FLOW AS A POSITIVE STATE: ANTECEDENTS AND OUTCOMES OF FLOW STATES

by

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Abstract

The field of Industrial/Organizational Psychology has begun to incorporate elements from the growing field of Positive Psychology which has been manifest in Positive Organizational Scholarship (POS) and Positive Organizational Behavior (POB). This study examined two POB constructs, Psychological Capital (PsyCap) and Flow in a lab-based virtual-world simulation while utilizing Fredrickson's (2001) broaden-and-build theory of positive emotions. It was hypothesized that PsyCap would predict flow experiences and that those flow experiences would predict several outcomes, namely performance, affect, and resilience. It was found that individuals higher in Psychological Capital tended to experience more flow in a flow inducing task. During that task, individuals in flow performed better and experienced more positive affect than individuals who experienced lower levels of flow. Additionally, flow in that task was able to predict performance, affect, and resilience in a later, overly challenging task. Implications for these findings are discussed as well as limitations and future directions.

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Chapter 1 - Introduction

Over the past decade a positive approach to psychology has emerged in an effort to move away from the disease model that has plagued the field. Traditionally, psychology has emphasized research and practice that focused on solving problems and remedying pathologies (Seligman & Csikszentmihalyi, 2000). Seligman and Csikszentmihalyi (2000) have proclaimed that "…the time has arrived for a positive psychology, our message is to remind our field that psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue. Treatment is not just fixing what is broken; it is nurturing what is best."(p. 7).

This idea of going beyond fixing problems is not an entirely new one. In 1940 the World Health Organization defined health as "…not only the absence of infirmity and disease but also as a state of physical, mental, and social well-being" (Wright & Quick, 2009). Even within the science of psychology, numerous well-known and influential researchers have investigated positive outcomes and/or made calls for their study. For instance, Maslow in his 1954 book *Motivation and Personality* discussed high order needs such as self-actualization. Maslow believed that the pursuit of higher needs represented a health directed trend and that gratification of higher needs would lead to beneficial outcomes such as happiness and a rich inner life. Additionally, it is worth noting that within psychology, I/O psychology has relied less on the disease model than other areas. For instance, I/O psychologists have always been focused on some positive aspects of human functioning at work, such as performance and job satisfaction. Seligman and Csikszentmihalyi (2000) acknowledge that the notion of positive psychology is not new. However, they emphasize the development of the field of positive psychology necessitates a strong theoretical and empirical research base. As a result of this call, research in positive

psychology has begun to flourish both as its own field and within other areas of psychology, including industrial/organizational (I/O) psychology. Within I/O psychology, positive psychology has been manifested in two broad areas, Positive Organizational Scholarship (POS: Cameron, Dutton, & Quinn, 2003) and Positive Organizational Behavior (Luthans, 2002a).

Positive Organizational Scholarship (POS)

A focus of I/O research that has developed from the positive psychology movement is that of Positive Organizational Scholarship. Cameron, Dutton, and Quinn (2003) define POS as an area of organizational studies that is concerned with the study of positive outcomes, processes, and attributes of organizations and their members. By definition, POS is a broader domain than the closely related domain of Positive Organizational Behavior (POB). While POB restricts constructs to having state-like characteristics and an influence on performance, the POS umbrella covers anything that relates to positive states in an organizational setting, provided it has a research based or empirical grounding. POS is closely related not only to POB, but also to organizational development, citizenship behavior, corporate social responsibility, and positive psychology as a whole (Cameron, Dutton & Quinn, 2003). An example of the types of research being done within the field of POS is Peterson's work on the Values in Action classification of strengths. The aim of this research is to discover the strengths and virtues that define character and then find ways to measure them as individual differences (Park & Peterson, 2003). As a result, twenty four positive traits have been identified and subsequently organized into six core virtues; wisdom and knowledge, courage, love, justice, temperance, and transcendence (Dahlsgaard, Peterson, & Seligman, 2002). Building off this, researchers set out to do the same with virtues at the organizational level which serve broad goals beyond the bottom line, such as social and moral issues. As a result, five broad macro-level virtues of purpose, safety, fairness,

humanity, and dignity were identified (Park & Peterson, 2003). This research involving micro and macro level virtues has now provided another useful taxonomy for distinguishing individual differences between "good" and "bad" people or organizations. Although POS incorporates more constructs than virtues as individual differences, this program of research is both popular and provides a prime example of the type of work being done within the domain of POS. Although POS is a useful application of Positive Psychology to I/O, Positive Organizational Behavior is more applicable to the current study and is detailed below.

Positive Organizational Behavior (POB)

Another manifestation of positive psychology within I/O, and one that is more pertinent to the current study, is Positive Organizational Behavior (POB). POB 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…" (Luthans, 2002a: 59). Although this definition includes performance improvement, many positive psychological and POB constructs merit research in their own right. Luthans and Avolio (2009a) elaborate stating that the performance component is included in their definition mainly to help differentiate POB research from positive psychology as a whole. Luthans (2002b) also notes that in addition to performance, there are numerous antecedents, mediators, moderators, and outcomes that still fit within the domain of POB. Another defining characteristic of POB constructs is that they must be state-like so they can be managed and developed. Luthans (2002a) found that several POB constructs exhibited both state-like and trait-like qualities, however, POB's goal is to go beyond selection and focus on the state-like qualities of constructs that are open to intervention, training, or management (Luthans, 2002b). As a result, these constructs are studied at the individual or micro level (Eg: Luthans, Avey, Avolio, Norman, & Combs, 2006).

The characteristics of POB constructs described above also serve to differentiate POB from POS which has far fewer inclusion criteria. While POS is concerned with nearly any positive construct that can relate to an organization, POB is concerned with micro-level, state-like constructs that can subsequently be developed in order to impact job performance. In turn, the constructs of interest for the current study, Psychological Capital and Flow, are individual level, state-like variables that therefore fit nicely within the more specific criteria of POB.

Flow

The concept of flow was first operationalized by Csikszentmihalyi (1975) as a state of optimal experience. In lay terms flow could be referred to as ”being in the zone” or “in the groove” and was first studied using creative individuals such as athletes, musicians, and artists (Csikszentmihalyi, 1975). It was found that these individuals would persist in challenging tasks even though there were no clear external rewards motivating them. As a result, Csikszentmihalyi (1975) proposed the concept of the flow state to help explain why and how individuals were motivated in these tasks. According to Csikszentmihalyi (Nakamura & Csikszentmihalyi, 2002), these types of tasks (for example sport, art, or music) have several characteristics that lend themselves to an intrinsically rewarding experience, or more specifically, flow. Along this line, Csikszentmihalyi (1990) later clarified these specific task characteristics as a balance between perceived challenges and skill in addition to clear goals and immediate feedback. Of these three characteristics, the former (a balance between challenge and skill) is the most researched and discussed within flow literature.

Figure 1-1 Challenge/Skill Balance

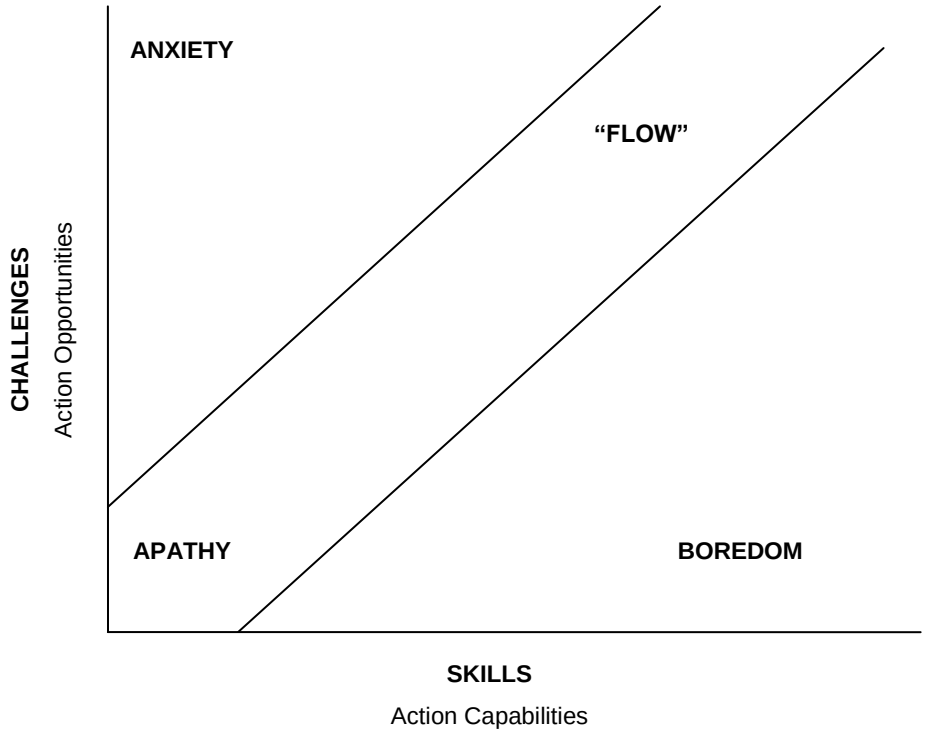


Figure 1-1 illustrates the idea that the flow experience lies along a delicate continuum wherein individual skill and task challenge are in alignment and complement each other. If the challenge inherent in a task greatly outweighs an individual's skill then they will experience anxiety and frustration from the inability or difficulty in completing the task. On the other hand, if an individual's skill at a task greatly outweighs the challenges present then they will experience boredom or apathy as the task becomes menial. However, when skill and challenge are in accordance, the individual can use their full range of skills to complete tasks they view as challenging allowing them to demonstrate a type of mastery (Csikszentmihalyi, 1990). It is of note that Csikszentmihalyi's (1990) work also shows that perceived skills and challenges should be moderate to high in order for flow to occur. It is found that very low skill, low challenge tasks, such as watching tv, are not engaging enough to generate flow states. Again, perceived skills and perceived challenges are most important so when they are both perceived by the individual to be moderate to high, flow is likely to occur.

In addition to a balance between task challenge and skill, clear goals that facilitate immediate feedback are also preconditions to the experience of flow within a task. In order for a task to allow for the experience of flow, it must be evident what the task's endpoint is and what one is striving to accomplish. Whether the goal is to beat another individual in sport or to simply finish a painting that others will enjoy, there simply has to be a goal that performers are aiming for. Secondly, the task itself must provide feedback towards goal accomplishment in order for flow to be experienced (Csikszentmihalyi, 1997; Jackson & Ecklund, 2004; Nakamura & Csikszentmihalyi, 2002). Using the above examples, the goal of beating another in a race provides feedback by seeing the other individual's position and the painter can compare their piece to other popular pieces or to a mental standard they hold. In both cases, the task performer can see at any point in time how close they are to accomplishing the task goal. If an individual has no way of determining if they are getting closer or further to goal accomplishment then this will inhibit their ability to engage in flow (Csikszentmihalyi, 1997).

Given the above preconditions of challenge/skill balance, clear goals and feedback are innately present in a task then individuals have the ability to experience the subjective feeling of flow. It is of note that given the pre-conditions, flow does not always occur, however, it is unlikely to occur if the pre-conditions are absent (Csikszentmihalyi, 1997).

The subjective experience of flow from the individual's perspective is comprised of six characteristics. First, there is intense and focused concentration on the performance of the task (Csikszentmihalyi, 1975). When an individual is engaged in flow during a task their attention is focused solely on accomplishing the task and not on any distractions present. Second, when in flow an individual's action and awareness merge, meaning that one does not have to think about each individual behavior they are doing, instead the actions just seem to flow naturally. For

instance, a pianist while performing is not thinking about each individual note they must hit, but instead they just play. Third, there is a loss of reflective self-consciousness while in flow (Csikszentmihalyi, 1990). This is also referred to as the loss of awareness as a social actor meaning while in flow the individual is not thinking about what others think, they are focused solely on the task. Fourth, while in flow individuals feel direct control over their actions and the belief that those actions have specific outcomes. The fifth characteristic of the flow experience is the feeling of temporal distortion (Csikszentmihalyi, 1975), although there is a lack of empirical research examining this component. Sixth, while in flow the process of completing the task, and not the end product, becomes the most intrinsically rewarding. Csikszentmihalyi (1990) has defined this experience as an autotelic experience which directly translated from Greek means self-goal. A pure autotelic activity is any task one would engage in strictly for the pleasure of performing the task itself; however, it is rare to find a perfect autotelic experience that offers no external rewards whatsoever (Csikszentmihalyi, 1990).

Flow and POB

As a construct, flow would seem to satisfy the criteria for inclusion within POB as outlined by Luthans (2002b). Specifically, if flow fits in the POB domain, it should function as a positive state, impact performance, and be related to other POB constructs such as Psychological Capital. Previous research (Fullagar & Kelloway, 2009) has shown that much of the variance (74%) in flow can be attributed to situational factors lending support to the notion that flow is a state-based construct. Additionally, there is cross-sectional evidence from naturalistic settings that flow impacts performance (Demerouti, 2006; Jackson, Thomas, Marsh, & Smethurst, 2001). This study elaborates on these findings by examining flow within a broader framework of positive states. POB would theorize that if flow is a positive state it should be associated with

positive functioning and be positively related to positive constructs, such as Psychological Capital. In addition to POB, the hypothesized relationships between flow and the outcomes of interest are guided by the broaden-and-build theory (Fredrickson, 2001) which details the way in which positive states and emotions function, namely that they broaden awareness and build cognitive resources. In turn, it is hypothesized that flow will also have a positive impact on outcomes of a later, overly challenging task which would provide more evidence that flow functions as a positive state.

Psychological Capital (PsyCap)

As discussed previously, one of the core components of flow is that it is an autotelic state but Csikszentmihalyi (1975; 1990) has extended that into discussion of an autotelic personality. Csikszentmihalyi (1990) details the autotelic person as having control over situations and their attention, not being excessively self-conscious, and having an internal locus of control. However, these components are nearly identical to several of the components of the flow state itself and are not grounded in any existing personality taxonomy or theory. Additionally, Csikszentmihalyi (1990) posits that the autotelic personality is trait-based and therefore genetically determined and not open to outside intervention. Other research (Demerouti, 2006; Eisenberger, Jones, Stinglhamber, Shanock, & Randall, 2005) has shown that there are some individual differences in the flow experience, however, empirical evidence seems to suggest the experience of flow does not entirely depend on the personality of the individual. For instance, Fullagar and Kelloway (2009) used ESM to track flow longitudinally and found that 74% of the variance in flow could be attributed to within-individual differences. If the experience of flow is influenced heavily by personality traits, then one would expect to see a majority of variance being attributed to between-individual difference rather than within. However, as Fullagar and Kelloway (2009)

and others (Demerouti, 2006; Eisenberger, et. al., 2005) demonstrate, between-individual differences still have some impact on the experience of flow. Therefore, it would be prudent to examine these differences within an established taxonomy.

Within the domain of POB, Luthans and colleagues have defined an individual difference variable know as Psychological Capital, or PsyCap. PsyCap is composed of four state-like traits; self-efficacy, hope, optimism, and resilience.

Self Efficacy

Self efficacy within PsyCap is defined as "one's conviction (or confidence) about his or her abilities to mobilize the motivation, cognitive resources, and courses of action needed to successfully execute a specific task within a given context" (Stajkovic & Luthans, 1998b: 66). Given that PsyCap is a construct within POB, the context discussed within self-efficacy is generally the workplace or another organizational setting. Within PsyCap, efficacy is structured similarly to the early work on efficacy (Bandura, 1997), namely that individuals have domain and task specific self-efficacy, but there is also a global self-efficacy which is influenced by the numerous domain specific efficacies one may possess (Luthans & Youssef, 2004). Of the four PsyCap components, self-efficacy has the most research background, much of which (e.g. Bandura, 1997) has confirmed the assertion that self-efficacy is a state and subject to change as opposed to traits which are relatively stable over time. Additionally, self-efficacy is related to numerous work related outcomes such as leadership effectiveness (Chemers, Watson, & May, 2000; Luthans, Luthans, Hodgetts, & Luthans, 2001), creativity (Tierney & Farmer, 2002), participation (Lam, Chen, & Schaubroeck, 2002), and learning (Ramakrishna, 2002) not to mention the meta-analytic findings (Bandura & Locke, 2003; Stajkovic & Luthans, 1998a) that self-efficacy is strongly related to work performance. Lastly, like the rest of the PsyCap

components, self-efficacy can be developed and improved through various methods such as mastery experiences, vicarious learning or modeling, social persuasion, and psychological or physiological arousal (Bandura, 1997, 2000; Maddux, 2002; Stajkovic & Luthans, 1998a, 1998b). Subsequently, several of these methods are inherent to certain, simple work-place interventions such as on-the-job training or mentoring or coaching programs.

Hope

The second component of PsyCap is *hope*, which is closely related to self-efficacy in that it influences individual's self-initiated, goal-directed behaviors. Hope within PsyCap uses Snyder, Irving, and Anderson's (1991: 287) definition which states hope is "a positive motivational state that is based on an interactively defined sense of successful (1) agency (goal-directed energy) and (2) path-ways (planning to meet goals)." The main distinction between the two is that one of the crucial mechanisms within the definition of hope is a sense of agency or an internal locus of control for the situation (Luthans & Youssef, 2007). Another crucial component to hope is the idea that individuals can modify existing plans or formulate contingency plans to help overcome obstacles while striving for a goal. Additionally, hope is involved in the process of setting, modifying, and approaching goals as well (Luthans & Youssef, 2007). As was the case with self-efficacy, hope is also a state construct and open to interventions, primarily goal-setting training like stretch-goaling, stepping, and regoaling (Snyder, 2000). Lastly, organizational leaders' hope is related to the profitability of their specific units as well as the satisfaction and retention of their employees (S. J. Peterson & Luthans, 2003) and more broadly hope in general is related to performance and work attitudes (Youseff & Luthans, 2007) and organizational profitability (Adams, Snyder, Rand, King, Sigmon, & Pulvers, 2002).

Optimism

The next component in PsyCap is *optimism* which is an attributional style in which individuals attribute successes to internal, stable traits while attributing negative events to external, situational causes. The opposite of optimism is pessimism where individuals attribute their success to the environment and failures to their internal traits (C. Peterson & Steen, 2002; Seligman, 1998). Although optimism is related to self-efficacy and hope, it is distinct in that it incorporates external components and is not directly involved in goal striving or attainment, only goal setting. For instance, individuals can garner optimism internally or externally from other people and events. Also, unlike self-efficacy and to some extant hope, optimism is not domain specific (Luthans & Jensen, 2002; Scheier & Carver, 1985) Another point of distinction is that self-efficacy and hope are largely cognitive in nature whereas optimism is cognitive, emotional, and motivational in nature (C. Peterson, 2000; Seligman & Csikszentmihalyi, 2000) Although there is still some debate as to the bipolarity of optimism and pessimism (Peterson & Chang, 2002), optimism has been associated with broad, positive outcomes like physical and psychological health and well-being (e.g., C. Peterson, 1999; Scheier & Carver, 1987, 1992; Scheier et. al., 1989; Seligman, 2002) while pessimism is associated with negative outcomes like depression and illness (e.g. C. Peterson & Seligman, 1984; C. Peterson, Seligman, & Vaillant, 1988). Of most importance to POB, optimism has also been associated with workplace performance, including sales and leadership roles as well (e.g. Chemers et. al., 2000; Luthans et. al., 2005; Schulman, 1999; Seligman, 1998; Wunderlay, Reddy, & Dember, 1998) Lastly, although there may be a baseline level of optimism, studies show that a more optimistic attributional style can be learned and developed through focused interventions (Carver & Scheier, 2002; Luthans, Avey, et. al., 2006; Luthans, Avey, Avolio, & Peterson, 2010; Seligman, 1998).

Resilience

The last component of PsyCap and most relevant to the current study is *resiliency*. Resiliency is defined by Luthans (2002a: 702) as "the capacity to rebound or bounce back from adversity, conflict, failure, or even positive events, progress, and increase responsibility". Within PsyCap and POB, resiliency is considered state-like (Luthans, Youssef, & Avolio, 2007; Wagnild & Young, 1993) and is open to development within individuals (Masten, 2001; Masten & Reed, 2002). Traditional definitions of resilience were somewhat distinct in that they considered resiliency as a rare personality trait that influenced an individual's ability to adapt and cope to a challenging environment (Block, 1961), however, later research has confirmed that resilience is not rare and can be influenced by numerous situational characteristics (Garmezy, 1971; Luthar, 1991; Masten & Coatsworth, 1998; O'Dougherty-Wright, Masten, Northwood, & Hubbard, 1997; Rutter, 1979; Werner & Smith, 1982, 1992). Within the research on resilience, there is still some debate as to what effect resilience has on performance following an obstacle or adverse event. Some studies (Gest, Reed, & Masten, 1999; Masten et. al., 1999) indicate that resilience leads to a return to normal performance while others (Luthar, 1991) suggest that resilience may lead to an increase in performance levels following a difficult event.

Although PsyCap is defined as having four distinct traits, Luthans, Youssef, & Avolio (2007) posit that the four components of PsyCap combine in a Gestalt fashion such that PsyCap as a whole is more predictive of work related outcomes than the sum of the individual components. Research has shown the individual facets have both discriminant validity (Bryant & Cvengros, 2004; Carifio & Rhodes, 2002; Luthans, Avolio, Avey, & Norman, 2007; Magaletta & Oliver, 1999) as well as convergent validity (Luthans, Avolio, Walumbwa, & Li, 2005; Luthans, Avey, et. al., 2006; Luthans, Avolio, Avey, & Norman, 2007; Youssef, 2004) lending support to the idea of PsyCap as a core construct composed of individual components. Lastly,

psychological resource theories like the key resource theory (Thoits, 1994) have provided empirical evidence that foundational resources (such as efficacy and resiliency) can combine interactively and synergistically in order to manage higher order resources to produce positive outcomes (Cozzarelli, 1993; Rini, Dunkel-Shetter, Wadhwa, & Sandman, 1999).In sum, the individual components of PsyCap appear predictive both individually and more so collectively.

The four components of PsyCap are considered traits, however, their openness to interventions has lead Luthans and colleagues (e.g., Luthans, Youssef, & Avolio, 2007) to describe them as state-like traits which means they are relatively stable over time unless conscious effort is given to changing them (Luthans & Youssef, 2007).

Luthans and Youssef (2004) provide several examples of how these traits may be enhanced through the use of interventions. First, efficacy can be increased through mastery experiences, vicarious learning, modeling, and positive feedback. In other words, letting individuals practice their skills and receiving constructive feedback about their performance. Hope has been shown to best be developed through training on goal-setting and contingency planning. These types of training help provide individuals with the knowledge to set realistic goals and change those goals if needed. Optimism can be increased through interventions aimed at changing or modifying individual's perspectives so they are more positive about the future and are less concerned with past failures. Lastly, resilience is enhanced through the teaching of strategies that can be used in the face of difficulty.

PsyCap and Flow

PsyCap and its' four components of hope, optimism, resilience, and efficacy would seem then to be a useful framework with which to examine these individual differences for several reasons. First, the components of PsyCap closely relate to the components of the autotelic

personality as described by Csikszentmihalyi (1990). Hope and optimism, as defined within PsyCap (Luthans & Youssef, 2007) incorporate concepts of agency and goal-setting which directly relates to the control component of Csikszentmihalyi's (1990) autotelic personality. Second, Csikszentmihalyi's (1990) discussion of self-consciousness within the autotelic personality is defined in a similar fashion as the attributional styles included in the PsyCap components of efficacy and optimism (Luthans, Youssef, & Avolio, 2007). Additionally, these attributions, specifically the attribution of success to internal traits and attributing failure to situational constraints, are nearly identical to Csikszentmihalyi's (1975, 1990) definition of internal locus of control. These similarities provide the rationale for the first hypothesis of the current study:

H1: PsyCap will positively predict the experience of flow in a flow inducing task.

If supported, the relationship between PsyCap and flow will be more practically useful than the relationship with the autotelic personality due to the fact that PsyCap components are not pure traits and have been shown to increase with targeted interventions (Luthans, Youssef, & Avolio, 2007).

Flow as a Positive State

As stated previously, if flow is a positive construct within the domain of POB then in addition to being related to other positive constructs like PsyCap, it should also function as a positive state. Namely, if the flow experience is a positive one then it should be positively associated with positive affect and performance and negatively associated with negative affect during the experience. Previous research has begun to examine some of these relationships. For instance, flow is predictive of school progress (Csikszentmihalyi, Rathunde, & Whalen, 1993), success in sport competitions (Jackson, Kimiecik, Ford, & Marsh, 1998), and performance in

competitive sporting events (Jackson, Thomas, Marsh, & Smethurst, 2001). Flow was also associated with better in-role and extra-role performance at work, but this relationship was not consistent across all individuals and was moderated by personality characteristics (Demerouti, 2006). In addition to performance, one study (Rogatko, 2009) found that flow was associated with positive affect, however the methodology lacked experimental control and therefore the ability to make strong conclusions.

It is of note that many of the studies cited above lacked experimental control and were conducted in naturalistic settings. Csikszentmihalyi's (1975) early work on flow used a purely qualitative methodology which allowed for rich, detailed descriptions of the flow state that were then used to formulate flow theory. More recently, research examining flow in a variety of natural settings has tended to use an experience-sampling methodology (ESM) which is a longitudinal method developed by Larson and Csikszentmihalyi (1983). ESM involves providing participants with a pager or PDA along with numerous copies of the surveys or questionnaires of interest. The researchers are then able to page participants at fixed or random time intervals which serve as cues for participants to complete measures which assess their thoughts or feelings at that exact moment. This method has several strengths, including the ability to assess both within-individual effects across time and between-individual variation across situations in addition to improving ecological validity by allowing participants to act in natural settings (Fullagar & Kelloway, 2013). Despite these strengths, ESM can potentially be intrusive and disrupt flow states by bringing attention away from the task at hand.

Due to some of the drawbacks with ESM, experimental and laboratory methods have been developed in order to examine flow in more controlled settings (Engeser & Rheinberg, 2008; Keller & Bless, 2008; Keller & Blomann, 2008; Moller, Meier, & Wall, 2010). Much of

this work involves using computer simulations or video-games that allow for the manipulation of the challenge/skill balance while still providing a cognitively complex environment similar to natural settings. This results in increased internal validity through laboratory control while maintaining external validity through the use of tasks which closely resemble natural environments (Fullagar & Kelloway, 2013).

Building off previous naturalistic and ESM based studies, the current study will examine flow as a positive state in a lab setting using a video-game methodology. More specifically, flow will be examined using components of both hedonic and eudaimonic well-being. In this study, hedonic well-being is taken as the presence of pleasure and absence of pain (Ryan & Deci, 2001; Waterman, 1993). Previous research (Fullagar & Kelloway, 2009; Rogatko, 2009) has shown preliminary evidence that flow is associated with positive affect, however, the current study will examine flow and its' relationship with positive and negative mood in a more controlled lab setting. In addition to examining flow in relation to hedonic well-being, the current study will also incorporate an aspect of eudaimonic well-being, namely performance. However, research has shown that positive affect can be an outcome of both eudaimonic functioning (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Ryff & Singer, 1998; Sheldon, Ryan, & Reis, 1996) and flow experiences (Han, 1988; Hull, 1991; Massimini & Carli, 1988) lending some convergent evidence that flow leads to eudaimonic well-being. Given this prior evidence, the current study hypothesizes that flow states will be positively associated with aspects of both hedonic and eudaimonic well-being.

H2a: Flow will be positively associated with PA during the flow task.

H2b: Flow will be negatively associated with NA during the flow task.

H2c: Flow will be positively associated with performance during the flow task.

If supported, these hypotheses will lend convergent evidence to the body of naturalistic flow literature which has already shown some support for the idea that flow is a positive state. However, this assumes that a positive state is merely one in which individual's experience aspects of hedonic and eudaimonic well-being during the task. This study will go further by incorporating flow into an overarching theoretical framework which can guide predictions for the outcomes of flow states.

The Broaden-and-Build Theory of Positive Emotions

Beginning in 1998, Barbara Fredrickson has been examining a wide variety of positive states and emotions to determine their form and function. As a result of this research, Fredrickson has indicated that positive emotions serve a distinctly different purpose than that of negative emotions. The traditional model of emotions asserts that all emotions serve to prime specific action tendencies (Frijda, 1986; Frijda, Kuipers, & Schure, 1989; Lazarus, 1991; Levenson, 1994; Tooby & Cosmides, 1990). Specifically, negative emotions create an urge to engage in a specific behavior or behaviors. For instance, fear triggers the fight or flight response, anger the urge to attack, and guilt the urge to make amends. These responses are thought to be evolved responses and are largely automatic and beyond our control (Fredrickson, 1998). This model has been prevalent and applied to the whole range of emotions. However, Fredrickson believes that such a model may not be appropriate for explaining the role of positive emotions. As a result, the adaptive value and evolutionary role of positive emotions is not equivalent to that of negative ones (Fredrickson, 1998). Fredrickson (1998) states that positive emotions prime general thought-action tendencies as opposed to the specific-action tendencies associated with negative emotions. Negative emotions, by priming specific and evolutionarily adaptive behaviors, serve to narrow thought-action repertoires (Fredrickson, 1998). On the other hand,

positive emotions are not associated with life threatening situations so the immediate priming of behaviors is not necessary. Instead, Fredrickson (1998) asserts that positive emotions serve to broaden one's momentary thought-action repertoire. For example, the emotion of joy (also referred to as happiness) is associated with safe and familiar situations (Izard, 1977) that require low effort (Ellsworth & Smith, 1988). As a result, joy is associated with what is called free activation (Frijda, 1986), the urge to engage in enjoyable situations, or simply play. The term play is used very broadly here in that it can mean physical, social, intellectual, or artistic play, all of which are unscripted and involve exploration and learning. Previous research has also shown that play is associated with the development of several types of skills, such as manipulative-cognitive or social-affective skills (Boulton & Smith, 1992; Dolhinow & Bishop, 1970). As a result, it would appear that the positive emotion of joy and the priming of play activities facilitate the building of numerous skills within individuals. This example also makes it clear why Fredrickson's theory has been titled the broaden-and-build theory, given that it asserts that positive emotions broaden thought action repertoires which in turn build skills.

In addition to formulating the broaden-and-build theory, Fredrickson, as well as others, have built a large empirical base of evidence for the validity of this theory. One line of research examined global or local biases in vision, with the findings demonstrating that negative emotions predicted a local bias whereas positive emotions predicted a global bias indicating a broadened attentional focus (Basso, Schefft, Ris, & Dember, 1996). In addition to broadening attention, several studies conducted by Isen and colleagues demonstrate that positive emotions also broaden the scope of cognition. For instance, individuals in a positive affect group (as opposed to a neutral control) made more unusual associations to neutral words (Isen, Johnson, Mertz, & Robinson, 1985) and used fewer, more inclusive categories when sorting objects (Isen &

Daubner, 1984; Isen, Niedenthal, & Cantor, 1992). Lastly, Isen, Daubman, & Nowicki (1987) demonstrated that positive affect is associated with higher scores on creative thinking tests and tasks. Additionally, Fredrickson has also gathered supportive evidence comparing positive affect to both neutral and negative conditions. For instance, Fredrickson and Branigan (2000) induced positive, negative, or neutral affect in participants and then had them freely respond to the prompt "I would like to". Results indicated that those in the positive condition listed the most responses and that even those in the neutral condition listed significantly more than those in the negative condition. Lastly, and of most relevance to the current study, positive emotions are associated with life satisfaction and ego resilience (the ability to bounce back in the face of difficulty), but more importantly, momentary positive emotions were still highly predictive of resilience when partialling out the effect of overall life satisfaction (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). In sum, evidence from various domains with various populations all suggest that positive affectivity is associated with positive outcomes consistent with the broaden-and-build theory.

Hypothesis 2 utilized the existing, simple definition of a positive state that has been used in most flow research to date. This study will not only attempt to show that flow is a positive state because it is associated with hedonic and eudaimonic well-being during the flow task (H2a, b, and c) but to expand and show that flow is a positive state as defined in the broaden-and-build theory. According to the broaden-and-build theory, if flow is truly a positive state then it should facilitate an upward spiral of beneficial outcomes. In other words, flow should build resources which buffer against future difficulties. Therefore, in order to more fully show evidence of flow as a positive state, it should be positively predictive of positive experiences not only during the flow task (H2) but also during a later, more challenging task. This then leads to Hypothesis 3.

H3a: Flow will be positively predictive of PA during a later, more challenging task.

H3b: Flow will be negatively predictive of NA during a later, more challenging task.

H3c: Flow will be positively predictive of performance during a later, more challenging task.

Lastly, as mentioned above, positive states are associated with an increase in resilience when faced with difficulty (Cohn, Fredrickson, Brown, Mikels, & Conway, 2009). Therefore, if flow is a positive state, the experience should build resilience such that individuals who experience more flow in an earlier task will give greater effort and persist longer during a later, more challenging task. This is directly addressed in Hypothesis 4.

H4a: Flow will be positively predictive of effort in a later, more challenging task.

H4b: Flow will be positively predictive of persistence in a later, more challenging task.

Chapter 2 - Method

Participants

40 undergraduate psychology students from a large Midwestern state university received course credit for their participation in this study. All subjects were recruited through an online system (SONA) which provided a brief overview of the study and allowed participants to sign up for an open time slot. The study overview also instructed participants to not sign up for the study if they had no experience playing RockBand® or similar games. This was done to eliminate the need for participant training by ensuring that each participant had a minimum level of skill to participate. Demographics of the participants were consistent with other undergraduate samples with an average age of almost 19 (M=18.9) and a fairly even split between genders (62% male).

To elaborate, the experimental task RockBand® is music based video game in which players "perform" songs using a guitar controller. The controller is shaped like a guitar and has five colored buttons that correspond to where the frets would be on a real guitar. Additionally, there is a strum button on the body of the guitar which corresponds to where players would strum the strings of a real guitar. The object of the game is then to play along with a certain song. The game has a series of colored bars, or notes, fall from the top of the screen and when they pass a bar along the bottom and line up with the music, the player should press the corresponding colored button and strum. When all put together, the individual gets to simulate playing the guitar or bass part to whichever song they have selected in the game.

Measures

Flow

Flow was assessed using a modified version of the 36-item Flow State Scale (FSS; Jackson, Kimiecik, Ford, & Marsh, 1998). The survey for the present study included four items

for each of the six components of the flow experience as well as the three pre-conditions. This then created 9 sub-scales with 4 items each to allow for examination of the individual components of flow. The scale was modified by adapting some items to reflect the experimental task of playing the video-game RockBand®. Example items include "I felt in total control of what I was doing" and "I played almost automatically". All items were rated on a 5-point Likert scale ranging from 1=Strongly Disagree to 5=Strongly Agree with higher values indicating flow experiences. Alpha for the overall scale at time 1 was found to be .92.

PsyCap

Individual PsyCap was assessed using the 24-item PsyCap Questionnaire (PCQ; Luthans, Avolio, Avey, & Norman, 2007). Again, some items were re-worded slightly to reference a student sample instead of a working adult sample. Example items include "Right now, I see myself as being pretty successful at school" and "If I should find myself in a jam at school, I could think of many ways to get out of it". All items were rated on a 6-point Likert scale ranging from 1=Strongly Disagree to 6=Strongly Agree. Additionally, there were three reverse coded items. Alpha was found to be .85 in the current study. Lastly, the measure can be broken into 4 sub-scales, each pertaining to one of the components of PsyCap.

Affect

Participant affect was assessed using the 20-item Positive Affectivity Negative Affectivy Scale (PANAS; Watson, Clark, & Tellegen, 1988). This scale consists of 10 adjectives each addressing positive and negative affect. Sample positive items include "Proud" and "Enthusiastic" while negative items include "Upset" and "Frustrated". Participants then rated the extant they felt that emotion at that moment using a 5-point Likert ranging from 1=Very slightly or not at all to 5=extremely. The positive and negative items are then summed separately to

provide an overall measure of positive and negative affect and alpha was found to be .85 and .83 at time 1 for the positive and negative items, respectively.

Performance

Performance indicators for the current study were percentage of correct notes played. Several indicators of performance are provided after each song (percent correct, overall score, and longest string), however, percent correct is the least influenced by skill based strategies that not all players are aware of. For instance, participants can go into "overdrive" which allows them to earn an increased point value for each note hit but not all players take advantage of this ability. Therefore, using a percentage of total notes hit provides a more objective and standardized measure of participant performance. This adds to the strength of this study considering much of the previous research on flow has either not utilized measures of performance or utilized subjective ones.

Resilience

Building off Luthans work on resilience (eg: Luthans, Vogelgesang, & Lester, 2006), which defines resilience as the ability to bounce back from adversity, resilience in the current study was operationally defined as effort and persistence in the face of adversity, in this case an overly challenging song. The song was overly challenging because it was selected from the most difficult song category and set at a skill level above what the participant felt comfortable at. To assess resilience, participant's performance was recorded during the challenging task and then one minute clips were pulled from the middle of each recording. This was done to allow participants a chance to engage in the song but not become fatigued or burnt out. These clips were randomly coded and subsequently rated by independent raters on both effort and persistence. Raters were given training prior to the actual coding which consisted of providing

examples of high, medium, and low effort and persistence. High effort was evident by the individual utilizing all the guitar buttons to try and hit all the notes. Low effort was demonstrated by individuals only utilizing one or two buttons to only hit some of the notes. Persistence was defined as the participant maintaining their level of effort, whether high or low, for the duration of the clip. For instance, if a participant started performing with high effort but reduced their effort during the clip, they would be rated as having low persistence. However, if a participant began with low effort but maintained that effort throughout the clip, they would be rated as having high persistence.

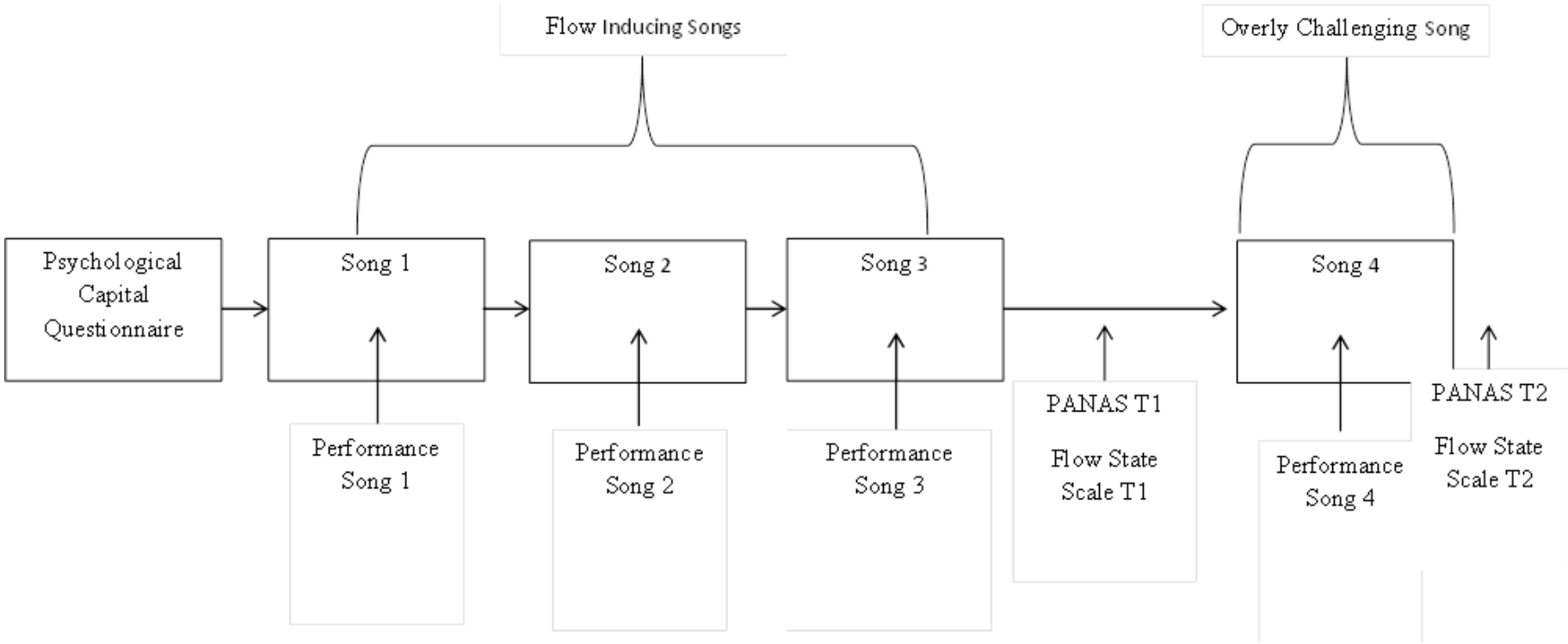
Once the ratings had been conducted, the scores were examined to determine agreement among the raters. First, zero-order correlations between raters were run for both effort and persistence and all were significant. Correlations for persistence ranged from .51(p<.01) to .75(p<.01) and correlations for effort ranged from .69(p<.01) to .73(p<.01). Further evidence for rater agreement is the average measures ICC (LeBreton & Senter, 2008), which demonstrates the reliability of using the average of all rater scores. The average measure ICC was .83 and .72 for effort and persistence respectively indicating it is acceptable to average the rater scores to form a composite for each component of resilience (McGraw & Wong, 1996). Ratings were only conducted for 35 participants due to researcher and technology errors which rendered five video clips missing or incomplete.

Procedure

When participants arrived for the study they were greeted by the researcher, told a brief overview of the procedure and given the informed consent document. If the participant provided consent, the experimenter provided the participant with the first survey, the Psychological Capital Questionnaire. Following completion of the PsyCap measure, participants were

instructed to play three songs of their choosing in RockBand®. Participants were allowed to choose their own songs based on pilot data which indicated that flow was higher in conditions where individuals were able to select their own songs and difficulty instead of having them selected by the researcher. This is also consistent with previous research demonstrating that task autonomy is associated with flow (Eg: Demerouti, 2006; Bakker, 2005). After participants completed the three songs of their choosing they were given the time 1 PANAS and flow scale. The PANAS was given first to capture affect at that moment and reduce any bias that may have been introduced by giving the flow scale first. Upon completion of those two measures, participants were instructed to play an overly challenging song which was recorded by the researcher. Additionally, the difficulty level of the song was set to a level one above what the participant had self-selected during the flow inducing songs. The recordings only captured the video-game monitor screen and are tied only to the random participant number preventing any invasion of privacy or special IRB approval. Following this challenging song, participants were given one more flow measure and PANAS after which their participation was complete. These were then the time 2 measures referred to in later analyses. Participants were then given a debriefing form detailing the study, thanked for participating, and granted course credit for their participation. A visual diagram of the experimental procedure is provided in Figure 2-1.

Figure 2-1 Experimental Procedure



Chapter 3 - Results

Before formally testing the hypotheses of the current study, the data were first examined for outliers, missing responses, or other issues. It should also be noted that data for participants who had no knowledge of playing RockBand® were discarded during the data collection phase. Additionally, participants who clearly did not respond honestly, such as answering all 5's on a scale, were removed during data collection as well. This resulted in data for 40 participants which were then screened for outliers and skewness. An outlier was defined as any data point with a Z-score greater than the absolute value of 3.29 (Tabachnick & Fidell, 2007). By this criterion, two outliers were found for negative affect at time 1 and one was found for time 2 so they were excluded pair-wise from any analyses which included negative affect at that time. Skewness statistics were also examined by dividing the provided skewness values by the standard error of skewness. The resulting values were also compared against the 3.29 standard cut-off and were found to be acceptable (Tabachnick & Fidell, 2007).

Table 3-1 Zero-order Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean	SD
1. PsyCap	(.85)																		4.49	.43
2. Efficacy	.78**	(.67)																	4.40	.58
3. Hope	.79**	.57**	(.80)																4.63	.60
4. Optimism	.60**	.26	.23	(.70)															4.42	.62
5. Resilience	.74**	.46**	.50**	.23	(.71)														4.51	.57
6. Flow	.37*	.25	.29	.23	.31*	(.92)													3.84	.46
7. Balance	.33*	.19	.24	.20	.34*	.85**	(.85)												3.75	.79
8. Goals	.27	.06	.16	.27	.29	.83**	.75**	(.84)											4.14	.73
9. Feedback	.34*	.21	.25	.30	.23	.81**	.79**	.76**	(.86)										4.28	.66
10. Act/Aware	.26	.11	.33*	.08	.24	.76**	.63**	.71**	.57**	(.90)									3.81	.92
11. Concen.	.17	.09	.11	.07	.24	.59**	.49*	.41**	.59**	.26	(.79)								4.12	.60
12. Control	.42**	.28	.34*	.29	.30	.89**	.69**	.69**	.75**	.69**	.59**	(.91)							3.92	.86
13. Self-Consc.	.29	.27	.27	.09	.22	.25	-.02	-.04	-.10	.03	.12	.20	(.77)						3.42	.82
14. Time	-.30	-.07	-.29	-.24	-.28	-.03	-.16	-.08	-.34*	-.08	-.36*	-.21	-.21	(.70)					3.29	.61
15. Autotelic	.20	.23	.07	.21	.06	.59**	.53**	.38**	.51**	.21	.27	.47**	-.03	.12	(.76)				3.83	.64
16. Perf.	.23	.06	.20	.21	.19	.76**	.76**	.72**	.75**	.65**	.39*	.73**	-.10	-.21	.47**	(.85)			87.22	11.85
17. PA	-.00	.17	-.19	.07	-.06	.51**	.44**	.33*	.49**	.23	.37*	.46**	-.12	.17	.63**	.49**	(.86)		3.19	.66
18. NA	-.01	.06	.06	.09	-.26	-.11	-.09	-.09	.14	-.11	.03	-.02	-.49**	.00	.18	.03	.18	(.83)	1.39	.33

Note. N=40 for all variables except T1 NA where N=38. All Flow, performance, and affect measures are from T1. *=p<.05, **=p<.01

To first examine Hypothesis 1, which stated that PsyCap would predict the experience of flow during the flow inducing task, a regression analysis was conducted. First, the composite measure of PsyCap was used to predict the experience of flow. This was done due to the assertion by Luthans, Youssef, and Avolio (2007) that the components of PsyCap combine in a Gestalt fashion meaning PsyCap is better examined as a global construct instead of independent components. Results of this analysis indicated that composite PsyCap was a significant predictor of flow ($F(1, 38)=8.14$, $p<.01$, $\beta=.42$) during the flow inducing task. Additionally, results of this analysis indicated that the PsyCap composite explained nearly 18% of the variance in the overall experience of flow.

Despite the significant results using composite PsyCap to predict the experience of flow, this relationship was examined further. Another regression was conducted; however, this regression used step-wise procedures with the independent factors of PsyCap as predictors of the flow experience. Additionally, this analysis used a Bonferroni adjustment to control for family-wise error resulting in an alpha level of .025. Results of this regression indicated that the hope component of PsyCap was the only significant predictor of flow ($F(1,38)=5.72$, $p<.05$, $\beta=.36$) and explained 13% of the variance in flow. These results indicate that hope is driving the relationship between PsyCap and flow, however, the composite measure still explains almost 5% more variance in the flow experience lending more support to the Gestalt component of PsyCap. It is of note that this could be due to the fact that reliability of a scale increases as a function of the number of items, however, the reliability for the full scale was .85 while the reliability for the hope component was very similar with a .80. Overall Hypothesis 1 was supported in that PsyCap was a significant predictor of flow experiences.

Table 3-2 Regression Analyses Predicting flow from PsyCap

Variable	β	F	F Change	*p*	R^2	R^2 Change
Overall PsyCap	.42	8.14	8.14	<.01	.18	.18
Stepwise						
Hope	.36	5.72	5.72	.02	.131	.131

Following the examination of Hypothesis 1, the hypothesized relationships between flow, positive affect, negative affect, and performance were examined. First, the composite measure of flow was used as a predictor of positive affect, negative affect, and performance during the flow inducing task. In this instance, due to the three outcome variables of interest, a Bonferroni adjustment was made in order to control the family-wise error rate. This resulted in a significance value of α=.017. Using this criterion, composite flow scores were a significant predictor of positive affect ($F(1,38)=13.543$, $p<.01$, β=.51), negative affect ($F(1, 38)=11.79$, $p<.01$, β=-.49), and performance ($F(1, 38)=50.53$, $p<.01$, β=.76). Full results are presented in Table 3-3.

Table 3-3 Regression Analyses Predicting T1 Outcomes from T1 Flow

Variable	β	F	F Change	*p*	R^2	R^2 Change
Positive Affect						
Flow	.51	13.54	13.54	.001	.26	.26
Stepwise						
Autotelic	.63	25.39	25.39	<.001	.40	.40
Negative Affect						
Flow	-.49	11.79	11.79	.001	.24	.24
Stepwise						
Balance	-.53	14.54	14.54	<.001	.28	.28
Performance						
Flow	.76	50.53	50.53	<.001	.57	.57
Stepwise						
Balance	.50	52.35	52.35	<.001	.58	.58
Control	.39	35.53	8.45	.006	.66	.08

Although flow is generally discussed in a composite fashion, it was considered useful to probe these relationships and determine what aspects of the flow experience may be driving the outcomes examined. As was done with PsyCap, step-wise regression was used in order to determine which components of flow had the most influence on the outcomes in question. Again, a Bonferroni adjustment was made to control family-wise error across the three analyses resulting in an α=.017. First, all the components of flow were entered into a stepwise regression to predict positive affect. Results indicated only one significant predictor, the autotelic experience (F(1, 38)=25.39, p<.01, β=.63). The same was done for the prediction of negative affect which again resulted in only one significant predictor, this time challenge/skill balance (F(1, 38)=14.54, p<.01, β=-.53). Lastly, the analysis predicting performance resulted in two predictors, challenge/skill balance (F(1, 38)=52.35, p<.01, β=.50) as well as control (F(2, 37)=35.53, p<.01, β=.39). In sum, all three components of Hypothesis 2 were supported in that flow was associated with positive affect, negative affect, and performance in the directions anticipated.

After testing Hypothesis 2, Hypothesis 3 was examined. Hypothesis 3, using the broaden-and-build theory, stated that if flow was a positive state, it would also influence outcomes in later tasks through the building of cognitive resources. In this case, the same outcomes from Hypothesis 2 were examined (positive affect, negative affect, and performance) but this time during an overly challenging task. As was done in the previous hypothesis, a Bonferroni adjustment was made reducing the alpha level to α=.017. First, overall flow was regressed on the three outcomes but only positive affect and performance were significant; (F(1, 38)=15.70, p<.01, β=.54) and (F(1, 37)=15.71, p<.01, β=.55) respectively. Flow did not predict negative

affect in the later task with (F(1, 37)=.00, p>.05, β=.00). These results, which are presented in full in Table 3-4, confirm H3a and H3c, but not H3b.

Table 3-4 Regression Analyses Predicting T2 Outcomes from T1 Flow

Variable	β	F	F Change	*p*	R^2	R^2 Change
Positive Affect						
Flow	.54	15.70	15.70	<.001	.29	.29
Stepwise						
Autotelic	.52	20.68	20.68	<.001	.35	.35
Concentration	.26	13.24	4.11	.006	.42	.07
Negative Affect						
Flow	.00	.00	.00	1.0	.00	.00
Performance						
Flow	.55	15.71	15.71	<.001	.30	.30
Stepwise						
Action/Awareness	.48	19.56	19.56	<.001	.35	.35
Autotelic	.34	13.50	5.22	.03	.43	.08
Time	-.26	11.48	4.68	.04	.50	.07

In order to examine the significant relationships flow had with positive affect and performance more closely, stepwise regressions were conducted to try and determine which components of flow were most important to positive affect and performance during a challenging task. Again, a Bonferroni adjustment was made but this time the use of only two outcome variables resulted in an alpha level of α=.025. First, the components of flow were entered into a stepwise regression to predict positive affect. Results of this analysis showed the autotelic component to be the strongest predictor (F(1, 38)=20.68, p<.01, β=.52) with the concentration component predicting 6.5% more variance (F(2, 37)=13.24, p<.01, β=.26). This same procedure was used to predict performance and results indicated that one component of flow was a significant predictor of performance when using the adjusted alpha value. The action/awareness component explained 34.6% of the variance in performance (F(1, 37)=19.56, p<.01, β=.48). As shown in Table 3, the autotelic and time distortion components approached significance. To

summarize, flow was only a significant predictor of positive affect and performance lending support to H3a and H3c.

After examining the influence flow had on the outcomes of affect and performance, to incorporate the broaden-and-build theory, it was examined whether flow had an influence on resilience during an overly challenging task. Again, resilience was defined as effort and persistence in the face of adversity so both effort and resilience were rated by trained raters as they observed one minute clips of participant performance during the challenging task. Using an alpha level of α=.025 to control family-wise error, overall flow scores were significant predictors of both effort and persistence during the challenging task; (F(1, 33)=18.16, p<.01, β=.60) and (F(1, 33)=9.52, p<.01, β=.47). These results, shown in Table 3-5, support both H4a and H4b. As was done previously, these relationships were probed to determine which components of flow were most influential. A stepwise regression was conducted using all of the components of flow to predict effort and resulted in the action/awareness component explaining 41.6% of the variance (F(1, 33)=23.51, p<.01, β=.65). The same was done to predict persistence and again the action/awareness component was most significant and explained 29.9% of the variance in persistence (F(1, 33)=14.07, p<.01, β=.55). To conclude, both aspects of Hypothesis 4 were supported.

Table 3-5 Regression Analyses Predicting T2 Resilience from T1 Flow

Variable	β	F	F Change	*p*	R^2	R^2 Change
Effort						
Flow	.60	18.16	18.16	<.001	.36	.36
Stepwise						
Action/Awareness	.65	23.51	23.51	<.001	.42	.42
Persistence						
Flow	.47	9.52	9.52	.004	.22	.22
Stepwise						
Action/Awareness	.55	14.07	14.07	.001	.30	.30

Chapter 4 - Discussion

The above analyses sought to provide support for the overall research question of the current study, whether or not flow is a positive state. First, if flow is a positive state it should be related to positive personality characteristics such as PsyCap. Second, the flow experience itself should be a positive one that results in greater positive affect and performance as well as decreased negative affect. Additionally, utilizing the broaden-and-build theory of positive emotions, it was expected that if flow is a positive state it should also predict positive outcomes in later, more challenging tasks. The outcomes examined after the challenging task were again affect and performance, but resilience components were included as well. Overall, the data lent support to these hypotheses indicating that flow behaves as a positive state.

Before discussing the results in detail, there are some limitations to the study which should be mentioned. First, the flow experienced by participants would best be considered micro-flow. Although Csikszenmihalyi (1990) considers all flow states to be experientially similar and comprised of the same components, participants only had the chance to experience flow over three songs in RockBand. In other settings, such as the workplace or in creative pursuits, individuals may experience prolonged states of flow which potentially last hours. Although it is expected that longer, deeper states of flow would only serve to strengthen the relationships uncovered, future research should empirically examine this assumption.

Another limitation of the current study is that both the flow-inducing and challenging task were of a highly similar nature. Both tasks involved playing RockBand, however, the challenging song required more guitar keys and was at a faster pace than the easier songs. According to the broaden-and-build theory, the influence of positive emotions is not dependent

on how or why the emotion is experienced, but again it would serve the literature well to examine this specifically with flow.

Lastly, flow was induced in a lab setting and not allowed to naturally occur in the workplace so assertions about the applicability of the findings to the workplace have not been specifically confirmed. However, Bakker (2008) conceptualized the work related flow inventory which showed strong relationships with previous flow measures and work outcomes that it is argued the flow state itself does not change depending on the context in which it is experienced. It is asserted that the results of current study are still applicable to the workplace and that by conducting the study in a lab setting, more control was utilized allowing for greater internal validity while resulting in a slight reduction in external validity.

Results of the analyses regarding Hypothesis 1 indicated that overall PsyCap was a significant predictor of the flow experience during the flow inducing task and that the hope component was the strongest predictor. This finding fits with the flow and PsyCap literature. Hope, which is closely tied to efficacy beliefs, a sense of agency, and an internal locus of control, fits very well with Csikzentmihalyi's (1990) description of the autotelic personality. In that work, an autotelic person is one that is more prone to experience and enjoy flow due to their sense of self-efficacy, internal locus of control, and autotelic enjoyment of performing challenging tasks.

Results of the global analysis lend support to the assertion by Luthans and colleagues (Luthans, Youssef, & Avolio, 2007) that PsyCap has a Gestalt component wherein the overall measure of PsyCap can be a better predictor of relevant outcomes than the sub-components independently. The global measure of PsyCap was able to predict 17.6% of the variance in the flow experience, but results of the step-wise regression, which attributed all shared variance to

the strongest independent factor, hope, only explained 13.1% of the variance in flow. This would seem to indicate that the overall measure of PsyCap does have a Gestalt component that can explain more variance in outcomes than the sum of its parts. However, this assertion is still not clear considering these results could have been inflated due to a large amount of shared variance between the components that is being eliminated through a step-wise regression.

The overall results which support the relationship between total PsyCap and flow in a flow inducing task have broad implications as well. Previous work examining flow and personality has used one of two distinct approaches. First, Csikszentmihalyi (1975; 1990) discusses the previously mentioned autotelic personality but this construct is almost entirely defined using the definition of flow. Second, other research has examined flow within more established personality frameworks such as the Big 5 (Demerouti, 2006; Eisenberger, et. al., 2005; Ullen et al., 2011). A similarity between both of these approaches is that in both, personality is considered entirely trait based. In contrast, PsyCap is comprised of state-like traits, meaning individual's trait levels are generally stable but they can be improved through targeted interventions (Luthans & Youssef, 2004; 2007). Therefore, considering the support shown for the relationship between PsyCap and flow, organizations can facilitate more flow experiences through interventions targeting PsyCap.

Hypothesis 2 stated that flow would positively predict positive affect and performance while negatively predicting negative affect during the flow inducing task itself. Results of the analyses indicated that the overall flow scores were significant predictors of all three outcomes in the directions anticipated. This lends more support to the assertion that flow is indeed a positive state. Within POB, a positive state is one that has an impact on important outcomes, which flow demonstrated in the current study, especially through its influence on positive affect and

performance. In other words, flow is a positive state because during flow, individuals feel more positive and perform better. The evidence supporting this finding may provide even broader implications. Eisenberger et al. (2005) demonstrated that the positive relationship between flow and performance is partially mediated by positive mood. Additionally, there has been much research showing there is a positive relationship between positive mood and performance (Bolte, Gotschkey, & Kuhl, 2003; Frederickson & Branigan, 2005; Isen, Daubman, & Nowicki, 1987). These findings are consistent with the broaden-and-build theory (Fredrickson, 1998) which at its core states that positive emotions and states serve to broaden awareness and build resources, both physical and cognitive. The results of the current study add to this body of literature by replicating the relationship between flow and affect and performance during flow in addition to demonstrating a relationship between flow and positive experiences during an overly challenging task. In other words, the flow experience is not only facilitating positive mood which has a positive impact on performance, but it is also building resources which buffer against future difficulties. This information would appear to be valuable to organizational leaders who may increase performance and mood through interventions focused on positive traits and intrinsic experiences.

Further statistical analyses were conducted to determine which aspects of the flow experience were driving the relationship with the positive outcomes mentioned above. It was found that the autotelic component was the strongest predictor of positive affect and explained 40.1% of the variance in the outcome. Within Csikszentmihalyi's (1975) work on flow, the autotelic component encompasses the feelings of intrinsic motivation one experiences while performing a moderately challenging and rewarding task. It is then fitting that using this definition the autotelic component would have the most significant impact on feelings of positive

affect. However, it is of note that there may be some method bias present due the fact that the items addressing the autotelic component on the flow measure tap into the experience of positive emotions. For instance, one item reads "I really enjoyed playing this song". However, through the use of the PANAS, it was shown that the enjoyment from the flow experience translated into an increased experience of specific positive emotions. This is an important finding, especially in the context of the broaden-and-build theory (Fredrickson, 1998) which states that the experience of positive emotions facilitates growth and encourages individuals to seek out more positive experiences. Therefore, in an organizational setting, the positive experience of flow should encourage individuals to seek out more positive or intrinsically rewarding experiences. Lepper, Greene, and Nisbett (1973) demonstrated that increasing extrinsic rewards for task performance resulted in an "overjustification" effect where intrinsic interest in tasks decreased as extrinsic rewards increased. Therefore, organizations would be better suited to increase positive, intrinsically rewarding experiences, such as flow, instead of attempting to increase motivation through extrinsic means. Additionally, since the current study demonstrated that the effects of the positive flow state could be seen even in later, overly challenging tasks, this would indicate that positive experiences can help maintain intrinsic motivation in tasks that are not inherently enjoyable.

In addition to positive affect, stepwise analyses were also conducted to determine which aspects of flow were most significant in predicting negative affect. This time, it was found that the challenge/skill balance component of flow was the most important predictor of negative affect. As the challenge/skill balance is shown in Figure 1, Csikszentmihalyi (1975) illustrates how flow can only occur in the "Goldilocks" area in which challenge and skill are balanced just right. When this balance is not in place, the task becomes boring or frustrating and results in

greater feelings of negative affect. These results also have implications for organizations and lend more evidence to the importance of flow. If an organization wishes to reduce feelings of stress and negative affect in their members, then they must be concerned with the skill of their employees and how their abilities interact with the difficulty of that tasks they are assigned. While it may not be possible to tailor every task to every individual to ensure a perfect balance, organizations could increase autonomy and let members determine how they want to accomplish the task and tailor it to their own skill level. As stated earlier, positive mood partially mediates the relationship between flow and performance (Eisenberger, et al. 2005) and general positive mood has been linked to increased performance (Bolte, Gotschkey, & Kuhl, 2003; Frederickson & Branigan, 2005; Isen, Daubman, & Nowicki, 1987). Therefore, in order to get the most benefit from intrinsically motivated positive states such as flow, one must also be concerned with maximizing positive mood while minimizing negative emotions. In addition to the benefits that stem from encouraging positive emotions at work, negative work place emotions and stress can have costly and severe outcomes as well. Workplace stress is linked to increased absence, greater risk of coronary diseases and weakened immune support, and greater overall feelings of job dissatisfaction (Borritz, et al., 2010; Illies, Dimotakis, & DePater, 2010; Steffy & Jones, 1988). Given this, organizations should be concerned not only with positive moods and the impact they have, but also with negative moods and the dangerous outcomes they may have.

Lastly, analyses were conducted to determine which components of flow were most influential to performance on the flow inducing task. In this case, the challenge/skill balance component was most predictive and explained 57.9% of the variance in performance while the control component explained another 7.8%. It has been shown previously that flow is associated with increased performance in several types of tasks (Csikszentmihalyi, Rathunde, & Whalen,

1993; Jackson, Kimiecik, Ford, & Marsh, 1998; Jackson, Thomas, Marsh, & Smethurst, 2001) but, to the author's knowledge, it has not been more closely examined to determine what aspects of flow lead to the increased performance. One interpretation could be that the positive affect associated with flow could be causing an increase in performance, similar to the moderate relationship between job satisfaction and performance (Judge, Thoreson, Bono, & Patton, 2001). However, the correlation between flow and performance in the current study was $r=.76$, $p<.01$, much higher than the overall $r=.30$ found in the Judge et. Al. meta-analysis. Considering balance was found to be the strongest predictor of performance, followed by control, this is taken as evidence that the relationship between flow and performance is not due to its influence on positive affect. Instead, results of the current study suggest that the close interaction between the individual and the task are driving the performance improvements. By ensuring congruence between the challenge of the task and the skill of the individual, it can be ensured that the task is not too hard or too easy, both of which would result in performance detriments. Second, as Csikszentmihalyi details, when there is a balance between challenge and skill, the individual is utilizing all of their abilities and is fully engaged in the task, something which does not happen when a task is too easy or hard. Lastly, control was also a significant predictor of performance beyond the variance attributed to the balance component. Considering participants were allowed to autonomously choose which songs they wished to play, and the skill level at which they wanted to play them, this may have increased feelings of control over the task which pushed them to perform better. By increasing these feelings of autonomy and control, participants may have had higher intrinsic motivation resulting in higher performance. Again, knowing that organizations are primarily concerned with member performance, results of these analyses would indicate organizations should still be primarily concerned with the balance aspect of flow. Also,

the inclusion of control would lend more support for the notion of increasing autonomy and allowing workers to tailor work tasks to their skill level and thereby increasing their feelings of control, both of which should increase performance.

The primary concern of Hypothesis 3 of the current study was to confirm whether or not flow is a positive state as defined in the broaden-and-build theory (Fredrickson, 2001). As the theory details, positive emotional states build cognitive resources which in turn allow for better functioning in the future, especially in the face of adversity. Although previous research and the previous hypothesis have demonstrated that flow is associated with positive feelings and increased performance during the flow task, little work has been done to examine whether or not the experience of flow can facilitate better functioning in a later task. Results of the hypothesis testing showed that flow in the early task was predictive of positive affect and performance in the later, challenging task. Both of these findings lend support that flow is indeed a positive state that functions similar to other positive states as outlined in broaden-and-build. However, it is theorized that these positive states also buffer against the impact of negative emotions so it was concerning that flow was not related to negative affect in the later task. However, this may be due to the nature of the task. Students inherently enjoy playing video games and negative affect scores in the challenging song were not very large with a M=1.75 and SD=.49.

Step-wise regressions were conducted to determine what aspects of flow were driving the relationship with the outcomes of the challenging song and as was found in Hypothesis 2, the autotelic component of flow was most predictive of positive affect during the challenging song. Additionally, the concentration component also explained an additional 6.5% of the variance in positive affect. As was discussed previously, the strong effect of the autotelic component is congruent with both flow theory as well as the broaden-and-build theory. Csikszentmihalyi

(1990) would argue that the autotelic experience and its feelings of intrinsic motivation through the demonstration of ones' abilities are providing the positive feelings that keep one persisting through the task. On the other hand, broaden-and-build (Fredrickson, 1998) posits that positive states generate positive feelings which encourage individuals to engage in other positive activities which generate positive states and feelings and that this cycle continues in what is termed an upward spiral. In the context of this study, it could be said that flow in the earlier task was building positive emotions which in turn allowed individuals to find and experience more positive moments in the challenging song.

Considering flow was not predictive of negative affect in the later task, no step-wise analyses were able to be conducted but they were conducted for the relationship between flow and performance in the challenging task. Whereas the challenge/skill balance and control components were most predictive of performance during the flow task, the action/awareness merging, autotelic experience, and time distortion factors were most influential in predicting performance during that challenging song. Although one may assume that the challenge/skill balance would still be as influential to performance in a later task, the challenging task was constructed to ensure there was not a balance between challenge and skill. Additionally, the challenging song was faster and used more buttons on the guitar controller than the easier, flow inducing songs. The action/awareness factor of flow deals directly with the speed at which one is able to respond to the challenges of the task at hand and make the required movements almost automatically. In the context of the challenging song, participants who were able to stop thinking and simply perform the song were the ones who performed best. On the other hand, those that had to think about each upcoming note and then how it corresponded to the button presses they would have to make ended up performing more poorly.

The findings for Hypothesis 3 not only show more support for flow being a positive state that has important outcomes, these findings can be taken as even stronger support for the importance of flow to organizations. The support for Hypothesis 2 showed that flow was associated with beneficial outcomes during the flow task, but now there is evidence that flow experiences also impact later tasks, which could be very useful to organizations. As stated previously, it is in the best interest of organizational stake-holders to concern themselves with the positive experiences of their members, especially flow. Evidence form the current study shows that flow is a positive state and can be predicted by positive psychological traits which can also be increased through interventions. As a positive state, flow not only has an impact during the flow experience, but also in later tasks. Additionally, considering flow functions as a positive state according to the broaden-and-build theory, there may be even more spill-over benefits that were not included in the current study.

Results of the regression analyses predicting the resilience outcomes of effort and persistence supported both Hypothesis 4a and 4b. In other words, flow during the early task was able to predict resilience in the challenging task. This support provides further evidence that flow is indeed a positive state as defined within the broaden-and-build theory. Namely, flow appears to build resources that are then able to be used during the performance of a challenging task. Specifically, the more flow a participant experienced in the flow inducing task, the more effort and persistence they demonstrated during their performance in the challenging song.

After probing the flow relationship further, it was found that the action/awareness merging component of flow was the most predictive of both effort and persistence in the final song. In this case, results indicate that individuals who were more able to think and act at the same time, were later more likely to put forth a higher effort for a longer amount of time when

confronted with a challenge. Previous research has even shown that the automaticity of flow has physiological influences as well. De Manzano et al. (2010) demonstrated that high levels of flow were associated with the same physiological responses (smiling, greater respiratory depth, lower blood pressure) as are seen with high arousal, positive emotions like hope and joy. This would indicate that the automaticity of flow is helping individuals remain positive in the face of adversity, as would be predicted by the broaden-and-build theory. However, it is worth noting that this component was also the strongest predictor of performance in the challenging song so the action/awareness and resilience relationship may be influenced by the performance relationship, or vice versa.

As with the results of the other hypotheses, these results have promising implications for organizations. For one, employee's that experience flow, inside or outside the office, will be more resilient when they are challenged at work through an increase in effort and/or persistence. It is unreasonable to expect organization members to never be challenged at work, but results of this study would indicate that if organizations encourage flow when possible, then the benefits of that experience will spill-over into other tasks. Again, work-place stress has negative consequences for both performance and the health of the individual (Borritz, et al., 2010; Illies, Dimotakis, & DePater, 2010; Steffy & Jones, 1988) but flow is associated with positive physiological responses (De Manzano, et al., 2010), increased performance, and increased effort and persistence in the face of difficulty. In sum, by implementing interventions to increase PsyCap among employees and encouraging flow experiences, organizations should see increased performance, increased positive mood, and reduced stress among their members. These benefits should not only be seen in the tasks that are conducive to flow, but also in other, difficult or less intrinsically motivating tasks.

Future Directions

The promising results of the current study, and some of the limitations, should help guide future research. First, future research should examine if the same outcomes are seen when flow is experienced in an entirely different task. It is anticipated that they will, but this should be empirically determined. Second, flow should be examined more in a naturalistic or work-place setting to ensure the findings of the study can be replicated outside of the lab. Additionally, deeper flow should examined in these settings as well. The current study allowed for flow to be experienced, but other, natural tasks, allow for deeper and prolonged states of flow which may have even greater positive benefits. Another need within the flow literature is a closer examination of the flow-performance relationship. All flow research relies on assessing flow during or after the task itself and it may be that individuals who are performing well are more satisfied and more likely to answer positively on a flow measure. It would therefore be useful to try and disentangle the relationship between flow and performance, perhaps through the use of false feedback. Lastly, other positive outcomes of flow states could be examined as well. For one, there is still very little research investigating the physiological impact of flow. Fredrickson (2009) details the numerous physiological benefits of positive emotions so it would be beneficial to see if those same benefits are consistently linked with flow. It would also be useful to examine more workplace outcomes of flow so see if there is an influence on other work characteristics such as overall job engagement and satisfaction, absenteeism, commitment, and pro-social or leadership behaviors. To conclude, flow demonstrated very promising outcomes which provide evidence for its utility as a positive state but future work should examine what other outcomes the positive flow state may provide.

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Appendix A - Informed Consent

INFORMED CONSENT

PROJECT TITLE: Flow as a positive state: Antecedents and outcomes of flow states

APPROVAL DATE OF PROJECT: 07/26/2011 EXPIRATION DATE OF PROJECT: 07/26/2012

PRINCIPAL INVESTIGATOR: CO-INVESTIGATOR(S): Dr. Clive Fullagar, Kyle van Ittersum

CONTACT AND PHONE FOR ANY PROBLEMS/QUESTIONS: Kyle van Ittersum; 314-306-1595; kwvan@ksu.edu

IRB CHAIR CONTACT/PHONE INFORMATION: Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224.

SPONSOR OF PROJECT: Dr. Clive Fullagar

PURPOSE OF THE RESEARCH: MS Thesis

PROCEDURES OR METHODS TO BE USED: Participants will be asked to complete several short surveys and play several songs on the videogame RockBand.

LENGTH OF STUDY: 60 Minutes

RISKS ANTICIPATED: No risks other than those inherent in videogames. We ask that you do not participate if you cannot play videogames safely.

BENEFITS ANTICIPATED: Your data will allow us to better understand the flow experience. Additionally, participants will gain experience seeing how psychological research is conducted.

EXTENT OF Participant's data will only be recorded by random participant number, no names will be

CONFIDENTIALITY:	linked to data in any way. Additionally, all data will be stored in a locked file in a locked office until it can be destroyed.
IS COMPENSATION OR MEDICAL TREATMENT AVAILABLE IF INJURY OCCURS:	N.A

TERMS OF PARTICIPATION: I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty, or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

Participant Name _____

Participant Signature _____ **Date:**_____

Witness to Signature: (Project Staff) _____ **Date:**_____

Appendix B - Debriefing Form

First, we would like to thank you for your participation in our study. Without willing participants like yourself we would be unable to gather valuable data about psychological states and their functioning.

The study you have just participated in seeks to study the psychological experience of flow. Flow is type of intense task absorption that has also been called "being in the zone". Additionally, you were asked to play RockBand because previous research has shown that flow can be experienced during video game play or musical performance. By using this method, we hope to generate flow in the lab in order to collect data on what leads to flow states and what kind of outcomes those states produce. In specific, this study is looking at the personality type variable of Psychological Capital as a predictor of flow while looking at behavioral resilience as an outcome.

We would like to stress again that all your data will remain confidential and anonymous and will be destroyed once sufficient time has passed. If you have any questions or concerns with this study or how it was conducted, feel free to contact to the researchers (kwvan@ksu.edu; Fullagar@ksu.edu), the head of the Psychology department (Frieman@ksu.edu), or the University Research Compliance Office (URCO@ksu.edu).

Thank you again for your participation.

Appendix C - Psychological Capital Questionnaire

Instructions: Below are statements that describe how you may think about yourself **right now**. Use the following scale to indicate your level of agreement or disagreement with each statement.

	Strongly Disagree	**Disagree**	**Somewhat Disagree**	**Somewhat Agree**	**Agree**			**Strongly Agree**		
	1	2	3	4	5			6		
1.	I feel confident analyzing a long-term problem to find a solution.					1	2	3	4	5	6
2.	I feel confident in representing my view area in group meetings.					1	2	3	4	5	6
3.	I feel confident contributing to discussions during classes.					1	2	3	4	5	6
4.	I feel confident helping to set targets/goals in my academic life.					1	2	3	4	5	6
5.	I feel confident contacting people outside of class (e.g., tutors, writing centers) to discuss course work.					1	2	3	4	5	6
6.	I feel confident presenting information to a group of peers.					1	2	3	4	5	6
7.	If I should find myself in a jam at school, I could think of many ways to get out of it.					1	2	3	4	5	6
8.	At the present time, I am energetically pursuing my academic goals.					1	2	3	4	5	6
9.	There are lots of ways around any problem.					1	2	3	4	5	6
10.	Right now I see myself as being pretty successful at school.					1	2	3	4	5	6
11.	I can think of many ways to reach my current academic goals.					1	2	3	4	5	6
12.	At this time, I am meeting the academic goals that I have set for myself.					1	2	3	4	5	6
13.	When I have a setback at school, I have trouble recovering from it, moving on.					1	2	3	4	5	6
14.	I usually manage difficulties one way or another at work.					1	2	3	4	5	6
15.	I can be “on my own,” so to speak, in a class if I have to.					1	2	3	4	5	6
16.	I usually take stressful things at school in stride.					1	2	3	4	5	6
17.	I can get through difficult times in school because I’ve experienced difficulty before.					1	2	3	4	5	6
18.	I feel I can handle many things at a time while in school.					1	2	3	4	5	6

19.	When things are uncertain for me at school, I usually expect the best.	1	2	3	4	5	6
20.	If something can go wrong for me school-wise, it will.	1	2	3	4	5	6
21.	I always look on the bright side of things regarding my academic career.	1	2	3	4	5	6
22.	I'm optimistic about what will happen to me in the future as it pertains to the rest of my academic career.	1	2	3	4	5	6
23.	In school, things never work out the way I want them to.	1	2	3	4	5	6
24.	I approach college as if "every cloud has a silver lining."	1	2	3	4	5	6

Appendix D - Flow State Scale

I would like you to think about **the song you have just played.** This assessment asks about the thoughts and feelings that you may or may not have experienced while playing the song. There are no right or wrong answers. Think about how you felt when playing. Circle the number that best matches your experience from the options to the right of each question.

	Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1. I was challenged by the song, but I believe my playing skills allowed me to meet the challenges.	1	2	3	4	5
2. I made the correct finger movements and actions without thinking about trying to do so.	1	2	3	4	5
3. I knew clearly what I should do.	1	2	3	4	5
4. It was really clear to me when I was playing well.	1	2	3	4	5
5. My attention was focused entirely on the the game and the song that I was playing.	1	2	3	4	5
6. I felt in total control of what I was doing.	1	2	3	4	5
7. I was not concerned with what the researcher was thinking thinking of my playing.	1	2	3	4	5
8. Time seemed to pass very quickly	1	2	3	4	5
9. I really enjoyed playing this song.	1	2	3	4	5
10. My playing abilities matched the challenge of the song.	1	2	3	4	5
11. My playing just seemed to happen automatically.	1	2	3	4	5
12. I had a strong sense of what I wanted to do.	1	2	3	4	5
13. I was aware of how well I was performing the song.	1	2	3	4	5
14. It was no effort to keep my mind on what I was playing.	1	2	3	4	5
15. I felt like I could control what I was doing.	1	2	3	4	5
16. I was not worried about my performance while playing the song.	1	2	3	4	5
17. The way time passed while playing seemed to be different from normal.	1	2	3	4	5

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
18. I loved playing the song and want to play it again.	1	2	3	4	5
19. I felt I was competent enough to meet the demands of playing this song.	1	2	3	4	5
20. I played almost automatically.	1	2	3	4	5
21. I knew what I wanted to achieve.	1	2	3	4	5
22. I had a good idea while I was playing about how well I was doing.	1	2	3	4	5
23. I had total concentration.	1	2	3	4	5
24. I had a feeling of total control.	1	2	3	4	5
25. I was not concerned with how well I was presenting myself to the researcher.	1	2	3	4	5
26. It felt like time stopped while I was playing.	1	2	3	4	5
27. The experience left me feeling great.	1	2	3	4	5
28. The challenge of the song and my skills were at an equally high level.	1	2	3	4	5
29. My fingers moved spontaneously and automatically without having to think.	1	2	3	4	5
30. My goals were clearly defined.	1	2	3	4	5
31. I could tell by the way I was performing how well I was doing.	1	2	3	4	5
32. I was completely focused on playing the song.	1	2	3	4	5
33. I felt in total control of what I was doing.	1	2	3	4	5
34. I was not worried about what the researcher may have been thinking of my playing.	1	2	3	4	5
35. At times, it almost seemed like things were happening in slow motion.	1	2	3	4	5
36. I found the experience of playing this song extremely rewarding.	1	2	3	4	5

Appendix E - PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer using the scale below. Indicate to what extent you felt this way *right now*.

Very Slightly or Not at all	A little	Moderately	Quite a bit	Extremely
1	2	3	4	5

_____ Enthusiastic
_____ Active
_____ Upset
_____ Anxious
_____ Strong
_____ Incompetent
_____ Hostile
_____ Tense
_____ Frustrated
_____ Inadequate
_____ Effective
_____ Irritable
_____ Interested
_____ Nervous
_____ Proud
_____ Alert
_____ Excited
_____ Attentive
_____ Bored
_____ Determined