co-worker who had too much to do.”

To assess job performance, data will be collected that best assesses employees’ productivity and fiscal components of productivity. Performance metrics reflected one month of performance that coincided with the employees taking the survey. More specifically, performance data collected at the group level to incorporate the teamwork aspect of working in a warehouse setting. This approach had three important benefits. First, previous research has found that flow can cross over between people (Bakker, 2005). This effect is related to the emotional contagion phenomenon which is defined as “The tendency to automatically mimic and synchronize facial expressions, vocalizations, postures and movements with those of another person and, consequently, to converge emotionally” (Hatfield, Cacioppo, & Rapson, 1994, p. 5).
Organizational studies have shown a similar effect in the workplace. Bakker, Demerouti, de Boer, and Schaufeli (2003) found that employees working for an insurance company caught the burnout symptoms of their co-workers, especially when they were susceptible to the emotions of others. If it is possible for contagion emotions to have a negative effect on employee-well-being, it is certainly plausible for positive emotions and experiences (e.g. engagement and flow) to have an enhancing effect. In turn, contagion emotions and experiences should influence job performance at a group level.

The second benefit of collecting performance data at the group level is to ensure the anonymity and confidentiality of individual employees. This is done so that employee participants will feel secure in expressing their attitudes and not need to worry that individual performance data collection could affect their employment status. Using group level performance metrics ensures trust between employees, the organization, and the researcher.

The third benefit of collecting performance data at the group level is to have more practically interpretable results. Most job tasks at a warehouse are intertwined and involve individuals working together to accomplish common goals. Thus, it is the end result of their collaborative efforts that should be the metric used to determine performance. From an organizational perspective, it is more useful to gather data from a particular warehouse’s output to determine bottom-line results. In addition, there is always a management team assigned to oversee an entire warehouse operation. By understanding a warehouse’s overall level of flow and overall level of productivity, managers may be able to promote flow by focusing on specific actions, such as providing more clear goals or giving more immediate feedback to increase levels of flow in order to increase productivity. A management team is more aptly suited to take
actionable behavior by better understanding the relationship between engagement, flow, and job performance.

Job performance metrics included DART (Days Away, Restricted & Transfer) Frequency, DART Expense, Total Accident Expense, P&D (Pickup and Delivery) Stops per Hour, and Dock Bills per Hour. DART Frequency is an Occupational Safety and Health Administration (OSHA) metric measuring the rate of injuries that require time away from work and lost time injuries. DART Frequency is calculated by dividing the number of times away from work and lost time injuries by the monthly number of employee work hours. DART Expense measures cost and severity of an injury that results in an employee having days away from the job, restricted from their usual job in some manner, or being transferred to another job. DART Expense is calculated by the number of DART injuries by tier multiplied by the cost per tier. Total Accident Expense measures the total cost of auto crashes. It is calculated by the number of auto accidents by tier multiplied by the cost per tier. P&D Stops per Hour measure the driver’s productivity. P&D Stops per Hour are calculated by dividing total P&D stops by total P&D driver hours. Dock Bills per Hour measure the dockworker’s productivity. Dock Bills per Hour is calculated by dividing total dock bills stripped by total dock and yard hours.

DART Frequency, DART Expense, and Dock Bills per Hour are most reflective of dockworker performance. Total Accident Expense and P&D Stops per Hour are most reflective of driver performance.

Results

Having established construct validity for flow in Study 1, the main purpose of study 2 was to clarify the relationship between flow and engagement in the workplace and to establish criterion validity for flow at work with job performance and OCB. First, an exploratory factor
analysis (EFA) was conducted on each of the three scales of flow (all items including immediate-feedback, clear goals, and indicators), engagement, and OCB.

The flow items EFA Maximum likelihood extraction with a Varimax rotation resulted in a one-factor solution with all 12 items loading onto a single factor (all factor loadings > .40). The engagement items EFA Maximum likelihood extraction with an oblique rotation resulted in a one-factor solution with all 9 items loading onto a single factor (all factor loadings > .72). The OCB items EFA Maximum likelihood extraction with an oblique rotation resulted in a one-factor solution with all 5 items loading onto a single factor (all factor loadings > .77).

Next, discriminant validity was established between flow and engagement using the exact procedure described in study 1A successful evaluation of discriminant validity shows that the test of a concept is not highly correlated with other tests designed to measure theoretically different concepts. It is possible to calculate the extent to which the two scales overlap by using the correction for attenuation formula outlined in Campbell and Fiske (1959). The formula states that the correlation of the two scales $r_{xy}$ is divided by the square root of the product of each scale’s reliability, $\sqrt{r_{xx} \cdot r_{yy}}$. If the correction for attenuation value is less than .85, there is minimal overlap with the two constructs and there is evidence for discriminant validity. This procedure was applied to the 12 items from the flow scale and 9 items from the UWES to test for discriminant validity between flow and engagement.

The reliability of the 12-item flow scale was 0.90. This indicates a very internally consistent and highly reliable scale. The reliability of the 9-item UWES used to measure engagement was 0.94. This value also indicates very high internal consistency and reliability. The correlation between the flow scale and UWES was 0.64. This indicates that the two scales are highly correlated and there is substantial overlap. However, the correction for attenuation
formula resulted in a value of 0.69. This value was less than the standard cutoff value of .85 and there was evidence for discriminant validity between flow and engagement. In other words, the two scales measure theoretically different constructs.

A Balance Score was also computed to test for the relationship between balance and job performance and organizational citizenship behavior. This score was computed because study one identified balance as the single most important factor in predicting academic performance. However, using the balance items by Jackson and Eklund (2002) does not allow for a balance score to be computed. The balance items from the DFS-2 include the following, “I am challenged, but I believe my skills allow me to meet the challenges of my studies,” “My abilities match the high challenge of my studies,” “I felt I am competent enough to meet the high demands of my studies,” and “The challenge of my studies and my skills are at an equally high level.” This does not allow one to determine if the balance of challenge and skill is due to both components being high, both components being moderate, or both components being equally low. In study two, a Balance Score was computed to overcome this limitation.

A Balance Score was computed by the following formula: (5-ABS(Challenge-Skill)) + Challenge + Skill. In other words, the absolute value of the difference between challenge and skill was subtracted from 5, and then I added to the score of challenge plus the score of skill. This formula allows for higher values resulting from a closer match of challenge and skill, a greater level of challenge, and a greater level of skill. The formula more precisely operationalizes the balance of challenge and skill while rewarding higher levels of each.

Correlations of Flow, Balance, Engagement and Job Performance Metrics

First, simple Pearson’s correlations were calculated for flow (an 11-item composite of the Balance Score and the flow items excluding the challenge and skill items), balance, engagement,
and job performance metrics for the dockworker group. Next, the same correlations were calculated for the driver group (see Table 4 and Table 5 for correlations).

The first set of analysis was performed for the dockworker group. A series of hierarchical regression models was created to test the effect of flow or balance to predict various job performance metrics while controlling for engagement. In other words, it was important to examine the effect of flow or balance while controlling for the effect of engagement. This allows a model to determine if flow or balance is a significant predictor of job performance metrics over and above engagement.

Flow, Engagement, and Job Performance in Dockworkers

Model 1A regressed DART (Days Away, Restricted or Transferred) Frequency on engagement and the effect was non-significant (engagement $\beta = -0.018, p=.39$). Model 1B regressed Dart Frequency on engagement and flow and flow was a significant predictor (flow $\beta = -0.07, p<.01$) while controlling for engagement. The change between model 1A and model 1B in $R^2$ (.003) and change in $F$ (6.39) was significant $p<.01$ (see Table 6). The negative beta indicated that higher levels of flow significantly correlated with lower levels of DART Frequency. This result shows that higher levels of engagement are not linked to lower frequency of DART injuries. Higher levels of flow, however, are more predictive of lower frequency of DART injuries.

Model 2A regressed DART Expense on engagement and the effect was significant (engagement $\beta = -0.095, p<.001$). Model 2B regressed Dart Expense on engagement and flow and flow was a significant predictor (flow $\beta = -0.219, p<.001$) while controlling for engagement. The change between model 2A and model 2B in $R^2$ (.028) and change in $F$ (63.30) was significant $p<.001$ (see Table 6). The negative beta indicated that higher levels of flow
Table 4: Correlations of Flow, Balance, Engagement, and Job Performance for Dockworkers

<table>
<thead>
<tr>
<th></th>
<th>Flow</th>
<th>Balance</th>
<th>Engagement</th>
<th>DART Frequency</th>
<th>DART Expense</th>
<th>Dock Bills per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance</td>
<td>.625***</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Engagement</td>
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<td>.328***</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DART Frequency</td>
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<td>-.064**</td>
<td>-.018</td>
<td>1</td>
<td></td>
<td></td>
</tr>
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<td>DART Expense</td>
<td>-.189***</td>
<td>-.118***</td>
<td>-.095***</td>
<td>.271***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dock Bills per Hour</td>
<td>.218***</td>
<td>.129***</td>
<td>.150***</td>
<td>-.080***</td>
<td>-.530***</td>
<td>1</td>
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</tbody>
</table>

*p<.05  **p<.01  ***p<.001

Table 5: Correlations of Flow, Balance, Engagement, and Job Performance for Drivers

<table>
<thead>
<tr>
<th></th>
<th>Flow</th>
<th>Balance</th>
<th>Engagement</th>
<th>Total Accident Expense</th>
<th>P&amp;D Stops per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance</td>
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<tr>
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<td>.359***</td>
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<tr>
<td>Total Accident Expense</td>
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<td>-.044**</td>
<td>-.042**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>P&amp;D Stops per Hour</td>
<td>.029*</td>
<td>.031*</td>
<td>-.008</td>
<td>-.165***</td>
<td>1</td>
</tr>
</tbody>
</table>

*p<.05  **p<.01  ***p<.00
significantly correlated with lower levels of DART Expense. This result shows that higher levels of engagement do predict lower DART Expenses. However, when flow is added as an additional predictor, a significant amount of additional variance is accounted for in predicting DART Expense. In other words, higher levels of engagement with higher levels of flow predict lower DART Expenses than simply higher levels of engagement alone.

Model 3A regressed Dock Bills per Hour on engagement and the effect was significant (engagement $\beta = .150, p<.001$). Model 3B regressed Dart Expense on engagement and flow and flow was a significant predictor (flow $\beta = .207, p<.001$) while controlling for engagement. The change between model 3A and model 3B in R-squared (.025) and change in F (57.10) was significant $p<.001$ (see Table 6). The positive beta indicated that higher levels of flow significantly correlated with higher levels of Dock Bills per Hour. This result shows that higher levels of engagement do predict more Dock Bills per Hour. However, when flow is added as an additional predictor, a significant amount of additional variance is accounted for in predicting Dock Bills per Hour. In other words, higher levels of engagement with higher levels of flow predict more Dock Bills per Hour than simply higher levels of engagement.

Model 4A regressed DART Frequency on engagement and the effect was non-significant (engagement $\beta = -.018, p=.39$). Model 4B regressed Dart Frequency on engagement and balance and balance was a significant predictor (balance $\beta = -.065, p<.01$) while controlling for engagement. The change between model 4A and model 4B in R-squared (.004) and change in F (8.29) was significant $p<.001$ (see Table 7). The negative beta indicated that higher levels of balance significantly correlated with lower levels of DART Frequency. This result shows that
higher levels of engagement are not linked to lower frequency of DART injuries. Higher levels of balance, however, are more predictive of lower frequency of DART injuries.

Model 5A regressed DART Expense on engagement and the effect was significant (engagement $\beta = -.095, p<.001$). Model 5B regressed DART Expense on engagement and balance and balance was a significant predictor (balance $\beta = -.097, p<.001$) while controlling for engagement. The change between model 5A and model 5B in R-squared (.008) and change in F (18.58) was significant $p<.001$ (see Table 7). The negative beta indicated that higher levels of balance significantly correlated with lower levels of DART Expense. This result shows that higher levels of engagement do predict lower DART Expenses. However, when balance is added as an additional predictor, a significant amount of additional variance is accounted for in predicting DART Expense. In other words, higher levels of engagement with higher levels of balance predict lower DART Expenses than simply higher levels of engagement alone.

Model 6A regressed Dock Bills per Hour on engagement and the effect was significant (engagement $\beta = .150, p<.001$). Model 6B regressed Dock Bills per Hour on engagement and balance and balance was a significant predictor (balance $\beta = .090, p<.001$) while controlling for engagement. The change between model 6A and model 6B in R-squared (.007) and change in F (16.02) was significant $p<.001$ (see Table 7). Although the change in the models was significant, balance had a lower beta than did engagement for predicting Dock Bills per Hour. This result shows that higher levels of engagement do predict more Dock Bills per Hour. However, when balance is added as an additional predictor, a significant amount of additional variance is accounted for in predicting Dock Bills per Hour. For predicting Dock Bills per Hour, engagement is still the best predictor because it had a higher beta than did balance when using both predictors in conjunction to predict Dock Bills per Hour.
Flow, Engagement, and Job Performance in Drivers

A similar set of analyses was performed for the driver group using the job performance outcomes relevant the driver group. Model 7A regressed Total Accident Expense on engagement and the effect was significant (engagement $\beta = -0.042, p<.01$). Model 7B regressed Total Accident Expense on engagement and flow and flow was a significant predictor (flow $\beta = -0.051, p<.01$) while controlling for engagement. The change between model 7A and model 7B in $R^2$ (.003) and change in F (7.29) was significant $p<.01$ (see Table 8). The negative beta indicated that higher levels of flow significantly correlated with lower levels of Total Accident Expense. This result shows that higher levels of engagement do predict lower Total Accident Expenses. However, when flow is added as an additional predictor, a significant amount of additional variance is accounted for in predicting Total Accident Expenses. In other words, higher levels of engagement with higher levels of flow predict lower Total Accident Expenses than simply higher levels of engagement alone.

Model 8A regressed P&D (Pickup and Delivery) Stops per Hour on engagement and the effect was non-significant (engagement $\beta = -0.008, p=.574$). Model 8B regressed P&D Stops per Hour on engagement and flow and flow was a significant predictor (flow $\beta = 0.054, p<.01$) while controlling for engagement. The change between model 8A and model 8B in $R^2$ (.002) and change in F (8.043) was significant $p<.01$ (see Table 8). The positive beta indicated that higher levels of flow significantly correlated with higher levels of P&D Stops per Hour. This result shows that higher levels of engagement do predict higher P&D Stops per Hour. However, when flow is added as an additional predictor, a significant amount of additional variance is accounted for in predicting P&D Stops per Hour. In other words, higher levels of engagement
with higher levels of flow predict higher P&D Stops per Hour than simply higher levels of engagement alone.

Model 9A regressed Total Accident Expense on engagement and the effect was significant (engagement $\beta = -0.042, p<.01$). Model 9B regressed Total Accident Expense on engagement and balance and flow was a significant predictor (balance $\beta = -0.033, p<.05$) while controlling for engagement. The change between model 9A and model 9B in R-squared (.001) and change in F (4.103) was significant $p<.05$ (see Table 9). The negative beta indicated that higher levels of flow significantly correlated with lower levels of Total Accident Expense. This result shows that higher levels of engagement do predict lower Total Accident Expenses. However, when balance is added as an additional predictor, a significant amount of additional variance is accounted for in predicting Total Accident Expenses. In other words, higher levels of engagement with higher levels of balance predict lower Total Accident Expenses than simply higher levels of engagement alone.

Model 10A regressed P&D Stops per Hour on engagement and the effect was significant (engagement $\beta = -0.008, p=.574$). Model 10B regressed P&D Stops per Hour on engagement and balance and balance was a significant predictor (balance $\beta = .039, p<.01$) while controlling for engagement. The change between model 10A and model 10B in R-squared (.001) and change in F (4.103) was significant $p<.01$ (see Table 9). The positive beta indicated that higher levels of balance significantly correlated with lower levels of P&D Stops per Hour. This result shows that higher levels of engagement do predict higher P&D Stops per Hour. However, when balance is added as an additional predictor, a significant amount of additional variance is accounted for in predicting P&D Stops per Hour. In other words, higher levels of engagement with higher levels of balance predict higher P&D Stops per Hour than simply higher levels of engagement alone.
Flow and balance were significant incremental predictors over and above engagement of job performance metrics in both dockworkers and drivers. However, in both dockworkers and drivers, flow was a stronger and more incremental predictor than balance. This result demonstrates that the total flow experience (i.e., antecedents and indicators) is important in predicting job performance metrics.
Table 6: Hierarchical Regression of Job Performance Metrics on Engagement and Flow for Dockworkers

<table>
<thead>
<tr>
<th>DV: DART Frequency</th>
<th>Engagement</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>SE of the Estimate</th>
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** p<.01  *** p<.001
Table 7: Hierarchical Regression of Job Performance Metrics on Engagement and Balance for Dockworkers

<table>
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<tr>
<th>Model</th>
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<td>Model 4B: Engagement</td>
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<td>.172</td>
<td>.030</td>
<td>.029</td>
<td>1.44</td>
<td>.007***</td>
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</tbody>
</table>

** **p<.01 ***p<.001
Table 8: Hierarchical Regression of Job Performance Metrics on Engagement and Flow for Drivers

<table>
<thead>
<tr>
<th>DV: Total Accident Expense</th>
<th>Model 7A: Engagement</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>SE of the Estimate</th>
<th>R² change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.042</td>
<td>.002</td>
<td>.002</td>
<td>50.09</td>
<td></td>
</tr>
<tr>
<td>DV: Total Accident Expense</td>
<td>Model 7B: Engagement and Flow</td>
<td>.059</td>
<td>.003</td>
<td>.003</td>
<td>50.05</td>
<td>.002**</td>
</tr>
<tr>
<td>DV: P&amp;D Stops per Hour</td>
<td>Model 8A: Engagement</td>
<td>.008</td>
<td>.000</td>
<td>.000</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>DV: P&amp;D Stops per Hour</td>
<td>Model 8B: Engagement and Flow</td>
<td>.044</td>
<td>.002</td>
<td>.001</td>
<td>0.19</td>
<td>.002**</td>
</tr>
</tbody>
</table>

** p<.01
Table 9: Hierarchical Regression of Job Performance Metrics on Engagement and Balance for Drivers

<table>
<thead>
<tr>
<th>Model</th>
<th>DV: Total Accident Expense</th>
<th>DV: P&amp;D Stops per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>9A: Engagement</td>
<td>.042</td>
<td>.002</td>
</tr>
<tr>
<td>9B: Engagement and Balance</td>
<td>.052</td>
<td>.003</td>
</tr>
<tr>
<td>10A: Engagement</td>
<td>.008</td>
<td>.000</td>
</tr>
<tr>
<td>10B: Engagement and Balance</td>
<td>.038</td>
<td>.001</td>
</tr>
</tbody>
</table>

* p<.05  p<.01
Flow, Engagement, and OCB

Next, flow was tested as a mediator of the relationship between engagement and OCB. The relationship of engagement and OCB has been thoroughly researched in the Industrial-Organizational Psychology field (Christian et al., 2011; Macey & Schneider, 2008) and there is a strong link between an employee’s engagement and willingness to engage in discretionary effort (i.e., OCB). Christian and colleagues (2011) conducted a meta-analysis of engagement and found links to both in-role job performance and extra-role job performance (i.e., OCB). The authors intentionally omitted studies with flow because it did not fit their conceptualization of engagement. However, flow could influence the link between engagement and OCB because it is characterized as a short-term peak experience (Bakker, 2008) that could explain additional variance in OCB above engagement alone. I believe that flow plays an important role in clarifying the relationship between engagement and OCB and subsequent models tested this hypothesis.

The first model tested for flow (an 11-item composite of the Balance Score and the flow items excluding the challenge and skill items) as a mediator for the relationship between engagement and OCB. The first step regressed OCB on engagement to confirm that the independent variable is a significant predictor of the dependent variable. The relationship between OCB and engagement was significant ($\beta = .217$, $p<.001$). The second step regressed flow on engagement to confirm that the independent variable is a significant predictor of the mediator. The relationship between flow and engagement was significant ($\beta = .625$, $p<.001$). The third step regressed OCB on both engagement and flow to confirm that the mediator was a significant predictor of the dependent variable, while controlling for the independent variable. This relationship was significant and showed that flow was a significant predictor of OCB while
controlling for engagement (flow $\beta = .245$, $p<.001$) (engagement $\beta = .064$, $p<.001$). As a result, evidence for flow as a partial mediator for the relationship between engagement and OCB was established.

A bootstrapping procedure was conducted to test for significant mediation (Preacher & Hayes, 2008). For the current procedure 10,000 resamples were used. The direct effect of engagement on OCB was statistically significant (engagement $\beta = .280$, $p<.001$). In the model, flow was significant (flow $\beta = .197$, $p<.001$) for predicting OCB while controlling for engagement. The 95% confidence interval to test for the indirect effect through flow was .1708 to .2555. The 95% confidence interval did not include 0 and the test indicated strong evidence for mediation.

The second model tested for the Balance Score as a mediator for the relationship between engagement and OCB. The first step regressed OCB on engagement to confirm that the independent variable is a significant predictor of the dependent variable. The relationship between OCB and engagement was significant ($\beta = .217$, $p<.001$). The second step regressed balance on engagement to confirm that the independent variable is a significant predictor of the mediator. The relationship between balance and engagement was significant ($\beta = .355$, $p<.001$). The third step regressed OCB on both engagement and balance to confirm that the mediator was a significant predictor of the dependent variable, while controlling for the independent variable. This relationship was significant and showed that balance was a significant predictor of OCB while controlling for engagement (balance $\beta = .109$, $p<.001$) (engagement $\beta = .179$, $p<.001$). However, engagement still remained a stronger predictor of OCB while controlling for balance.

A bootstrapping procedure was conducted to test for the significance of mediation (Preacher & Hayes, 2008). For the current procedure 10,000 resamples were used. The direct
effect of engagement on OCB was statistically significant (engagement $\beta = .280$, $p<.001$). In the model, balance was significant (balance $\beta = .050$, $p<.001$) for predicting OCB while controlling for engagement. The 95% confidence interval to test for the indirect effect through balance was .0370 to .0623. The 95% confidence interval did not include 0 (albeit just slightly) and the test indicated evidence for partial mediation.

Sources of Immediate-Feedback and Clear Goals

There was no significant evidence to distinguish the importance of receiving immediate-feedback from the tasks itself or from a manager for predicting job performance metrics (all $p>.05$). There was also no significant evidence to distinguish the importance of receiving clear goals from the tasks itself or from a manager for predicting job performance metrics (all $p>.05$). The results of these analyses demonstrate the importance of receiving immediate-feedback and clear goals from both the task itself and from a manager.

This is because both immediate-feedback items, “While working, I receive immediate feedback from the task itself that tells me how well I am doing” and “While working, I receive immediate feedback from my manager that tells me how well I am doing” did not significantly differ in how well they each predicted job performance metrics. However, they were both significant components of the flow score used to predict job performance metrics.

Also, both clear goal items, “The tasks I perform have clear goals so I know exactly what I need to do to perform well” and “My manager makes sure my work goals are clearly defined so I know exactly what I need to do to perform well” did not differ significantly in how well they each predicted job performance metrics. However, they were both significant components of the flow score used to predict job performance metrics.
Study two built on the results of study one by using an adult working population. The main purpose of study one was to establish the criterion validity for flow with links to job performance and organizational citizenship behavior. Study two confirmed results from study one by showing discriminant validity from engagement. This demonstrated that flow and engagement are theoretically distinct constructs. By establishing discriminant validity from engagement, flow can be used as a standalone to examine its relationship with job performance and OCB. Further, it can be used as an incremental predictor over engagement to predict job performance and OCB.

Study two also established flow as a significant predictor of job performance metrics for employees working in an operations setting. More specifically, the results of study two showed that greater levels of flow for dockworker groups significantly predicted fewer DART (Days Away, Restricted, or Transferred) accidents, lower DART expense, and more Dock Bills per Hour. This demonstrates the value of flow for dockworkers that results in fewer costly accidents and an increase in productivity that is cost efficient.

The results of study two also indicated that greater levels of flow for driver groups significantly predicted fewer Total Accident Expense and more P&D (Pickup and Delivery) Stops per Hour. This demonstrates the value of flow for drivers that results in fewer costly accidents and an increase in productivity that is cost efficient.

Finally, the results of study two showed that flow mediates the relationship between engagement and OCB. This demonstrates the value of examining flow in addition to engagement for predicting OCB. Traditionally, researchers and organizations have focused on engagement as the primary driver of OCB, but the results of study two show that flow is a significant mediator and significantly predicts OCB.
Summary of Findings

Overall, the results from the two studies supported the three hypotheses. Hypothesis one predicted that a hybrid-computational model of flow, separating the antecedents and indicators would exhibit better model fit than a single, global factor of flow model. Hypothesis one was proven to be true. Hypothesis two predicted that flow and engagement are theoretically different constructs and that there will be discriminant validity between the two concepts. Hypothesis two was proven to be true. Hypothesis three predicated that flow would be an incremental predictor over and above engagement in predicting job performance and would mediate the relationship between engagement and OCB. Hypothesis three was also proven to be true.

In study one the results confirmed previous research showing that a nine-factor model of flow demonstrated better model fit than did a single, global factor model (Jackson & Eklund, 2002). The results also demonstrated that a model separating the antecedents and indicators of flow had superior model fit than did a model of a single, global factor of flow. This hybrid-computational model allowed the factors of balance and clear goals to load onto a second-order factor of antecedents and the remaining seven factors loaded onto a second-order flow factor. This model is also more theoretically consistent with previous work separating the antecedents and indicators of flow (Csikszentmihalyi, 1990). The empirical findings from hypothesis one
confirm the theoretical notion of positioning the antecedents on a separate factor preceding the indicators of flow itself.

In study one the results show that flow is a distinct construct from engagement. This was demonstrated by evidence of discriminant validity between the two measures of flow and engagement. In study one, the results showed that flow was an incremental predictor over and above engagement for predicting student GPA while controlling for SAT score. This was demonstrated by the significant change in R-squared between models 1 and 2 when flow was added as a predictor in model 2. The study also revealed that the balance between challenge and skill was an incremental predictor over and above engagement for predicting student GPA while controlling for SAT score. Using an individual component of flow, such as balance, was supported by the nine-factor model, which exhibited greater fit than did a single, global factor of flow model.

In study one, I also tested whether flow mediated the relationship between engagement and OCB. This mediation was not supported. Using the method by Baron and Kenny (1986), balance was a partial mediator between engagement and OCB. However, using stronger bootstrapping procedures, balance did not significantly mediate the relationship between engagement and OCB.

In study two the discriminant validity between flow and engagement hypothesis was confirmed in an adult working population. There was evidence for discriminant validity between flow and engagement as measured in the job groups of dockworkers and drivers. There were also significant correlations between flow and balance and across all job performance metrics (see Table 4 and Table 5).
For dockworkers, model 1A and model 1B showed flow as an incremental predictor for DART (Days Away, Restricted, or Transferred) Frequency. The results showed that dockworker groups that experienced more flow were also more likely to have fewer DART accidents. Model 2A and model 2B showed flow as an incremental predictor for DART Expense. The results showed that dockworker groups that experienced more flow were more likely to have lower DART Expenses and lower costs as a result of DART accidents. Model 3A and model 3B showed flow as an incremental predictor for Dock Bills per Hour (see Table 6). The results showed that dockworker groups that experienced more flow were more likely to have more Dock Bills per Hour and greater productivity as a result of moving more dock bills.

Model 4A and model 4B showed balance as an incremental predictor for DART Frequency. The results showed that dockworker groups that experienced more balance were also more likely to have fewer DART accidents. Model 5A and model 5B showed balance as an incremental predictor for DART Expense. The results showed that dockworker groups that experienced more balance were more likely to have lower DART Expenses and lower costs as a result of DART accidents. Model 6A and model 6B showed balance as an incremental predictor for Dock Bills per Hour (see Table 7). The results showed that dockworker groups that experienced more balance were more likely to have more Dock Bills per Hour and greater productivity as a result of moving more dock bills.

For drivers, model 7A and model 7B showed flow as an incremental predictor for Total Accident Expense. The results showed that driver groups that experience more flow were more likely to have lower Total Accident Expenses and lower costs as a result of accidents. Model 8A and 8B showed flow as an incremental predictor of P&D (Pickup and Delivery) Stops per Hour (see Table 8). The results showed that driver groups that experience more flow were more likely
to have more P&D Stops per Hour and greater productivity as a result of making more stops per hour.

Model 9A and model 9B showed balance as an incremental predictor for Total Accident Expense. The results showed that driver groups that experience more balance were more likely to have lower Total Accident Expenses and lower costs as a result of accidents. Model 10A and 10B showed balance as an incremental predictor of P&D Stops per Hour (see Table 9). The results showed that driver groups that experience more balance were more likely to have more P&D Stops per Hour and greater productivity as a result of making more stops per hour.

The results of the final analyses in study two established flow as a significant mediator of the relationship between engagement and OCB. This was demonstrated by using a bootstrapping procedure that resulted in 95% confidence interval excluding 0, indicating flow as a significant mediator. Balance was also determined to be a significant mediator, but engagement remained a significant explanatory variable in the model when balance acted as a mediator. The results show that researchers and organizations should consider flow, in addition to engagement, for predicting OCB.

Theoretical and Practical Implications

There are four main theoretical and practical implications of the studies conducted and hypothesis tested. First, the construct validation of flow in study one demonstrated the empirical importance of distinguishing between antecedents and indicators of flow. Previous research has taken only a single-dimensional view on flow and that perspective is insufficient to properly conceptualize the concept in its entirety. A practical implication of this finding is that companies can identify which antecedent of flow (e.g. balance or clear goals) will lead to positive indicators within their own organization. For example, in a financial company it may be that clear goals
lead to greater concentration whereas in a retail company it is balance that leads to greater concentration. Future research can determine optimal antecedents and indicators at the organization-specific level based on the foundational construct validity established in study one.

Second, evidence demonstrated discriminant validity for flow from engagement. Previous research had failed to clarify empirically the relationship between these two constructs. Evidence from study one and study establishes flow and engagement as distinct constructs. Although they are correlated, they are distinct and measure different attributes. A practical implication of this finding is that a measure of flow can be used either as a standalone or included alongside a measure of engagement in organization surveys. Because they are different, it is important for organizations to focus on flow, in addition to engagement to have a more complete picture of their employee’s well-being. A company stands to gain a tremendous amount of new and additional information over a engagement survey by being interested in the level of their employee’s flow.

Third, study one and two established criterion validity for flow as a predictor of academic performance and job performance. Flow was a significant predictor over and above engagement of student GPA while controlling for SAT score. The value of flow in an academic setting has implications for researchers wishing to further explore the relationship in the future. For example, researchers could determine which antecedent of flow has the largest impact on the indictors of flow, which have now been linked to academic performance. A practical implication of this finding would be that students could now identify which of the conditions is the most important for finding their own flow. If the ideal condition for flow can be found, greater flow while studying is the likely result, with greater academic performance as the downstream outcome. A practical implication of this finding for organizations is that managers could
determine which conditions foster flow for their employees. By identifying the ideal conditions for flow, it is possible for employees to experience flow more often in the workplace. Downstream outcomes of greater flow at work include fewer work accidents, less expense because of accidents, and increased in-role job performance. A slight increase in flow could result in millions of savings from accidents and millions in revenue from increased productivity.

Fourth, study two established flow as a mediator of the relationship between engagement and OCB. This finding has implications for researchers studying citizenship or discretionary behavior to examine flow as a new predictor. By including flow as a driver of discretionary behavior, future research can determine which antecedents of flow contribute to the indicators of flow that are most likely to result in discretionary behaviors. Further, it is possible that different indicators of flow are correlated with difference components of citizenship behavior, such as altruism or courtesy. A practical implication of this find is instrumental for organizations seeking to increase discretionary efforts of their employees. Many organizations have traditionally focused on increasing employee engagement as a means to increase discretionary behavior. However, the results of study two indicate that organizations can also increase flow in order to see an impact on extra-role behavior. Organizations that wish to promote their efforts at increasing OCB should incorporate flow into the process so as to maximize their return on investment of measuring engagement. The results of two studies have demonstrated the construct and criterion validity for flow.

Flow and Our Immediate-Return Biology

What implications do these results have for the argument made earlier in this paper that we are biologically immediate-return individuals living in a delayed-return world? How does flow help us living in harmony with our immediate-return biology and function optimally in a
delayed-return environment? I believe the answer can be summarized by the results in study one and study two demonstrating optimal performance as a result of optimal experience. In both studies, flow proved to be a significant driver of more optimal performance outcomes. I have argued that humans function best when they act in ways that are in harmony with their immediate-return biology and the ultimate proxy for these experiences is flow. The previous studies have demonstrated that it is possible to function optimally in a delayed-return world (i.e., at school studying or at the job working) by being in tune with our immediate-return biology (i.e., being in flow). In other words, we can reduce the discord between our immediate-return nature and delayed-return environment by being in flow. It is in the flow experience that we can find and reconnect with our true immediate-return hunter-gather self and function in a way that promotes not only optimal experience, but also optimal performance.

Conclusion

So, is it possible to live an optimal life based on evidence learned from our evolutionary ancestors? Can we have optimal experience, even while studying or working, by incorporating features that are congruent with our immediate-return biology? I believe we can.

I have empirically identified two conditions that give rise to the flow experience. A close match of skill and challenge and clear goals contribute to optimal experience and are also necessary for flow to occur in the workplace. These factors lead to work being an enjoyable activity to which people look forward to engaging in every day. Most importantly, I addressed why these conditions are so important for flow.

I argued that we are biologically immediate-return hunter-gatherers living in a complex delayed-return environment. Although there are advantages to both types of societies, our species has evolved in immediate-return societies. Therefore, it is in these societies that human nature is
adapted to function optimally. Also, because of this discord, we must make compensations in order to function optimally in the world today. If our compensations are successful, we can effectively reduce the estrangement.

I have shown empirical evidence from two studies establishing the conceptual framework of flow and its relationship to academic performance and job performance. These studies have demonstrated that flow can help reduce the discord between our immediate-return biology and delayed-return environment. The studies have also provided evidence that optimal experience leads to optimal performance.

Perhaps, with this starting point, future research can further the connection between our evolutionary past and current psychological well-being. Joseph Campbell (1988, p.113) said, “If you follow your bliss, you put yourself on a kind of track that has been there all the while, waiting for you, and the life that you ought to be living is the one you are living. Wherever you are—if you are following your bliss, you are enjoying that refreshment, that life within you, all the time.” If we follow our immediate-return bliss (i.e., we generate flow), we put ourselves back on a track that has been there all the while, we will be living a life that is the one we should be living. Wherever we are, at school or at work, if we are in flow, we are living the life we ought to be living.
REFERENCES


APPENDIX A

MODIFIED DISPOSITIONAL FLOW SCALE-2

This assessment asks about the frequency of thoughts and feelings that you may or may not experience while studying. There are no right or wrong answers. Think how frequently you experience these thoughts and feelings while studying.
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

Features of Flow Itself

2. While studying, I make the correct moves without thinking about trying to do so.
5. My attention is focused entirely on what I am doing while studying.
6. I have a sense of control over what I am doing while studying.
7. I am not concerned with what others may be thinking of me while studying.
8. Time seems to alter (either slows down or speeds up) while studying.
9. I really enjoy studying.
11. While studying, things just seem to happen automatically.
14. It is no effort to keep my mind on what is happening while studying.
15. I feel like I can control what I am doing while studying.
16. I am not worried about my performance while studying.
17. While studying, the way time passes seems to be different from normal.
18. I love the feeling while studying and want to capture it again.
20. While studying, I perform automatically, without thinking too much.
23. I have total concentration while studying.
24. While studying, I have a feeling of total control.
25. I am not concerned with how I am presenting myself while studying.
26. While studying, it feels like time goes by quickly.
27. While studying, the experience leaves me feeling great.
29. While studying, I perform spontaneously and automatically without having to think.
32. While studying, I am completely focused on the task at hand.
33. I feel in total control of my body while studying.
34. I am not worried about what others may be thinking of me while studying.
35. I lose my normal awareness of time while studying.
36. While studying, the experience is extremely rewarding.

Conditions for Flow (Antecedents)

1. I am challenged, but I believe my skills allow me to meet the challenges of my studies.
3. I know clearly what I should be doing while studying.
4. It is immediate to me when I am doing well while studying.
10. My abilities match the high challenge of my studies.
12. I have a strong sense of what I needed to do to perform well while studying.
13. I am immediately aware of how well I am doing while studying.
19. I feel I am competent enough to meet the high demands of my studies
21. I have a clear idea of what I want to achieve while studying.
22. I have an immediate idea while I am studying about how well I am doing.
28. The challenge of my studies and my skills are at an equally high level.
30. My goals are clearly defined while studying.
31. While studying, I can immediately tell how well I am doing.
APPENDIX B

UTRECHT WORK ENGAGEMENT SCALE FOR STUDENTS (UWES-S)

The following statements are about how you feel about your studies. Please read each statement carefully and decide if you ever feel this way about your studies. If you have had the described feeling, indicate how often you feel it by selecting the response from the options below each statement.
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

Vigor
1. When I’m studying, I feel mentally strong.
2. I can continue for a very long time when I am studying.
3. When I study, I feel like I am bursting with energy.
4. When studying I feel strong and vigorous.
5. When I get up in the morning, I feel like going to class.

Dedication
6. I find my studies to be full of meaning and purpose.
7. My studies inspire me.
8. I am enthusiastic about my studies.
9. I am proud of my studies.
10. I find my studies challenging.

Absorption
11. Time flies when I’m studying.
12. When I am studying, I forget everything else around me.
13. I feel happy when I am studying intensively.
14. I can get carried away by my studies.
APPENDIX C

ORGANIZATIONAL CITIZENSHIP BEHAVIOR CHECKLIST FOR STUDENTS

How often have you done each of the following things during your college career?
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

1. Took time to advise, coach, or mentor a fellow student.
2. Helped a fellow student learn new skills or shared class knowledge.
3. Helped a new student get oriented to the school.
4. Lent a compassionate ear when a fellow student had a school problem.
5. Offered suggestions to improve how schoolwork is done.
6. Helped a fellow student who had too much to do.
7. Volunteered for extra credit school projects.
8. Worked weekends or other days off to complete a school project or task.
9. Volunteered to attend school meetings on own time.
10. Gave up lunch and other breaks to complete schoolwork.
APPENDIX D

FLOW ITEMS USED FOR EMPLOYEES

This assessment asks about the frequency of thoughts and feelings that you may or may not experience while working. There are no right or wrong answers. Think how frequently you experience these thoughts and feelings while working.
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

1. I feel I have the necessary skills to perform well at work
2. I feel my work is challenging
3. While working, I receive immediate feedback from the task itself that tells me how well I am doing.
4. While working, I receive immediate feedback from my manager that tells me how well I am doing.
5. The tasks I perform have clear goals so I know exactly what I need to do to perform well
6. My manager makes sure my work goals are clearly defined so I know exactly what I need to do to perform well
7. My attention is focused entirely on what I am doing while at work.
8. I really enjoy working.
9. I am able to concentrate while at work.
10. While working, it feels like time goes by quickly.
11. At work, I am completely focused on the task at hand.
12. At work, the experience is rewarding.
APPENDIX E

UTRECHT WORK ENGAGEMENT SCALE (UWES)

The following statements are about how you feel about your studies. Please read each statement carefully and decide if you ever feel this way about your studies. If you have had the described feeling, indicate how often you feel it by selecting the response from the options below each statement.
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

1. I am motivated to go to work.
2. I am dedicated to my job.
3. When I am working, I am completely focused on my job.
4. When I am working, I feel strong and energetic.
5. I am motivated to do my best at work.
6. I am deeply involved in my work.
7. At work I always keep going, even when things are not going well.
8. I am proud to say that I work for UPS.
9. I am engaged while at work.
APPENDIX F

OCB ITEMS USED FOR EMPLOYEES

How often have you done each of the following things during work?
(1 = never, 2 = infrequently, 3 = sometimes, 4 = frequently, 5 = always)

1. Took time to advise, coach, or mentor a co-worker.
2. Helped a co-worker learn new skills or shared job knowledge.
3. Listened with care when someone had a work problem.
4. Offered suggestions to improve how work is done.
5. Helped a co-worker who had too much to do.