The development and validation of a work-flow scale

by

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B.A., University of Pune, 2008
M.A., University of Pune, 2011
M.A., Louisiana Tech University, 2013

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Psychological Sciences
College of Arts and Sciences

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Manhattan, Kansas

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Abstract

The definition of flow has been put forth by Csikszentmihalyi (1975) as “the holistic sensation that people feel when they act with total involvement”. Even though the original definition of flow has been widely accepted, there still exist varied approaches to measure the construct. Despite there being several scales that measure flow, there are still a number of psychometric issues associated with the measurement of flow. This dissertation attempts to address these issues, by first, developing a measure of flow in the workplace, by operationalizing flow based on its original definition. In the first study, items in the scale were developed to measure the dimensions and the preconditions of flow. Based on the results of the first study, models that measured the dimension and the preconditions of flow, separately, showed the best fit. Furthermore, a nomological network was examined in the second study to assess the construct validity of the scale. Results did show convergent and divergent validity flow had with its antecedents and consequences, but the model did not show a good level of fit. Partial and full mediation models, with job satisfaction as a mediator are also examined in the second study. The partial mediation model showed the best fit. Finally, concurrent validity of the scale was also examined, by correlating it with the Work-Related Flow Scale (Bakker, 2008), results of which showed a moderate correlation ($r = 0.66$), thereby suggesting that there was a difference in the manner in which both scales measured flow. Current research not only provides a theoretically developed short measure of flow, but also, by examining job satisfaction as a mediator, provides insight and evidence into how job satisfaction can influence certain consequences faced by employees.

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Acknowledgements

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Chapter 1 - Introduction

The Development and Validation of a Work-Flow Scale

"*Most enjoyable activities are not natural; they demand an effort that initially one is reluctant to make. But once the interaction starts to provide feedback to the person's skills, it usually begins to be intrinsically rewarding."* ***Mihaly Csikszentmihalyi***

"In a world allegedly ruled by the search for money, power, prestige, and pleasure, it is surprising to find certain people who sacrifice all those goals for no apparent reason, such as risking their lives climbing rocks, devoting themselves to art, or spending their energies playing chess" (Csikszentmihalyi, 1975). The management of behavior was initially based on the implicit belief that people were motivated only by external rewards or by the fear of external punishment (Csikszentmihalyi, 1975). That individuals might engage in an activity because the activity is perceived as rewarding, in and of itself, is a notion that has not always been prevalent in the motivational literature (Deci, 1975; Cooper, 2018; Fullagar & DelleFave, 2017). The commonsense assumption was that extrinsic rewards, like money and status, were basic human needs. But there were good reasons to believe that striving for material goods was in great part a motivation that a person learned as part of their socialization into a culture (Csikszentmihalyi, 1975).

According to Csikszentmihalyi (1975) one of the problems associated with using extrinsic rewards as an incentive for reaching goals is that extrinsic rewards are, by nature, either scarce or expensive to attain. The same sort of argument holds for the other forms of extrinsic rewards, which include power, prestige and esteem. Although these are in many ways different from each other, they are all based on unwanted and undesirable comparisons between persons. Because of such comparisons, when a social system learns to rely exclusively on extrinsic

rewards, it tends to create a sense of alienation among its members and can place a drain on material resources (Csikszentmihalyi, 1975).

Flow has been defined by Csikszentmihalyi (1975) as "the holistic sensation that people feel when they act with total involvement". According to Csikszentmihalyi, Abuhamdeh, and Nakamura (2005), "flow is a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue and everything else but the activity itself". Flow theory explains why people perform time consuming, difficult, and dangerous activities for which they receive no apparent external reward.

Even though the concept of flow has not been extensively studied in the workplace, there are a number of studies that suggest that flow is important at work. Flow has been found to be related to different well-being outcomes including positive mood (Fullagar & Kelloway, 2009) and energy at the end of the day (Demerouti, Bakker, Sonnentag, & Fullagar, 2012). Flow has been found to be related to important organizational behaviors as well. Flow has been found to have a strong positive relationship with both in-role and extra-role performance (Demerouti, 2006; Eisenberger, Jones, Stinglhamber, Shanock, & Randall, 2005). Even though both these studies identified personality factors that moderated the relationship between flow and performance, they did support the notion that flow is important in an organizational context (Simmons, 2015).

Since its initial conceptualization (Csikszentmihalyi, 1975), and regardless of the methodology that has been used to study flow, the construct has been conceived as a multi-dimensional one. There still exists however, a certain level of disagreement among researchers as to how flow should be measured (Moneta, 2012). A valid and reliable instrument that measures flow in the workplace would assist in progressing research on the flow experience in

organizational settings, which is the purpose of the current dissertation. Currently, The Work-Related Flow Scale (WOLF; Bakker 2008) is the predominant scale that is used to measure flow in the workplace. However, Bakker's operationalization of flow at work is not conceptually grounded in flow theory (for reasons that will be explicated below). This dissertation has two aims; (1) to develop a reliable and psychometrically sound work-flow scale that is conceptually based on Csikszentmihalyi's (1975) definition of the construct using rigorous scale development practices put forth by Hinkin (1995); and (2) to develop a nomological network to establish the construct validity of the scale by demonstrating its convergent and discriminant validity.

The Concept of Flow

The main goal of Csikszentmihalyi's (1975) early studies was to begin exploring activities that appear to contain intrinsic rewards and that did not rely on extrinsic incentives, (Csikszentmihalyi, 1975). For this reason, he looked at activities such as rock climbing, dancing, playing chess and basketball. Csikszentmihalyi (1975) assumed that there was an unbridgeable gap between 'work' and 'leisure'. To maintain this gap a few occupations were also included in the study, such as surgeons and teachers. By understanding what makes leisure and work activities enjoyable he hoped to learn how to decrease dependence on extrinsic rewards in other areas of life. The simple goal of the study was to understand enjoyment in the moment and not as compensation for past desires, or as preparation for future needs, but as an ongoing process that provided rewarding experiences in the present.

Csikszentmihalyi (1975) conducted pilot interviews with sixty respondents, including hockey and soccer players at a college, spelunkers and explorers, a mountain climber of international reputation, a champion handball player, and a world-record long-distance swimmer. From these interviews, a more structured questionnaire was developed. Using these

questionnaires, a broader sample of individuals involved in similar activities was surveyed. All participants that were studied had one thing in common; they consisted of people who devoted a lot of energy to some activity which yielded minimal extrinsic rewards. It was these studies and this understanding that basically laid the foundation for the theory of flow.

Research conducted on flow indicates that the experience of flow consists of the following six components or characteristics (Nakamura & Csikszentmihalyi, 2009):

1. ***An intense focus and concentration on the task at hand***: Total concentration on the task at hand occurs when in flow. Total concentration is one of the most commonly mentioned flow dimensions (Csikszentmihalyi, 1990).
2. ***A merging of action and awareness in that the activity becomes spontaneous and automatic***: Involvement in the flow activity is so deep that it becomes spontaneous or automatic. There is no awareness of self as separate from the actions one is performing (Jackson & Marsh, 1996).
3. ***A sense of control over what one is doing***: A sense of exercising control is experienced without the person actively trying to exert control. What seems critical to this dimension is that it is the potential for control, especially the sense of exercising control in difficult situations that is central to the flow experience (Jackson & Marsh, 1996).
4. ***A loss of self-consciousness and a lack of concern for, or about oneself***: Concern for the self disappears during flow as the person becomes one with the activity. The absence of preoccupation with self does not mean the person is oblivious of what is happening in mind or body, but rather is not focusing on the information normally used to represent to oneself who one is (Jackson & Marsh, 1996).

5. ***A transformation of one's perception of time passing***: Time may simply become irrelevant and out of one's awareness when performing the activity (Jackson & Marsh, 1996).
6. ***A sense of enjoyment in the intrinsic motivation of the activity (autotelic experience)***: This dimension is described by Csikszentmihalyi (1975) as the end result of being in flow. It is illustrated by statements such as "*really enjoy the experience*" and "*leaves you on a high*."

Flow experiences are relatively rare in everyday life but almost everything, work, play or a religious ritual, is able to produce them providing certain preconditions are met, which are considered necessary and important to induce flow (Fullagar & Van Krevelen, 2017):

1. ***Challenge and Skill***: First flow tends to occur when there is a balance between perceived challenges and perceived skills. When perceived challenges and perceived skills match, attention is completely absorbed. This balance, however, is intrinsically fragile. If challenges begin to exceed skills, one typically becomes anxious, and if skills begin to exceed challenges, one relaxes and then becomes bored. Typically, both skills and challenge must be at a moderate to high level to experience flow (Fullagar & VanKrevelen, 2017; Csikszentmihalyi, 1975).

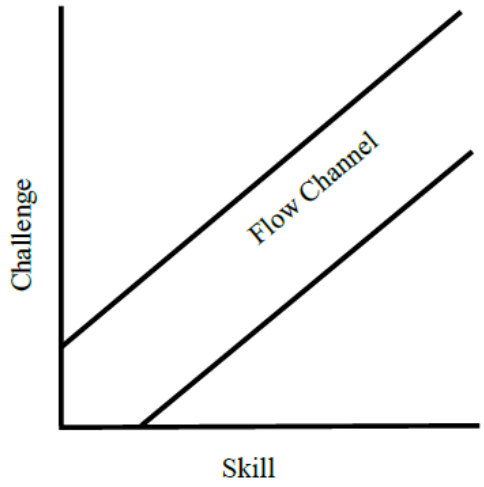

Figure 1. The balance between challenge and skill (adapted from Csikszentmihalyi, 1990, p. 70)

2. ***Clear Goals***: The second precondition of flow is that the activity engaged in should have clear and proximal goals (Csikszentmihalyi, 1990). These goals serve to add direction and purpose to behavior (Csikszentmihalyi, 1990). Their value lies in their capacity to structure experience by channeling attention rather than being ends in themselves (Fullagar & VanKrevelen, 2017).
3. ***Unambiguous feedback***: Finally, flow is dependent on the task providing immediate feedback. The individuals need to continually negotiate the changing task demands. It is the task that informs the individual how well he or she is progressing in the activity and dictates whether to adjust or maintain the present course of action (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005).

The term “flow” is derived from the descriptions provided by several of Csikszentmihalyi’s (1975) original interviewees, who recurrently emphasized the fluid process of playful effort and concentration, as similar to "being carried along on a stream of water” (Csikszentmihalyi, 1975).

These early investigations produced valuable insights about the nature of flow at work. First, the reasons for enjoying work and leisure activities were similar. Consistently, and regardless of domain, people reported being engaged in an activity because it provided a sense of enjoyment and the opportunity to use and develop skills. Second, the psychological characteristics, such as intense concentration, action/awareness merging, sense of control, loss of self-consciousness, time distortion, and enjoyment, as well as the preconditions of flow, were relatively reliable and constant across all the types of activities studied and the methods used. Third, and possibly most importantly, regardless of whether individuals were climbing mountains, or performing surgery, they tended to report enjoying those activities that enabled them to challenge the limits of their abilities and provide an opportunity for their expansion. Furthermore, these early findings suggested that the dichotomy between work and leisure activities may be random and perhaps even pointless (Csikszentmihalyi, 1975; Fullagar & VanKrevelen, 2017). Csikszentmihalyi's (1975) early research also opened the door to studying the nature of flow experiences at work.

Flow at work

Even though the concept of flow has not been widely studied in the workplace, there are a number of studies that indicate that flow is important at work. Growing evidence has shown that workers tend to spend more time in flow during work rather than in leisure activities (Fullagar & VanKrevelen, 2017). In terms of the research that has been conducted on flow, and given the fact that flow is a positive psychology construct, it is not surprising that relationships have been found between flow and physical and psychological wellbeing (Steele, 2006) and positive mood (Eisenberger et al., 2005). Furthermore, studies conducted on flow in the

workplace have also provided empirical evidence about the antecedents and consequences of flow in an organizational context.

In spite of having a strong theoretical foundation, there have been issues with measuring flow conceptually, as well as psychometrically, particularly in the workplace. Flow experience at work has predominantly been measured with The Work-Related Flow Scale (WOLF; Bakker, 2008; Demerouti et al, 2012; Makikangas, 2010; Salanova et al, 2006). There are, however, a number of theoretical and psychometric issues associated with this scale, which will be discussed in the next section. Given the inconsistencies and problems that are associated with the measurement of flow in general and specifically in the workplace, the main purpose of the current dissertation is to extend the critical evaluation of existing measures of flow and then to propose the development of a new measure of work-flow based on rigorous scale development practices like those set forth by Hinkin, (1995) and Crocker & Algina (1986). Furthermore, the second part of this study will also assess the construct validity of the newly developed scale by examining its convergent and discriminant validity through a nomological network.

Measurement of Flow

Given the complexity in defining flow it is probably not surprising that approaches to measuring it have varied. Since the inception of the concept of flow by Csikszentmihalyi (1975) there have been a number of issues and changes related to its conceptualization and measurement. The concept of flow originally emerged out of qualitative interviews conducted by Csikszentmihalyi (1975) investigating the experiences that people have when they are completely involved in what they are doing. Typically, flow has been measured qualitatively, by employing the Experience Sampling Method (ESM; Csikszentmihalyi et al, 1977) and quantitatively with different types of questionnaires and scales. This dissertation is an attempt to

address the limitations of the different methods that are currently being used to measure flow in the workplace, by developing a psychometrically valid and reliable scale.

Models of Flow

According to Engeser and Schiepe (2012) the definition of flow has changed very little since Csikszentmihalyi's (1975 /2000) original conceptualization in 1975. Even though there is strong agreement among researchers on the definition itself, there is some level of disagreement as to how flow should be measured (Moneta, 2012). According to Moneta (2012) the main reason for issues regarding the measurement of flow can be understood by recognizing the path from the theoretical definition to the operationalization of flow. When researchers use a particular measurement method in order to test specific predictions derived from a theory, they typically simplify the theory and condense it into a simpler and more precise model. Modeling is helpful because it allows "the testing of abstract relationships expressed in natural language on real-world data using statistics" (Moneta, 2012, p.24). Moneta (2012) discusses the different models of flow that researchers have developed over a period of time, which have added to the confusion in operationalizing flow.

The conceptualization of flow began with the graphic model that was first put forth by Csikszentmihalyi (1975). According to the graphic model, (see Figure 1), the world of experience is partitioned into three states. The first state is the flow state that is perceived to occur when there is a balance of perceived challenges from the activity and perceived skills to carry out the activity. This can occur when both challenges and skills are low, medium or high. The second state is the anxiety state that is posited to occur when the perceived challenges put forth by the activity exceed the perceived skills in carrying out the activity. The third state, the boredom state, is said to occur when the perceived skills to carry out the activity far exceed the

perceived challenges offered by the activity. One of the main criticisms of this model is the emphasis placed on challenge and skill to assess flow. This model fails to consider all the identified dimensions of the flow experience, as well as other preconditions of flow such as feedback and goal clarity (Moneta, 2012).

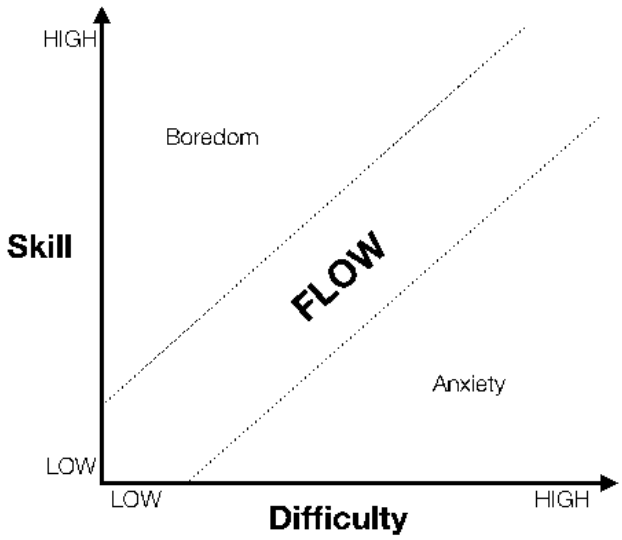

Figure 2. The graphic model of the flow state (adapted from Csikszentmihalyi 2002, p.196)

The second model Moneta (2012) discusses is the quadrant model developed by Csikszentmihalyi and LeFevre (1989), which divides the world of experience into four main states namely, flow, anxiety, boredom, and apathy (see Figure 2). The model represents flow as a state in which a participant perceives challenge and skill greater than the weekly average and in relative balance with each other (Moneta 2012). According to this model two main conditions have to be satisfied in order to experience flow. First, there should be a balance between challenge and skill, and second, both challenges and skills should be moderate to high compared to their weekly average. The main difference between the quadrant model and the graphic model of flow is the addition of the "apathy" state, which is considered to be the least positive of the four states. Therefore, the initial claim that flow occurs when challenges and skills are in relative

balance with each other independently of their level was abandoned in favor of a more complex representation (Moneta, 2012). The main strengths of the quadrant model include its simple classification system. It also allows performing simple tests of the core predictions made by flow theory (Moneta, 2012).

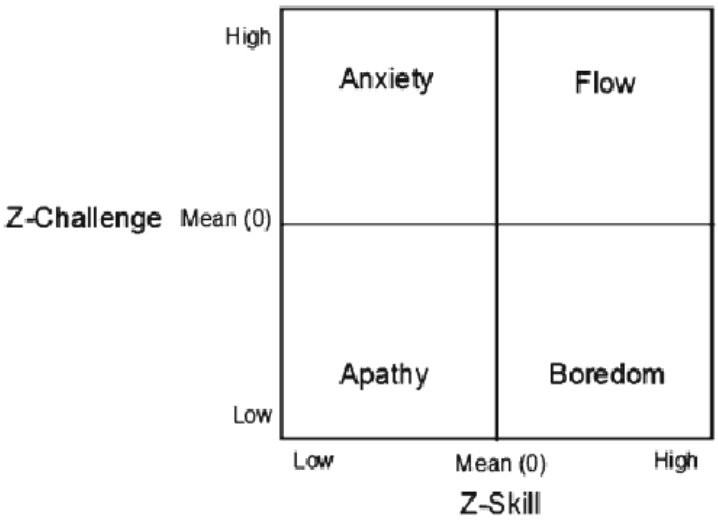

Figure 3. The quadrant model of the flow state (Adapted from Csikszentmihalyi & LeFerve, 1989, p.74)

The third model Moneta (2012) discusses is the experience fluctuation model. Similar to the quadrant model the experience fluctuation model represents flow as a state in which a participant perceives challenge and skill greater than the weekly average and in relative balance. However the experience fluctuation model provides a narrower operationalization of the constructs of challenge/skill balance by showing various combinations between the levels of perceived challenges and skills which are reported in terms of eight different ratios between the individual's standardized challenge and skill score (Moneta 2012). The different ratios are (1) high challenges and average skills (Moneta, 2012), (2) high challenges and high skills (flow) (Moneta, 2012) (3) average challenges and high skills (Moneta, 2012) (4) low challenges and high skills (boredom) (Moneta, 2012) (5) low challenges and average skills (Moneta, 2012) (6)

low challenges and low skills (apathy) (Moneta, 2012) (7) average challenges and low skills (8) high challenges and low skills (anxiety) (Moneta, 2012). These eight situations are represented visually in Figure 3. This model also shows a more detailed characterization of the non-flow states compared to the quadrant model. However, being a classification system, the experience fluctuation model does not allow testing of the implicit assumptions underlying the classification itself (Moneta 2012).

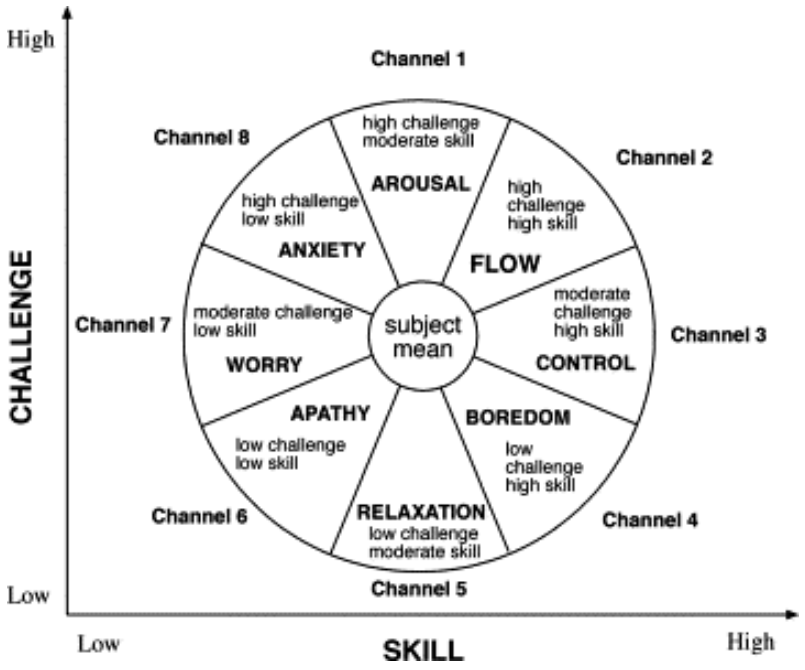

Figure 4. The experience fluctuation model of the flow state (Adapted from Massimini et al. 1987)

A regression model was then adopted by researchers to overcome the limitations where the experience of flow was interpreted as the equivalent ratio of perceived challenges from the activity to perceived skills in carrying out the activity (Moneta, 2012). The regression model was developed to:

(a) determine if the balance of challenges and skills matter (Moneta, 2012),

(b) identify a model of subjective experience, as opposed to a classification model that somewhat randomly assigns observations to channels or quadrants (Moneta, 2012), and

(c) use an estimated model as opposed to an imposed model in order to identify the optimal challenge/skill ratio and the extent to which the effects that challenges, skills, and their balance have on subjective experience, vary between individuals (Moneta, 2012).

The regression model however does not come without its limitations. First, according to the regression model many facets of subjective experience such as concentration, and interest in the activity are predicted by challenge and skill independently as well as by their relative balance (Moneta & Csikszentmihalyi, 1996). Moneta and Csikszentmihalyi (1996) conducted a study in which they used the Experience Sampling Method (ESM) on a sample of 208 talented adolescents to measure daily variations in four dimensions of experience (concentration, wish to do the activity, involvement, and happiness) in four contexts (in school, with relatives, with friends, and in solitude). Moneta and Csikszentmihalyi (1996) found that the balance of challenge and skills had a positive effect in some contexts and little or no effect in others. Furthermore, even within the same context, the balance of challenge and skill had a positive effect on one dimension of experience with little or no effect on others (Moneta and Csikszentmihalyi, 1996). For every context, the dimensions concentration, involvement, and happiness were found to reach their maximum expected values when challenges and skills were both highest. Second, there was also the conceptual problem with flow similar to the previous models where only challenge and skill was taken into consideration in measuring it.

The models discussed above were definitely original at the time they were developed and proved to be innovative in generating many insightful and robust findings (Moneta, 2012). These models however are not psychometrically sound. All the models discussed placed a significant emphasis on challenge and skill balance without giving an equal level of importance to the other dimensions and preconditions of flow. A number of researchers have found that the balance of

challenge and skill is not sufficient to explain the experience of flow. There were also problems with the operationalization of flow-conducive situations characterized as 'above-average' levels of challenge and skill (Moneta, 2012). While challenge and skill balance is an important precondition to flow, it is not the only one. There are two more preconditions that are considered important to induce flow (Keller & Bless, 2008). In addition to a balance of challenge and skills, the second precondition of flow is that the task should have clear intrinsic and proximal goals (Csikszentmihalyi, 1990, 1997). The final precondition to flow is that the task should provide the individual with clear feedback, particularly with respect to how much progress is being made toward achieving the goals inherent in the task (Csikszentmihalyi, 1990; 1997). The models do not focus on the other two preconditions. These preconditions may be argued to be structural task characteristics rather than components of the subjective experience of flow (Nakamura & Csikszentmihalyi, 2009). In order to measure flow appropriately, it is important to also assess the three preconditions. Focusing on one aspect of a construct can lead issues with validity, particularly construct underrepresentation, making the assessment too narrow by failing to include important dimensions and facets of the construct (Messick, 1995). Construct underrepresentation is also considered a major threat to construct validity (Messick, 1995).

Due to the psychometric limitations of the previous models researchers turned to the componential model to study flow. The componential model is a measurement model which involves the development and validation of questionnaires, by focusing on construct validity, which is customarily assessed with a confirmatory factor analysis (Moneta, 2012). According to Moneta (2012) the variation in these models has resulted in confusion regarding the measurement of flow over the years which will be discussed in detail later.

Csikszentmihalyi (1975) initially measured flow qualitatively when he tried to capture the phenomenon in detail by conducting in-depth interviews with groups of people, such as soccer players, hockey players, chess players and rock climbers, who reported doing activities without obvious external rewards (Csikszentmihalyi, 1975). In doing this, Csikszentmihalyi (1975) approached individuals who were involved in these autotelic activities and simply asked them why they were performing those activities. Pilot interviews were conducted with respondents. Firstly, from a psychometric standpoint, the main issue with collecting qualitative data is reliability and validity. Because of the subjective nature of qualitative data, it is challenging to apply conventional standards of reliability and validity. Because of the primary role played by the researcher in the generation of data, it is not possible to replicate qualitative studies. Also, contexts, situations, events, conditions, and interactions cannot be duplicated to any extent nor can generalizations be made with any confidence to a wider context other than the one studied (Mason 2010). Second, considering that conducting interviews is a labor-intensive process, the sample size for the study was also small. Because of the time and costs involved, qualitative designs also do not generally draw samples from large-scale data sets (Luborsky & Rubenstein, 2011). Since Csikszentmihalyi primarily used the interview method in his study, it is important to mention that the trade off with using the interview method is that first, while producing informative insights with regard to the description of flow and the shared characteristics, it does not allow an easy comparison between individuals because of its qualitative nature. This makes it even more difficult to quantify the influence of the context and other variables. Secondly, even though individuals describe their flow experience in their own words, participants tend to report it retrospectively. Therefore, it may be hard to remember every detail afterward which can further influence the results as well produce inaccurate data. Third,

the method to select participants was neither random nor stratified. Random sampling is one of the fundamental steps in designing an experimental study. The advantage of having a random sample is the elimination of sampling bias, which refers to an error in selecting participants for a scientific study such that the results are distorted (Neilson et al, 2017). For purposes of the current study the sample will be collected online through Amazon Mechanical Turk. Even though the sample essentially will be a convenience sample studies have found that Mechanical Turk holds promise for conducting research in the social sciences. For instance, Buhrmester et al. (2011) found that data provided by MTurk participants had satisfactory psychometric properties comparable to characteristics of published studies.

The Flow Questionnaire (FQ; Csikszentmihalyi, 1975)

The interviews conducted by Csikszentmihalyi (1975/2000) with participants produced a wealth of textual descriptions of the flow experience. Some of the most insightful explanations were selected and then condensed to create the first measurement method for flow, the Flow Questionnaire (FQ; Moneta, 2012). The FQ presented respondents with several passages describing the flow state by asking (a) whether they have had the experience, (b) how often, and (c) in what activity contexts (Csikszentmihalyi & Csikszentmihalyi, 1988). The FQ consists of both open-ended questions and scaled items inquiring about respondents' flow experiences, which can make it problematic to classify it as a questionnaire because questionnaires usually have a closed answer format. Understanding how the FQ measures flow requires an assessment of the key sections of the questionnaire, and the rating format. Some of the key sections of the Flow Questionnaire have been listed below (Csikszentmihalyi and Csikszentmihalyi 1988; Moneta, 2012).

Table 1. Flow Questionnaire (Adapted from Csikszentmihalyi and Csikszentmihalyi, 1988b p.195)

1. Please read the following quotes:

My mind isn't wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don't seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems.

My concentration is like breathing I never think of it. When I start, I really do shut out the world. I am really quite oblivious to my surroundings after I really get going. I think that the phone could ring, and the doorbell could ring or the house burn down or something like that. When I start I really do shut out the world. Once I stop I can let it back in again.

2. I am so involved in what I am doing. I don't see myself as separate from what I am doing.
3. Have you ever felt similar experiences?
4. If yes, what activities were you engaged in when you had such experiences?
5. Please write here the name of the activity—among those you quoted, if any—which best represents the experience described in the three quotations, that is, the activity where you feel this experience with the highest intensity.
6. On the next pages, there are a number of items referring to the ways people could

Item 1 presents three quotes that vividly describe the flow experience. Item 2 entails just a yes/no answer and hence allows classifying participants into flow-ers (i.e., those who experienced flow in their lives) and non-flow-ers (i.e., those who did not experience flow in their lives). The following sections are directed only to flow-ers. Item 3 asks them to freely list their

flow-conducive activities. Item 4 asks participants who reported two or more flow-conducive activities to select one activity that best represents the experience described in the quotes, that is, the best flow-conducive activity. Item 5 asks respondents to rate their subjective experience when they are engaged in the best flow-conducive activity and in other activities, such as work or being with family (Moneta 2012). Respondents are asked to rate their subjective experience along 12 dimensions related to the flow experience (Mayers 1978). The ratings are made on an 8 point semantic differential scale (Csikszentmihalyi, 1975). The rating dimensions are:

1. "I get involved".
2. "I get anxious".
3. "I clearly know that I am supposed to do".
4. "I get direct clues as to how well I am doing".
5. "I feel I can handle the demands of the situation".
6. "I feel self-conscious".
7. "I get bored".
8. "I have to make an effort to keep my mind on what is happening".
9. "I would do it even if I didn't have to".
10. "I get distracted".
11. "Time passes (slowly…fast)".
12. "I enjoy the experience, and/or the use of my skills" (Moneta, 2012, Csikszentmihalyi, 1988).

The FQ (Csikszentmihalyi and Csikszentmihalyi 1988; Moneta, 2012) enabled assessing the prevalence of flow across genders, age groups, occupations and cultures. The quotes in the FQ did capture the core of the construct as it is defined by Csikszentmihalyi (1975, 2000). The

flow quotes directly capture merging of action and awareness with statements such as “I don’t see myself as separate from what I am doing” (Moneta, 2012), centering of attention with “my concentration is like breathing I never think of it” (Moneta, 2012), and loss of self-consciousness with “I am less aware of myself and my problems” (Moneta, 2012), autotelic nature, feeling of control, and coherent, non-contradictory demands and feedback (Engeser, 2012 ;Csikszentmihalyi, 1975/2000; Moneta, 2012). However, by providing quotes that vividly described the flow experience the experimenter gets the participant to respond in a way that they want, thereby exhibiting method bias. Method biases are one of the main forms of measurement error. It “implies to variance that is attributable to the measurement method rather than to the construct of interest” (Podsakoff et al, 2003, p. 879). Measurement error can further threaten the validity of the conclusions about the relationships between measures (Podsakoff et al, 2003). It is also commonly recognized to have a random and a systematic component (Bagozzi & Yi, 1991; Nunnally, 1978; Spector, 1987). The Flow Questionnaire also asks respondents to freely list the activities in which they experience flow, therefore the FQ can be used to measure the prevalence of flow in specific contexts. Finally, by virtue of asking individuals who experience flow to rate the various aspects of a subjective experience, the FQ allows testing whether subjective experience is more positive in the flow state or in the anxiety or boredom state (Moneta, 2012). Also, by measuring challenge and skills as a part of the flow inducing activity, the FQ allows testing whether flow occurs when challenges and skills are in relative balance with each other (Moneta, 2012).

In addition to method bias, the FQ does demonstrate additional weaknesses. First, the FQ does not allow a straightforward assessment of how perceived challenges of the activity, perceived skills required to perform the activity, and the ratio of the two variables influence the

occurrence of the flow state. This is because participants are asked to suggest their *average* challenge and skill levels in the best flow-conducive activity, and hence they are not necessarily conveying challenge and skill levels when in the flow state (Moneta, 2012). The problem is that an average rating is also affected by the frequency with which flow versus other states, such as anxiety and boredom, which are associated with other challenge/skill ratios is experienced in the best flow-conducive activity (Moneta, 2012). Second, and perhaps the most significant weakness of the FQ, is that no study has assessed the psychometric properties of this scale. As a result, there is no data available regarding the reliability or validity of the Flow Questionnaire (Csikszentmihalyi and Csikszentmihalyi 1988), making it highly questionable to use this scale to assess flow.

The Experience Sampling Method (ESM; Csikszentmihalyi et al, 1977)

In addition to questionnaires, Csikszentmihalyi et al (1977) also employed the Experience Sampling Method (ESM) to measure flow as a state. According to Larson and Csikszentmihalyi (2019, 2014, p.21), "The Experience Sampling Method is a research method for examining what people do, feel, and think during their daily lives." It comprises asking individuals to provide systematic self-reports at random occasions during the waking hours of a normal week (Larson & Csikszentmihalyi, 1983, 2014). Sets of these self-reports from a sample of individuals create an archival file of daily experience (Larson & Csikszentmihalyi, 1983, 2014). Using this file, it becomes possible to address such questions as: How do people spend their time? What do they typically feel like when engaged in various activities? How do men and women, adolescents, adults, as well as disturbed and normal samples differ in their daily psychological states? (Larson & Csikszentmihalyi, 2014). In short, ESM features repeated measurements of the same participants as they go about their daily lives, with a focus on assessing variables that fluctuate

over the short term. Participants are asked to report their current or very recent affect, behavior, thoughts, and/or situational context several times per day for one or more weeks (Nakamura & Csikszentmihalyi, 2002). From the start on, ESM concentrated on sampling not only activities but also cognitive, emotional, and motivational states, providing a means for building an efficient phenomenology (Nakamura & Csikszentmihalyi, 2002). ESM has also been used extensively to study individuals' experiences in the workplace. The method has been used to better comprehend how workers spend their time on the job and to document how workers feel when doing various tasks on the job (Hektner, Schmidt & Csikszentmihalyi, 2007). ESM has also been used to compare how workers in different types of occupations (e.g., managers vs. blue-collar workers) experience their time at work in terms of levels of concentration, enjoyment, or flow (Hektner, Schmidt & Csikszentmihalyi, 2007). Several ESM studies provide estimates of the number of hours workers spend on the job (Robinson & Bostrom, 1994; Robinson & Godbey, 1997; Sexton, 2005). Studies have also employed ESM to investigate variation in individuals' perceptions of particular jobs and in the different situations that a given worker encounters in his or her workday (Hektner, Schmidt and Csikszentmihalyi, 2007). Haworth & Hill (1992) used ESM in their study to assess momentary enjoyment at work and overall happiness, total life satisfaction and psychological well-being. One of the main reasons organizational research has utilized ESM is to reduce recall bias and error that is inherent in global retrospective reporting of transient experiences, and to study the within person processes as they unfold over time (Fisher & To, 2012).

The Experience Sampling method, as a method of data collection comes with its set of limitations. First, it might not be likely to gain consistent compliance for large numbers of reports from participants per day without a signal. Second, since ESM requires a signaling

method of some sort, such as a Personal Digital Assistant (PDA), it can be expensive, and sometimes not audible in large workspaces (Fisher & To, 2010). Third, the potential intrusiveness of the method should also be taken into consideration, when used to capture daily experiences. The intrusiveness of using the experience sampling method is especially of particular concern while attempting to use it in the workplace as it may create real or perceived challenges to productivity in the work environment, and in an organizational setting (Hektner, Schmidt and Csikszentmihalyi, 2007). While the questionnaires that are used with ESM take little time to complete, using ESM can lead to interruptions several times during the workday, thus diverting attention from the task at hand. Often, ESM studies are organized such that sleep time and other personal time are protected (Zirkel, Garcia and Murphy, 2015). A researcher might typically set time constraints on when participants can be asked to respond to reports (Fisher & To, 2010). Fourth, the researcher may be asking participants to answer the same questions over and over which could lead to participant fatigue over a period of time. It is important to think about how many times per day and for how many days one can reasonably expect participants to complete surveys and like most research, this becomes a trade-off of more data versus reduced participation (Fisher & To, 2010). Fifth, self-selection bias (according to Jacobs, Hartog, and Vijverberg, 1990; "self-selection bias occurs in any situation in which individuals select themselves in a group, leading to a biased sample with a non-probability sample". It can make the determination of causation even more difficult; Heckman ,1990) and attrition are also some other pitfalls when using ESM because of the intensive nature of data gathering (Fisher & To, 2010). Furthermore, ESM may also not be suitable for studying some people or groups. Csikszentmihalyi and Larson (1987) found that blue-collar workers in the 1980s found the task too unusual and were less in compliance than clerical workers. Wilson et al.

(1992) found that elderly participants had difficulty reading digital displays. Therefore, even if a signal can be heard, the nature of some jobs makes it more difficult to participate. Lastly, the Experience Sampling Method (ESM) can be a labor intensive and an expensive undertaking for the researcher because a team of researchers is usually needed during key times of the study (Zirkel, Garcia, & Murphy, 2015) which can add to the inconvenience of using this method to measure flow.

The Experience Sampling Form (ESF; Csikszentmihalyi & Csikszentmihalyi, 1988) is one of the main questionnaires that have been used with the Experience Sampling Method. This is essentially a short scale and the idea of developing a short scale or a short version of a scale is implemented when there are certain practical constraints, such as participant fatigue and time constraints that can make long testing times difficult which can inhibit the use of a longer version of the scale measuring the same construct. The Experience Sampling Form assesses the activity, the context and aspects related to interest, motivation, and affective experiences. Items that capture aspects of flow more closely are also included, and demands, which this scale refers to as challenge and skills are measured (Schiepe-Tiska & Engeser, 2017). The ESF contains categorical items and scaled items. The categorical items serve to reconstruct the activity (main activity, concurrent activities), the context (date, time beeped, time filled out) and some aspects related to motivation and interest (reasons for the activity, sources of physical discomfort) (Schiepe-Tiska & Engeser, 2017; Moneta, in press). The categorical items are open-ended and need to be coded by the researcher after collecting the data. The scaled items are designed to measure the intensity of a range of subjective feelings (Engeser, 2012). Although the ESF taps on some aspects of flow, the decision of whether a person experiences flow was only based on the match between challenge and skills (Schiepe-Tiska & Engeser, 2017; Fullagar & DelleFave,

2017). Thus, if a person is believed to experience flow this assessment is based exclusively on the match between challenge and skills (Schiepe-Tiska & Engeser, 2017).

Table 2. Flow items of an example of the ESF (Csikszentmihalyi & Csikszentmihalyi, 1988, pp. 257-258)

	not at all			some what			quite		very
How well were you concentrating?	1	2	3	4	5	6	7	8	9
Was it hard to concentrate?	1	2	3	4	5	6	7	8	9
How self-conscious were you?	1	2	3	4	5	6	7	8	9
Did you feel good about yourself?	1	2	3	4	5	6	7	8	9
Were you in control of the situation?	1	2	3	4	5	6	7	8	9
Indicate how you felt about your activity:									
	Low								high
Challenges of the activity	1	2	3	4	5	6	7	8	9
Your skills in the activity	1	2	3	4	5	6	7	8	9

The Experience Sampling Form (Csikszentmihalyi & Csikszentmihalyi, 1988) implies an important issue that has dominated the measurement of flow literature, which is the construct validity of the instruments measuring it. Construct validity attempts to determine "how well a psychological scale actually measures the theoretical construct underlying the scale" (Messick, 1989, p.742). Not only has there been a failure to consider all the dimensions and the preconditions that make up the experience of flow, flow measures have also deviated from its original conceptualization by Csikszentmihalyi (1975). An example of a questionnaire that

operationalizes flow by deviating from its original definition is the one developed by Keller and Bless (2008). The questionnaire measures perceived control over an outcome, involvement and enjoyment. Perceived control is measured with items such as "*I had the necessary skill to play the game successfully*," "*I knew exactly what I had to do*," and "*I think I performed well in the game*" (Keller & Bless, 2008; Schiepe-Tiska & Engeser, 2017, Fullagar & DelleFave, 2017). The first two items do represent components of flow but the last item is more an evaluation of performance rather than the experience of the activity itself. Involvement and enjoyment are measured with items like "*I was strongly involved in what was happening in the game*," "*I was thrilled*," and "*I would consider buying the game for private use*". Involvement here signifies flow while doing the activity but buying the game may have different reasons beside the experience of the activity itself (Schiepe-Tiska & Engeser, 2017; Fullagar & Delle Fave, 2017). This scale demonstrates construct irrelevance by deviating from the original conceptualization of flow by Csikszentmihalyi (1975). According to Messick (1995, p.742), "construct irrelevance refers to a situation when assessors base their judgment on evidence and arguments that are not related to the conceptual framework and the construct being assessed, but to other, irrelevant constructs". This further strengthens the argument of having a strong theoretical foundation prior to developing a scale. The current dissertation will attempt to address this issue by developing a scale that will include all the dimensions of flow, including its preconditions in order to measure flow, with a strong underlying theoretical foundation.

Furthermore, the measurement of flow has also been influenced by the talk of whether flow is a state or a trait. Although flow has been defined "as a transitory state of mind, existing at a given moment in time, and reactive to the nature of the task that is being performed", by Fullagar and Kelloway, (2009) and DelleFave (2013) the discussion still exists, the result of

which has led to the development of some measures of flow (Fullagar, Knight & Sovern, 2013). The capacity to experience flow appears to be nearly universal (Lopez & Snyder, 2003). Nevertheless, people vary widely in the frequency of reported flow (Nakamura & Csikszentmihalyi, 2009). According to Nakamura and Csikszentmihalyi (2009) people also differ in the quality of their experience and in their desire to be doing what they are doing, when their capacities and their opportunities for action are simultaneously high. From the start, Csikszentmihalyi (1975/ 2000) recognized the possibility of an "*autotelic personality"*, a person who has a tendency to enjoy life or "generally does things for their own sake, rather than in order to attain some later external goal" (Csikszentmihalyi, 1997). Csikszentmihalyi (2014) distinguished this kind of personality by several *meta-skills* or competencies that enable the individual to enter flow and stay in it. These meta-skills involve a general inquisitiveness and interest in life, diligence, and low self-centeredness, which result in the ability to be motivated by intrinsic rewards (Nakamura & Csikszentmihalyi, 2009). Measures of flow, such as the Work-Related Flow Scale (Bakker, 2008), which will be discussed in detail later, and the Dispositional Flow Scale (DFS; Jackson & Eklund, 2002), instruct respondents to rate their tendency to experience flow 'in general' over a period of time, in an attempt to investigate the predisposition to experience flow. The development of the DFS began with a qualitative approach to explore the perceptions that elite performers held of flow and how they attained this state during their athletic performances (Jackson 1992, 1995, 1996). In the DFS (Jackson & Eklund, 2002) nine key flow dimensions are assessed, which include the preconditions of flow as well. These dimensions include those that make up the concept of flow such as merging of action and awareness, challenge/skill balance, sense of control, clear goals, autotelic experience, concentration on task, loss of self-consciousness, transformation of time, and unambiguous

feedback. Marsh and Jackson (1999) have reported a series of sophisticated confirmatory factor analysis to evaluate the DFS. Good support was presented for the construct validity of the DFS with item loadings on first order factors ranging from .29 to .86 (mean= .74). The internal consistency of the scale was found to be .88 which is higher than the threshold (.70) set by Cronbach (1951). Even though the DFS has been found to have satisfactory psychometric properties issues have still been reported at the conceptual level. The DFS measures nine dimensions of flow, as previously mentioned, however no distinction is made regarding the essential indicators of flow and the preconditions necessary to induce flow. Of the dimensions measured by the DFS, merging of action and awareness, sense of control, concentration on task, loss of self-consciousness, and transformation of time are the dimensions that are considered essential indicators of the flow experience. There is however no subscale measuring the sixth indicator, which is a sense of enjoyment in the intrinsic motivation of the activity. Statistical issues have also been found where the time transformation item, and the item measuring loss of consciousness in the scale has been found to have lower loadings on the higher order factor. The DFS (Jackson & Eklund, 2002) was primarily developed as a dispositional assessment of the frequency with which people experience flow in a target activity, to measure flow as a 'trait'. The definition of 'trait' indicates that it is a reliably permanent internal disposition that has a limited potential for development (Fullagar & Van Krevelen, 2017; Allport & Odbert, 1936). The main difference between the state and trait questionnaires is in the initial instructions given to participants: the state questionnaire asks participants to answer the questions thinking of the specific activity they just completed, while the trait questionnaire asks participants to answer the questions thinking of their general experience across situations and times or of their average experience when they are engaged in a context of activity (Moneta, 2012). Usually when there is

confusion about a certain construct it leads to issues related to its measurement, as has been the case with flow. Although some evidence does suggest the existence of an autotelic personality type, in that some individuals are more prone to experience flow when confronted with a challenging task, majority of findings still indicate that flow is predominantly a task-related state. On the other hand, a 'state' as a construct is more flexible and reactive to situational contingencies (Allen & Potkay, 1981; Cooper, 2018). Flow has also been found to be "a transitory, task-related experience existing at a given moment in time" (Fullagar & Kelloway, 2009, p.597). Studies that have assessed the experience of flow have found that flow is more susceptible to situational and task-related characteristics compared to dispositional factors (Fullagar & Kelloway, 2009).

The Flow State Scale (FSS; Jackson & Marsh, 1996)

The Flow State Scale developed by Jackson & Marsh, (1996) measures flow as a state. This scale was primarily developed to measure flow in sport and physical activity contexts. This scale also represents the most comprehensive work to examine flow as a multidimensional experience (Jackson & Marsh, 1996). The Flow State Scale (1996) is a 36-item measure measuring the dimensions of flow, challenge/skill, action-awareness, clear goals, unambiguous feedback, concentration, sense of control, loss of self-consciousness, transformation of time, and autotelic experience. Each dimension is measured by four items. The development of the items was based on past research with flow, both within and outside of sport settings followed by a qualitative analysis of interviews with elite athletes, followed by quantitative analyses. In developing the items of the scale, Jackson and Marsh (1996) however, do not provide a distinction between the dimensions and the preconditions of flow. The final version of the scale measures flow with nine dimensions, which include the six dimensions and the three

preconditions together. This distinction is important to operationalize flow because the three preconditions have been identified as necessary to induce flow, whereas the dimensions of flow are components of the flow experience itself.

Validity of the FSS (Jackson & Marsh, 1996). In examining the construct validity of the FSS, confirmatory factor analyses (CFA) carried out provided support for the nine scales. Consistent with the theoretical basis of the Flow State Scale (Jackson & Marsh, 1996), for a hierarchical model was also found, in which one global flow factor explained correlations among the nine first-order FSS factors (Jackson & Marsh, 1996). However, certain design limitations of the scale are inherent. According to Jackson & Eklund (2002), the Flow State Scale (FSS; 1996) was developed to assess events that were recently experienced, therefore the instructions were accordingly given to the participants. However, initial data collected for the FSS, when it was being developed were based on retrospective recall of physical activity reported by participants (Jackson & Eklund, 2002). The retrospective approach can be thought of as a limitation where the responses provided by the participants could have been influenced by the passage of time, resulting in inaccurate responses as a result of recall bias. Performance of items in some of the subscales was also found to create problems. In terms of statistical weakness, the poorest performing item across several analyses was found to be from the 'loss of the self-consciousness' sub scale. This item focuses on the lack of concern for self-presentation or evaluation by others (Jackson & Eklund, 2002). According to Jackson & Eklund (2002), this item was worded ambiguously, which made it open to a number of interpretations. Another issue, both conceptually and empirically, is the time transformation dimension, which consistently loaded weekly on a global flow factor. According to Csikszentmihalyi (1975), the experience of flow is the perceptual shortening rather than lengthening of time. The measurement of this dimension

was flawed as the items did not clearly represent the time transformation dimension. The first item in the FSS in the transformation of time subscale is "*Time seemed to alter"* (either slowed down or speeded up); this item does not specify whether time speeds up or slows down, making it a double barreled item, and confusing the participant by providing two likely scenarios and expecting one answer., The second item ,"*The way time passed seemed to be different from normal*"; this item does not clearly describe the passage of time or time transformation, and is rather vague as the word 'different' could be interpreted by the respondent in multiple ways. Third, "*It felt like time stopped while I was performing*"; this item does not clearly state whether time slowed down or speeded either, but provides a different scenario where time essentially stopped. Last, "*At times, it almost seemed like things were happening in slow motion*"; this item emphasizes on the slow movement of time, whereas the other items mention both slowing, speeding and stopping of time, making the wording of the items inconsistent. The items measuring time transformation in the FSS tend to confuse the passage of time by not wording the items consistently, which in turn can also affect the internal consistency of the subscale.

In their study, Jackson & Eklund (2002) revised the items on the FSS to address the issues mentioned above. Confirmatory factor analyses conducted did find adequate model fit for the FSS after revised items were introduced to replace the problem items. However, the results of their analysis showed the nine dimensions of flow weighed unequally on the global flow factor. Loss of self-consciousness and time transformation also continued to show low loadings on the global flow factor. In addition to psychometric limitations of the Flow State Scale (Jackson & Marsh, 1996), using this scale in the work context could also seem problematic. The Flow State Scale (Jackson & Marsh, 1996) was primarily developed to examine flow in the sports context, among athletes. In developing the items for the scale, Jackson and Marsh (1996) used qualitative

flow data that was obtained by Jackson (1992, 1995) from elite athletes. The pilot version of the FSS was also administered to participants who were actively involved in sports or physical activities. As mentioned previously, the main aim of Jackson and Marsh (1996) in developing the scale was to assesses flow in sport and physical activity, as a result of which their sample also represented athletes, for whom the scale was being developed, which does not make this an appropriate measure to use to measure flow in the workplace.

Reliability of the FSS (Jackson & Marsh, 1996). Reliability, particularly internal consistency, is also an issue that needs to be addressed in the measurement of flow. Internal consistency refers to "the estimates of reliability based on the average correlation among items within a test", (Nunnally & Bernstein, 1994, p.251) and is usually assessed with a Conbach's alpha. Reliability analysis of the FSS revealed reasonable internal consistency estimates, ranging for the nine FSS scales. However, according to Cortina (1993), the level of Cronbach's alpha can be affected by the length of the scale, where long scales tend to have higher levels of internal consistency, with a higher alpha. The internal consistency (alpha = .81) in the case of the FSS case could be a result of its length.

Table 3. Coefficient Alpha Estimates of Reliability from Different Versions of the Flow State Scale (Jackson & Marsh, 1996).

Challenge and skill	.80
Action-awareness	.84
Clear goals	.84
Unambigious feedback	.85
Concentration	.82
Sense of Control	.86
Loss of self-consciousness	.81
Transformation of time	.82
Autotelic experience	.81
Mean	.83

Short questionnaires measuring flow

There are shorter scales that have been developed to measure flow as well. The main aim of these questionnaires is to allow testing whether the components reflect the several dimensions underlying the flow concept (Schiepe-Tiska & Engeser, 2017). The Flow Short Scale (FSS) developed by Rheinberg, et al (2003) is an example of a questionnaire that includes all components of flow. The scale has been used in various contexts and with ESM as well. A main advantage of this scale is its length, as this scale consists of 10 items. Being a short scale, it reduces the burden on respondents, reduces fatigue and is more convenient, as it takes less time to complete (Schiepe-Tiska & Engeser, 2017). However, the components of flow are only assessed with one item. The use of one or two items to measure psychological constructs is a practice that is discouraged because they are presumed to have unacceptably low reliability, which is an issue that this study will attempt to address by having more than two items for every dimension and precondition to measure flow. Flow, being a complex construct to measure, necessitates the use of multiple items (Wanous, Reichers & Hudy, 1997). Second, similar to the

scales mentioned above the Flow Short Scale (FSS) also tends to confuse the preconditions of flow with the dimensions of flow, which brings together with it issues related to construct validity. Another scale that attempts to assess all components of flow is the Swedish Flow Proneness Questionnaire (SFPQ; Ullén et al., 2012). This questionnaire assesses the subjective sense of concentration, challenge-skill balance, explicit goals, clear feedback, sense of control, lack of a sense of boredom, and enjoyment. Although most components presented above are included, the merging of action and awareness and the loss of reflective self-consciousness are missing. The questionnaire measures flow in a summative way with regard to household maintenance, work, and leisure activities (Schiepe- Tiska & Engeser, 2017). The distinguishing factor of the SFPQ is that it was designed as a self-report measure of how frequently the participant has flow experiences in three different situations typical for division of activities in industrialized societies, i.e. work, maintenance, and leisure time. The SFPQ has three subscales, with 7 items for each, and an initial branching question on whether the participant is professionally active (the first 7 items on flow at work are only answered by individuals that are employed) (Ullen et al, 2012). An examination of the items of this scale raises two critical issues. First, the absence of boredom does not necessarily imply that individuals experience flow, in other words, respondents can be stressed out as well and experience flow. Second, having a clear picture of what to achieve and how to achieve it could mean that the individual is permanently reflecting their behavior which is incompatible with the component of loss of self-consciousness, (Schiepe-Tiska & Engeser, 2017), which can also end up acting as a confound to the preconditions and the experience of flow.

In the arguments presented above, there have been questionnaires that have only focused on selected dimensions of the flow experience, and questionnaires that have tried to assess all

components of flow. One issue with questionnaires that attempt to measure all the components of flow is whether some components of flow are considered as more central than others. In other words, some components may be considered the core of flow and therefore it may be assumed that measuring other components would make the assessment less valid (Schiepe- Tiska & Engeser, 2017). However, these questionnaires run the risk of missing important aspects of flow, and therefore may end up capturing some other construct. Furthermore, the measure also may not fully represent the experience of flow and selected components end up dominating the assessment. For example, the ESF (Csikszentmihalyi & Csikszentmihalyi, 1988) tends to determine flow based on the level of challenge and skill leading to issues with construct validity of the instrument, particularly construct underrepresentation. It is necessary to mention here that the main goal of a scale development process should be the development of a psychometrically sound short scale in which items that are developed should encompass the construct domain by having a strong theoretical foundation which dictates the scale development process, which is one of the main goals of this dissertation, and the steps of which will be discussed in detail in the methodology section. Delle Fave, Massimini, and Bassi (2011) also affirm that it is extremely important that measurement instruments adhere strictly to the nine original dimensions of flow. Given this, it would be safe to assume that the measurement of flow in the workplace should employ scales that cover the original dimensions of flow. Psychometric research underscores the value of measurement to enable more reliable assessment of target constructs and the ability to model systematic and random error (Williams et al, 2002).

The Work-Related Flow Scale (WOLF; Bakker, 2008)

Given the issues associated with the measurement flow in general, it is not surprising that the measurement of flow in the workplace also faces similar issues. The definition of work-related flow is similar to the original definition of flow put forth by Csikszentmihalyi (1975).Work-related flow has been defined as a developmental and dynamic phenomenon that undergoes continuous change over time (Fullagar & Van Krevelen, 2017; Rathunde & Csikszentmihalyi, 2006). This may be due to work having a greater potential to offer tasks that promote the perception of an optimal balance between high challenges with high skills. The dichotomy between work and leisure activities, based on studies and findings has also been found to be arbitrary and perhaps even meaningless (Csikszentmihalyi, 1975; Fullagar & VanKrevelen, 2017). In the workplace the WOLF, developed by Bakker (2008), is the scale that is used to measure flow. Bakker (WOLF; 2008, p. 401) has defined flow at work as "a short-term peak experience that is characterized by absorption, work enjoyment and intrinsic motivation". Absorption is referred to "a state of total concentration, where employees are completely immersed in their work". Employees who enjoyed their work and felt happy made positive judgements about the quality of their work life. "This happiness is a consequence of cognitive and affective evaluations of the flow experience" (Bakker, 2008, p.401; Gkorezis, 2020). Finally, intrinsic motivation refers to "performing a certain work-related activity with the aim of experiencing the inherent pleasure and satisfaction in the activity" (Deci & Ryan, 1985, p. 69). Bakker's (2008) conceptualization of flow differs from its original formulation by Csikszentmihalyi (1975). Hapell et al (2015) discuss four main reasons why this conceptualization of flow could be problematic. First, the inclusion of enjoyment and intrinsic motivation seems to conflict with increasing evidence that, during times of optimal experience at

work, enjoyment and intrinsic motivation can be quite low. Delle Fave (2013) found that there was a stable cognitive core that characterized the flow experience among settings, but during productive activities participants experienced lower levels of excitement and desire to perform the activity. If, as the evidence suggests, flow at work can occur in situations of both autonomous and controlled motivation (Delle Fave et al., 2011), inclusion of intrinsic motivation in a work-related flow measure would not appear to make sense. Second, enjoyment is inherent in the definition of intrinsic motivation. That is, enjoying oneself is a central aspect to what it means to be intrinsically motivated; these two constructs conceptually overlap (Delle Fave et al., 2011). Inspection of the fit indices Bakker (2008) stated, suggests that the two-factor model, with work enjoyment and intrinsic work motivation collapsed into one factor. The exploratory factor analysis (EFA) performed by Hapell et al (2015) also showed that all of the items within the work enjoyment and intrinsic work motivation factors highly correlated with both factors. Items such as '*I do my work with a lot of enjoyment*' (work enjoyment subscale) and '*I work because I enjoy it'* (intrinsic motivation subscale) clearly imply that these two dimensions are overlapping. This finding is unsurprising, because enjoyment is central to the conceptualization and measurement of intrinsic motivation (Ryan & Deci, 2000), and previous research has shown that enjoyment and intrinsic motivation are positively associated (Ryan & Connell, 1989). Third, within the work-related flow literature, Rodriguez-Sanchez, Schaufeli, Salanova, Cifre, & Sonnenschein. (2011) have suggested that intrinsic interest may be a precursor to enjoyment (an emotional component) and absorption (a cognitive component). These authors argue that intrinsic interest may motivate a person toward engaging in an intrinsically rewarding activity, and, in doing so, promote the probability of experiencing flow. However, according to the above authors, intrinsic interest is not part of the flow experience itself. The Work-Related Flow Scale

(2008) assesses intrinsic motivation as one of the dimensions of flow, by including a subscale that measures the level of intrinsic motivation. Fourth, it is unclear how this three-component model of flow is conceptually distinct from other constructs measured in workplaces, such as employee engagement (Macey & Schneider, 2008). The components that are measured in the WOLF (Bakker, 2008) have a conceptual overlap with employee engagement that is defined as "a positive, fulfilling, work-related state of mind that is categorized by vigor, dedication, and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002; Schaufeli & Bakker, 2010). When employee engagement has been conceived as a psychological state, researchers have typically included, in some form, one or more of the following dimensions: absorption, attachment, and enthusiasm (Macey & Schneider, 2008). It is important to distinguish these two constructs from each other. Engagement represents "a persistent involvement in one's job as a whole and all of the tasks that it entails" (Maslach, Schaufeli, & Leiter, 2001, p.416), whereas flow is typically described as "a more intense absorption and involvement with a specific work related task" (Csikszentmihalyi, 1975). Furthermore, engagement is usually operationalized as a relatively stable disposition that varies considerably between individuals (Christian, Garza, & Slaughter, 2011). Flow, on the other hand, shows substantial within-individual variance, and relatively less variations between persons (Fullagar & Kelloway, 2009). This would suggest that flow is definitely a state-like variable and that work engagement is predominantly a trait. The WOLF (Bakker, 2008) asks individuals to evaluate their experience of work in a summative way. Individuals are thinking about their general work experience which relates to the assessment of flow on a trait level. Assessing flow on the trait instead of the state level may be problematic because for the individual answering the questionnaire, the experience of flow and its consequences cannot easily be separated (Hapell et al, 2015). For example the item "*My work*

gives me a good feeling"; for the respondents, it is unclear whether this is a feeling that appears after work or whether it means that someone generally feels good while working (Hapell et al, 2015).

The WOLF (Bakker, 2008) does not include the preconditions to flow as well (challenge and skill, clear intrinsic and proximal goals, and clear feedback from the task), which are considered necessary to induce flow. On analyzing the items that make up the three factors of the WOLF (2008), none of the items indicate any of the preconditions. The WOLF (2008) does not address some of the dimensions that make up the experience of flow as well, as originally conceptualized by Csikszentmihalyi (1975). Bakker (2008) does not consider including an item addressing the transformation of one's perception of time passing, nor a sense of control over what one is doing. On further examination of the items, the wording of the items also seems a lot similar to each other, thus leading to an overlapping of the dimensions, as mentioned previously. Happel et al (2015) found almost all of the items within the work enjoyment and intrinsic work motivation factors to highly correlate with both factors. A further issue with the construction of the WOLF (Bakker, 2008) is the wording of the items in the intrinsic motivation subscale. Examples of such items include "*I would still do this work, even if I received less pay*"; and "*I get my motivation from the work itself and not from the reward for it*" (WOLF; Bakker, 2008). Rather than focusing on intrinsic motivation, Bakker (2008) operationalizes intrinsic motivation with reference to extrinsic motivation (reward, pay). The wording of the items also tends to ignore the reality that for many people the pay and rewards that gained through their work are necessary to maintain their standard of living (Hapell et al, 2015).

In terms of the construct validity of the WOLF (Bakker, 2008), examination of the confirmatory factor analysis of the results raises doubts about the adequacy of the WOLF in

clearly measuring the three separate aspects of work-flow (absorption, work enjoyment, and intrinsic motivation) that the scale measures. According to Hu and Bentler (1999), the values obtained for the fit indices showed a borderline fit of the model to the data using commonly used criteria for judging acceptability of fit. Additionally, in evaluating the discriminant validity of the scale, Bakker reported that the three-factor model outperformed alternative two- factor and one-factor models. Bakker (2008) drew this conclusion while referring to a statistically significant $\chi 2$, which is highly sensitive to a large sample size. In doing so, he seemingly ignores the five descriptive fit indices, all of which show a difference of fit of one unit (or less) between the three-factor model and the two-factor model in which the items of the work enjoyment and intrinsic work motivation factors are collapsed together. These findings raise issues regarding the discriminant validity of the WOLF subscales. Furthermore, intercorrelational analysis of the three factors demonstrated that there was 50% overlap of the work enjoyment and intrinsic motivation factors adding to the evidence that these two factors may have poor discriminant validity (Happel et al, 2015).

Happel et al (2015) examined the construct validity of the WOLF (2008) using data from a large sample from Queensland, Australia. Issues with construct validity were found on conducting a confirmatory factor analysis (CFA), when a moderately acceptable fit was found between the model and the data, duplicating the findings in the original study by Bakker (2008). The findings showed that the WOLF (Bakker, 2008) lacked discriminant validity. According to Hapell, Gaskin and Platania Phung (2015), the intrinsic work motivation subscale was able to explain more of the variance in the work enjoyment subscale than in its own items. The three-factor model found after carrying out an exploratory factor analysis (EFA) also did not provide any clues as to how the scale could be modified to improve its discriminant validity. Deleting the

items was not thought to be a viable solution. While assessing the factor structure, Bakker (2008) originally performed principal components analysis (PCA), as a form of EFA, and used varimax method of rotation. He did not however, report how the decision to extract the number of factors was made. According to Tabachnik and Fidell (2001) EFA and PCA serve different purposes, have different model formulations, and, in some circumstances, provide quite different results. When the goal of analysis is to describe the dimensions that may underlie items, EFA should be used. In selecting an orthogonal method of rotation, such as varimax, the expectation is that the factors are uncorrelated. This expectation is unrealistic with respect to the WOLF, because Bakker's (2008) work and the results of Hapell et al's (2015) study showed that some of the factors, especially work enjoyment and intrinsic work motivation, were highly correlated. More appropriate analytical decisions such as whether to perform an EFA instead of PCA, an oblique rotation rather than orthogonal rotation, can result in better psychometric reliability and validity. Deciding upon the number of factors to extract using evidence-based procedures can also result in the WOLF having psychometrically sound properties. According to Happell et al (2015) improving the instrument is not a simple matter of adding, deleting, or refining items. Considering the number of psychometric issues associated with the WOLF (Bakker, 2008) improving it would require a complete revision of the conceptual basis of the instrument, by revisiting Csikszentmihalyi's (1975) definition and conceptualization of flow, which is one of the main criticisms of the WOLF (Bakker, 2008).

As mentioned previously, the WOLF (Bakker, 2008) has been used to measure flow in the workplace. Demerouti, Bakker, Sonnentag, and Fullagar (2012) used the WOLF (2008) to measure flow while examining the relationship between work-related flow and energy after work with recovery efforts and detachment as moderators. A subscale of the WOLF (Bakker, 2008)

was also used by Demerouti, Bakker and Fried (2012) to measure work enjoyment and assess the role of instrumental versus intrinsic work orientations in the job demands-resources (JD-R) model. There are a number of other studies that have also used the WOLF (2008) to measure the experience of flow (Llorens, Salanova & Rodrigues, 2012; Makikangas, Bakker, Aunola, & Demerouti, 2010; Xanthopolou, Bakker & Illies, 2012). This scale has been used despite having a number of issues ranging from the conceptualization and operationalization of flow, to the validity and psychometric properties of the scale. Building a measurement scale is a time-consuming process. Items must be developed and written carefully to adequately reflect the theoretical construct; these items must then be organized into a scale, which is neither too long nor too short, with response anchors that will generate variability. The scale must then be administered to the appropriate sample based on the anticipated future use of the new measure. Factor analyses should then be used to assess the structure of the new scale and then fit indices like Chi-Square should be used to confirm that the model fits the data. The new scale must have good reliability so that scores can be interpreted confidently. And concerns related to construct validity must be attended to continuously over time until the new measure is situated within its nomological network of similar and dissimilar constructs. This process has been explained further in detail in the methodology section of this draft.

One of the reasons research is limited in organizational settings is the unavailability of shorter versions of scales, with sound psychometric properties (O'Keefe, Kelloway & Francis, 2012). One of the main aims of the current dissertation is developing a short scale that will enable the measurement of flow in the workplace. According to O'Keefe, Kelloway and Francis (2012) longer, and more detailed, measures may not be practical in some research settings and that there is value in shorter measures. Items for the current scale will be developed by focusing

on the underlying theory of flow formulated by Csikszentmihalyi (1975). The development process will not involve qualitative interviews with respondents prior to item development, unlike the FSS (Jackson & Marsh, 1996). By eliminating this step, the items will reflect the dimensions as well as preconditions that make up the experience of flow at work to ensure the content validity of the scale. While developing a short version of a scale one of the main challenges is making sure that the items encompass the multidimensionality of the construct. O'Keefe, Kelloway and Francis (2012) have demonstrated this by successfully capturing the multidimensional nature of the Big Five, and effectively developing a short version of a long scale. The main purpose of their study was to carefully examine the pitfalls of using short personality measures, and to assess whether it was possible to reduce the Trait Self-Descriptive Inventory to a very short measure (15, 20, or 25 items) to explore the extent to which it could be reduced without compromising its psychometric properties and still maintain its validity. Their results concluded that a 20-item version, which is a useful, short, and a psychometrically sound measure of the Big Five was suitable for use in organizational research. The purpose of the current dissertation will be to address the limitations of the scales discussed and in the process develop a shorter scale that will assess the experience of the flow state by including the dimensions as well as the preconditions of flow, based on its original formulation by Csikszentmihalyi (1975).

To summarize the discussion above, the concept of flow has been measured differently by different scales, some scales aiming to tap in to all the dimensions making up flow, whereas some scales tapping into a few, or just one dimension of flow (challenge and skill). It also demonstrates the confusion regarding the measurement of flow as a state or a trait i.e. some scales tend to conceptualize flow as a trait (DFS; Jackson & Eklund, 2002; Work-Related Flow

Scale, 2008) whereas some scales tend to measure it as a state (FSS; Jackson & Marsh, 1996), which adds to the confusion in terms of its measurement and conceptualization. The main aim of scale development should be to initially ensure that the content validity of the scale is not compromised. Some of the issues highlighted in the discussion above in the questionnaires measuring flow can be remedied by using the approach to scale development put forth by Hinkin (1995), especially focusing on the practice including items that comprehensively tap into the six theoretical dimensions of flow, followed by the preconditions. By following Hinkin's (1995) strategies, the main focus of this dissertation will be to develop a short scale to measure flow in the workplace by addressing the different limitations mentioned above, ranging from operationalizing flow to making sure that the scale is psychometrically sound by carrying out appropriate statistical analysis. Establishing the construct validity of the scale is also important. This will be addressed in the second part of this dissertation by developing a nomological network to assess the convergent and discriminant validity of flow. The procedure that will be followed will be explained in detail in the methodology section.

Chapter 2 - The Measurement of Work-Related Flow

Why is psychological measurement important?

Measurement is a vital activity of science. Knowledge is acquired about people, objects, events, and processes by observing them. Making sense of these observations requires that they be quantified (Maul, Irribara, & Wilson, 2015). The process of measurement and the broader scientific questions it serves interact with each other and the boundaries between them are often scarcely visible. Measurement has long been a leading concept in the physical sciences, engineering, and natural philosophy, and is often considered a privileged method for acquiring information about the world (Maul, Irribara, & Wilson, 2015). In the organizational context, decisions based on psychological measurement can impact decisions about new hires and promotions, which have consequences for the organization. In this section, psychological measurement will be discussed, along with its related challenges and its importance in social sciences, particularly in psychology.

A lot has been written on the topic of psychological measurement, including debates on how various perspectives (empirical operationalism, pragmatism, constructive realism) impact measurement definitions and approaches (Maul, Irribarra, & Wilson, 2016). Research scientists have offered a number of definitions, which have been mostly similar. The most widely used definition of measurement in psychological sciences is the one by Stevens that "measurement, in the broadest sense, is defined as the assignment of numerals to objects or events according to rules" (S.S. Stevens, 1946, p.667). This definition was further enhanced by Lord, Novick, and Birnbaum (1968), and Torgerson (1958) by their assertion that "numbers were assigned to the attributes of objects and not to the objects themselves". When measurement is considered in physical sciences, it usually involves measuring the mass of some compound where the scientist

usually takes measurements of a specific attribute of an object and not of the actual object itself. Similarly, psychologists do not take measurements of actual individuals; rather they measure attributes of the individual, for example a person's intelligence, anxiety level, motivation, etc. Unlike physical attributes, these psychological attributes cannot be measured directly. They are constructs, i.e. hypothetical concepts created from the informed imaginations of research psychologists for the purpose of explaining human behavior. Given that constructs are made-up, they can never be absolutely confirmed (Maul, Irribara, & Wilson, 2015). Observation of an individual's behavior can determine how closely a psychological construct depicts an individual (Crocker & Algina, 1986).

Crocker and Algina (1986) talk about an example of the process of construct formation and how that leads to the measurement of attributes. Consider a developmental psychologist that works with children who notices that certain children frequently try to direct the activities of the other children during recess. As the psychologist observes similar behavior for the same children, it is labeled as "socially dominating". The psychologist has constructed a theoretical construct represented by a collection of behaviors. However, inventing a construct is not the same as measuring it. Before measurement can occur, the theoretical construct must be "operationalized," i.e. some rules must be created linking the theoretical idea to observable behaviors. In this case, measuring social dominance requires that the psychologist determine which specific behaviors in the preschool setting are deemed "dominating." A plan must then be developed to systematically obtain samples of behavior from the children. This systematic plan for obtaining samples of the children's behavior is a test; and when a quantitative value is assigned to the sampled behavior that is measurement. Measurement has occurred when, for example, the psychologist counts and records the number of dominating behaviors displayed by

the child in a specified period of time. Based on these measurements of observations the psychologist might make inferences about how much of the theoretical construct characterizes the child (Crocker & Algina, 1986).

According to Cliff (1993) the central challenge of science in general is the identification of the principle variables and the demonstration of which things are the same and which things are different. This is particularly challenging in the social sciences because social scientists often observe similar behaviors but label them differently. This usually leads to the issues of construct proliferation in which similar or identical theoretical ideas are given unique labels and are treated as separate constructs. Construct proliferation in the social sciences is detrimental because it has the long-term effect of impeding progress towards identifying the principle variables that make up human behavior.

In addition to construct proliferation, Crocker and Algina (1986) discuss five measurement problems that are common to all psychological assessments. First, researchers seldom agree about which observable behaviors best depict a construct. Measurements of psychological constructs are always variable, which usually lead to differences of opinion regarding the behaviors that best represent the construct under study. Second, by definition psychological constructs are never based on an exhaustive set of behaviors. Determining the variety of content needed to adequately represent the skill is a considerable challenge in developing measurement procedures (Crocker & Algina, 1986). Measurement error is a third problem facing any psychological assessment (Crocker & Algina, 1986). Measurement error can be in the form of fatigue and/or boredom. These score inconsistencies must be regarded as error. A fourth problem in psychological measurement relates to defining and labeling the properties of the measurement scale (Crocker & Algina, 1986). Defining the properties of the measurement

scale, accurately labeling the scale units, and properly interpreting the values obtained from the test are serious challenges that must be addressed in any measurement procedure. A last problem emphasized by Crocker and Algina, (1986) is that constructs cannot be defined in isolation. They must also have demonstrated relations with other variables, and those relations should coincide with expectations generated from theory. Any construct must be defined based on its logical or mathematical relation to other constructs that are in the same theoretical system; this is referred to a nomological network. This can also be referred to as the construct validity of the measure, which entails the assessment of convergent as well as the discriminant validity of the measure (Crocker & Algina, 1986). For example, a test measuring mathematical skills should correlate well with another test which measures similar skills (multiplication). On the other hand, the same test should not correlate well with a test, measuring skills in reading comprehension. In sum, measurement is a serious and a challenging endeavor. Obtaining quality measurements of constructs requires careful consideration and resolution of several problems that challenge every measurement situation.

Duncan (1984) notes that the impact of psychometrics in the social sciences has exceeded its origins in the measurement of sensations and intellectual abilities and he supports this argument with three examples of the impact of psychometrics: (1) the extensive use of the definitions of reliability and validity, (2) the popular use of factor analysis in social sciences research, and (3) the adoption of psychometric methods for developing scales and measuring an array of variables far broader than those with which psychometrics was initially concerned (DeVellis, 2003, 2016). Unfortunately, the measurement of flow has largely ignored these issues, as a result of which the quality of the scales developed has been affected. Research attention is needed to precisely specify the theoretical underpinnings of flow. For example, researchers

should operationalize the concept of flow appropriately in order to measure it. There should be no confusion associated with the experience of flow if researchers accept the definition put forth by Csikszentmihalyi (1975). There is also a need to demonstrate construct validity of flow by demonstrating correlations between the antecedents and outcomes of flow in workplace, with a nomological net. The main aim of this dissertation was to have a final version of a short measure of flow that can be used in an organizational context. By following the steps prescribed by Hinkin (1995), the goal was to develop a scale that will include no more than 3 items for each dimension, and 3 items for each precondition of flow. The short length of the scale will allow employees to complete the scale without letting fatigue or boredom influence their responses.

Methodology

Hinkin (1995) provides a review of scale development procedures and describes the stages necessary for the development of scales in accordance with established psychometric principles. The current dissertation specifically followed these steps. The first study consisted of the development of a scale to measure flow at work. The second study examined the construct validation of this scale, according to APA criteria, through a nomological network.

The steps followed for the first study were the ones outlined by Hinkin (1995), who states that scale development falls into three basic stages. Stage 1 is item generation, or the generation of individual items. Stage 2 is scale development, or the manner in which items are combined to form scales and Stage 3 is scale evaluation, or the psychometric examination of the new measure.

Stage 1- Item generation- According to Hinkin (1995) the generation of items is the most important part of developing sound measures. Item generation is basically the process in which items are written to comprehensively represent the construct to be studied. The primary

concern here is content validity which is the minimum psychometric requirement for measurement adequacy and is the first step in assessing the construct validation of a new measure (Schriesheim et al., 1993). There are two basic approaches to item development. The first one is deductive which is also referred to as 'logical portioning' or the 'theoretical' method. This approach requires an understanding of the phenomenon to be investigated and a thorough review of the literature to develop the theoretical definition (Schwab, 1980). This theoretical definition is then used to develop the items (Schwab, 1980). The other approach is the inductive approach, in which there is often little theory involved at the outset as one attempts to identify constructs and generates items from individual responses (Hinkin, 1995). Researchers typically develop scales inductively by asking a sample of respondents to provide descriptions of their feelings about their organizations or to describe some facet of their behavior (Hinkin, 1995, 1998). Responses are then categorized into a number of categories by content analysis based on key words or themes. The Flow State Scale developed by Jackson and Marsh (1996) used the deductive approach, where the authors developed items that represented nine dimensions that represent the flow construct as defined by Csikszentmihalyi (1975). The Dispositional Flow Scale developed by Jackson and Eklund (2002) also followed the deductive approach, where the authors focused on the dispositional tendency to experience flow. The approach followed in the current study was also a deductive one. The items were developed based on the theoretical foundation that defines flow, by taking into consideration the six dimensions, as well as the preconditions that make up the construct. The theory of the flow construct has been outlined in the previous sections.

The process followed in Study 1 included looking at published sources such as the items in the Flow State Scale (Jackson & Marsh, 1996), as well as a theoretical understanding of flow.

However, for the purposes of this scale, the items were more tailored to activities performed in the workplace because the primary goal of this study was to develop a scale that would measure flow at work. Additionally, the items were written in a language which was comprehensible to individuals who are not familiar with the concept of flow.

One of the main focuses of this study was to develop a short scale that measures flow. Keeping the length of the scale short will reduce fatigue and will be more convenient, as it will be completed in the workplace, and will take less time. This scale also focused on measuring flow as a state; given the fact that majority of findings indicate that flow is predominantly a task-related state. As mentioned previously, studies that have assessed the experience of flow have found that flow is more susceptible to task-related characteristics compared to dispositional factors (Fullagar & Kelloway, 2009). In developing the items, the initial item pool consisted of 45 items; 5 items per dimension for the six dimensions (*an intense focus and concentration on the task at hand, a merging of action and awareness, a sense of control over what one is doing, loss of self-consciousness, a transformation of one's perception of time passing, and a sense of enjoyment in the intrinsic motivation of the activity)* and 5 items for every precondition of flow (*challenge and skill balance, clear goals, and unambiguous feedback)* which were provided to four subject matter experts (SMEs). The initial item pool can be seen in Table 4 and Table 6. Two items, in addition to the initial 30 items representing the dimensions of flow were provided to the four SMEs for feedback. These two items can be seen in Table 5. SMEs included professors and faculty members who have had extensive research experience in the area of scale development, flow research and who possess sound knowledge and an understanding of the concept of flow. SMEs were provided instructions to look for items that may seem double barreled, to assess the language used for the items in order to make sure that it is easy for the

target audience, and to assess the content validity to make sure it represents the construct under interest. SMEs were also asked to categorize items into dimensions and preconditions of flow, as these two will be presented as separate categories in the scale. In order to make sure that the items are classified appropriately, interrater reliability was assessed based on the agreement level of the SMEs. Ideally, 3/4 raters (80%) were required to agree with the classification of a particular item into either a dimension or a precondition of flow. Also, based on the feedback provided by the SMEs on quality and clarity of the wording of each item, they were either to be retained or deleted. According to Hinkin (1995) enough items must be developed to allow for deletion, as some items that appear to be valid might not be judged by others to be so and factor and reliability analyses often necessitate the deletion of items later in the process. Lastly, subject matter experts also reviewed the test items for accuracy, wording, grammar, ambiguity, as well as other technical flaws. On reviewing feedback received, and results obtained from the SMEs, problem items were modified and a total of 27 items; 3 items for each dimension, and 3 items for each precondition, were retained. In this manner, content validity of the measure was ensured through the process of item development, by taking into consideration the multidimensional nature of flow. Items included in the final version of the scale can be seen in Table 7.

Table 4. Initial item pool for dimensions of flow with subject matter expert feedback

Item no.	Dimensions of Flow	Part of Final scale	No. Agree
1.	I really enjoyed working on the task	N	2
2.	I didn't realize how quickly time had passed	N	2
3.	I automatically worked through the task	N	2
4.	I was not concerned what my colleagues were thinking of me	N	2
5.	I could control my actions	N	2
6.	Nothing distracted me while working on the task	N	0
7.	I worked through the task effortlessly	N	2

8.	I was internally motivated to complete the task	N	2
9.	The experience of working on the task made me feel good	N	2
10.	I was so absorbed in the task that I forgot to take a break	N	1
11.	Time did not matter when I was working	**Y**	4
12.	I was concentrating exclusively on the task at hand	**Y**	4
13.	I felt completely in control of my actions while working on the task	**Y**	4
14.	Time just passed when I was working	**Y**	4
15.	I was not concerned about how my performance was	**Y**	4
16.	I did not have to make an effort to work on the task	N	0
17.	My concentration on the task did not waiver at any point	N	2
18.	I was in total control of my actions	**Y**	4
19.	I did not notice time passing	N	0
20.	I felt the experience was very rewarding	**Y**	4
21.	I was not conscious of how I physically looked while working on the task	**Y**	4
22.	My attention was centered completely on the task	**Y**	4
23.	Time seemed to speed up when I was working	**Y**	4
24.	I had control over what I was doing	N	3
25.	I did not have to make an effort to complete the task	**Y**	4
26.	I enjoyed the experience of working on the task	**Y**	4
27.	I was in control of the situation while working on the task	**Y**	4
28.	It was not difficult for me to concentrate	**Y**	4
29.	I forgot myself while working on the task	**Y**	4
30.	The activities to perform the task came automatically to me	**Y**	4

Table 5. Two Items that required further assessment by SMEs

	Dimensions of Flow	Part of final scale	No. Agree
1.	Things happened spontaneously when performing the task	**Y**	4
2.	I worked on this because I get pleasure from doing it	**Y**	4

Table 6. Initial item pool for preconditions of flow with subject matter expert feedback

Item no.	Preconditions of Flow	Part of final scale	No. Agree
1.	I had a strong sense of what I wanted to accomplish	**Y**	4
2.	I knew what course of action to take based on how the task progressed	**Y**	4
3.	I felt I was skilled enough to perform the task well	**Y**	4
		N	0
4.	I was well aware of my goals regarding the task		
5.	I knew how I was progressing with the task	**Y**	4
6.	I felt I had the skills necessary to overcome the challenges the task offered	N	2
7.	I was aware of the mistakes I made while working on the task	**Y**	4
8.	My goals were clearly defined	N	2
9.	I felt the challenges the task offered and my skill level were equal	**Y**	4
10.	I could tailor my performance while working on the task	N	3
11.	I felt competent enough to perform the task	N	2
12.	I knew exactly what the objectives of the task were	**Y**	4
13.	My skills matched the challenges of the task	**Y**	4
14.	I was aware of how I was performing	N	3
15.	My goals concerning the task were very clear	**Y**	4

Table 7. Final version of the Work-Flow Scale

Item no.	Dimensions of Flow	Response Options
	Concentration	
1.	I was concentrating exclusively on the task at hand	1 2 3 4 5
2.	My attention was centered completely on the task	1 2 3 4 5
3.	It was not difficult for me to concentrate	1 2 3 4 5
	Merging of Action and Awareness	
4.	I did not have to make an effort to complete the task	1 2 3 4 5
5.	The activities to perform the task came automatically to me	1 2 3 4 5
6.	Things happened spontaneously when performing the task	1 2 3 4 5
	Sense of Control	
7.	I felt completely in control of my actions while working on the task	1 2 3 4 5
8.	I was in total control of my actions	1 2 3 4 5
9.	I was in control of the situation while working on the task	1 2 3 4 5

Loss of Self-Consciousness	
10. I was not concerned about how my performance was	1 2 3 4 5
11. I was not conscious of how I physically looked while working on the task	1 2 3 4 5
12. I forgot myself while working on the task	1 2 3 4 5
Time Distortion	
13. Time did not matter when I was working	1 2 3 4 5
14. Time just passed when I was working	1 2 3 4 5
15. Time seemed to speed up when I was working	1 2 3 4 5
Enjoyment	
16. I felt the experience was very rewarding	1 2 3 4 5
17. I enjoyed the experience of working on the task	1 2 3 4 5
18. I worked on this because I get pleasure from doing it	1 2 3 4 5
Preconditions of Flow	
Challenge and Skill	
19. I felt I was skilled enough to perform the task well	1 2 3 4 5
20. I felt the challenged the task offered and my skill level were equal	1 2 3 4 5
21. My skills matched the challenges of the task	1 2 3 4 5
Clear Goals	
22. I had a strong sense of what I wanted to accomplish	1 2 3 4 5
23. I knew exactly what the objectives of the task were	1 2 3 4 5
24. My goals concerning the task were very clear	1 2 3 4 5
Unambiguous Feedback	
25. I knew what course of action to take based on how the task progressed	1 2 3 4 5
26. I knew how I was progressing with the task	1 2 3 4 5
27. I was aware of the mistakes I made while working on the task	1 2 3 4 5

Note. 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree

Stage 2 – (a) Building the scale- Hinkin (1995) mentions a few issues that can influence item development. First, and most important, it is a necessary prerequisite for new measures to establish a clear link between items and their theoretical domain and this can be accomplished by beginning with a strong theoretical framework with the aim of developing a scale that is internally consistent, parsimonious, and comprised of the minimum number of items that adequately assesses the domain of interest (Thurstone, 1947). Both adequate domain sampling

and parsimony are important to obtain content and construct validity (Cronbach and Meehl, 1955).

According to Hinkin (1995), negatively worded items could be an issue of concern too. In the recent years, negatively worded items, or items that need to be reverse scored have come under scrutiny by a number of researchers. Reverse-scoring of items has shown to reduce the validity of questionnaire responses (Schriesheim & Hill, 1981), and may introduce systematic error to a scale (Jackson, Wall, Martin & Davis, 1987). Researchers have also shown that they may result in an artificial response factor consisting of all negatively worded items (Harvey, Billings & Nilan, 1985). In order to avoid issues associated with negatively worked items, no reverse coded items were included in developing the current flow scale.

Assuming that items have been developed that provide adequate content validity; the second primary concern in scale construction is scale length to assure adequate domain sampling, reliability, and to minimize response biases. Most researchers who utilize self-report measures as a way of assessment are aware of social desirability as one of the main biases that can influence responses provided. It is referred to as social desirability because questionnaire items may prompt responses that will present the participant in a favorable light. In order to overcome this bias, participants were assured of the anonymity of their responses thereby eliminating the incentive of providing socially desirable responses. The requirement of complete anonymity is presumed to accelerate collection of more accurate data by reducing social desirability pressures.

Sample and Participants- There were a number of other issues that had to be taken care of at this stage too. The first issue deals with the sample chosen and the sample size, which should be representative of the population that the scale will be administered to in the future and to which results can be generalized. Sample size also has to be taken into consideration as the

results of many multivariate techniques can be sample specific and increases in sample size may ameliorate this problem (Schwab, 1980). Hinkin (1995) recommends that "minimum sample sizes of between 150 to 200 observations should be adequate for most scale development efforts". Correlation coefficients also have a tendency to be less reliable when estimated from small samples. It is important that the sample size be large enough that correlations are reliably estimated (Tabachnik & Fidell, 2001). The required sample size also depends on magnitude of population correlations and number of factors: if there are strong, reliable correlations and a few, distinct factors, a smaller sample size is adequate. Comrey and Lee (1992) provide as a guide, sample sizes of "50 is very poor, 100 is poor, 200 is fair, 300 is good, 500 is very good, and 1000 is excellent" (Pearson & Mundform, 2010; Tabachnik & Fidell, 2001). According the Tabachnik & Fidell (2001), as a general rule of thumb, it is comforting to have at least 300 cases for a confirmatory factor analysis, therefore the proposed sample size for this scale was three hundred participants for the first set of confirmatory factor analyses. Responses from a second holdout sample of 200 respondents was also collected in order to assess model fit in a second confirmatory factor analysis. A large sample is necessary so that confirmatory factor analysis (CFA) results can be validated against an adequately sized hold out sample. Researchers, especially Hinkin (1995) and Tabachnick and Fidell (2007) recommend a subject to item ratio of at least 10:1 for scale development studies. This is especially important when using multivariate techniques like factor analysis because results have been shown to be sample specific with smaller sample sizes (Schwab, 1980).Utilizing a large sample size may improve on such issues.

The sample for the purpose of developing the current scale was collected from Amazon Mechanical Turk (MTurk), which included working professionals from varying occupations. Since this scale will primarily be used in an organizational context the sample was representative

of such a population. The pilot version of the scale was available to participants, including males and females, over 18 years of age and were currently a part of the workforce, through MTurk, and were reimbursed $1, as an incentive to participate. Participants included in the original sample consisted of males (56.3%) and females (43.0%), between the age of 18-65 years. In terms of occupation, 71.3% of respondents worked in private for-profit organizations. The holdout sample included males (59.3%) and females (39.2%). Even for the holdout sample a major percentage of respondents (70.9%) worked in private for-profit organizations. Scholars have raised concerns about online samples (Couper, 2000), arguing mainly that they tend to suffer from self-selection bias and thus could limit generalizability. However, Highhouse & Gillespie (2009) cite findings from five meta-analyses and make an empirical argument that the specific nature of the sample does not impact the (theoretical) generalizability of research findings. Also, the capability to recruit from diverse backgrounds can alleviate the concerns regarding the oversampling of participants from WEIRD (Western, Educated, Industrialized, Rich, and Democratic) backgrounds (Heinrich et al, 2010; Landers and Behrend, 2015). In addition, Horton (2011) found that experiments conducted on Mechanical Turk were as valid (both internally and externally) as other kinds of experiments (i.e., laboratory and field experiments), while reducing researcher time, costs, and inconvenience. These findings, coupled with the ease of data collection associated with online samples, and the fact that online samples are likely more demographically diverse than a typical introductory psychology course sample, justifies the use of an online sample for the current research. In terms of the item format used, the standard Likert scale format was employed for the purposes of this dissertation. One of the main advantages of using a Likert scale format is by providing a neutral response option respondents are not required to decide one way or the other on an issue; this may decrease the chance of

response bias, which refers to the tendency to favor one response over others (Fernandez & Randall, 1991). Respondents will not feel forced to have an opinion if they do not have one. For the purpose of this study, the scale responses ranged from Strongly Disagree to Strongly Agree, so there were five response anchors. Consensus among researchers suggests that when using Likert scales, five to seven response anchors are optimal (Hinkin, 1995).

As mentioned previously, one of the main goals of Study 1 was to ensure that the length of the scale remained short. The short length of the scale will let employees to complete the scale without letting fatigue or boredom affect their responses. Even though this scale will be short, it will sample the domain adequately, as there will be items representing all the six dimensions of the flow experience, and the three pre conditions, having its content validity already established, as stated above. After the initial pool of items was developed, scrutinized and administered to a large and appropriately representative sample, the model fit was assessed with a confirmatory factor analysis (CFA).

Proposed Analyses

Once items for the work-flow scale were developed and content validity of the scale had been established, confirmatory factor analysis was conducted on two separate samples (first sample, and a holdout sample) in order to examine model fit, and cross-validate findings. Analyses followed recommendations suggested by Hinkin (1995).

(b) Scale refinement/scale reduction- According to Hinkin (1995), factor analysis is the most commonly used analytic technique for data reduction and refining constructs. The key purposes of either exploratory or confirmatory factor analysis in scale construction are to examine the stability of the factor structure and provide information that will facilitate the refinement of a new measure. (Hinkin,1995). Exploratory techniques allow the elimination of

obviously poorly loading items, and the advantage of the confirmatory (LISREL, or similar approaches) analysis is that it allows the researcher more precision in evaluating the measurement model. Since the factor structure of flow has been established in a number of studies (Jackson & Marsh, 1996), a confirmatory factor analysis (CFA) was conducted on the first sample of 300 participants to assess model fit.

Confirmatory factor analysis (CFA) i.e. structural equation modeling (SEM) is defined by Tabachnik and Fidell (2007) as "a group of statistical methods that allow a set of relationships between independent variables, either continuous or discrete, and dependent variables, either continuous or discrete", (Tabachnick & Fidell, 2007, 2012; Ullman & Bentler, 2013; Ullman, 2001, 2012; Stoelting 2009) to be examined. In carrying out the CFA, an a priori structure will be posited and the ability of the solution will be tested based on this structure to fit the data by demonstrating that (a) the solution is well defined, (b) parameter estimates are consistent with theory and a priori predictions, and (c) the chisquare likelihood ratio and subjective fit indices are reasonable (Marsh, Balla, & McDonald, 1988; McDonald & Marsh, 1990; Marsh, Hau & Grayson, 2005). For the current study, model fit was assessed by looking at the χ^2 test statistic, the goodness of fit index (GFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) to evaluate the goodness of fit. The χ^2, which is an absolute fit index, provides the basis for statistical tests of the lack of fit resulting from overidentifying restrictions placed on models. Lastly, the goodness of fit index (GFI) is analogous to R^2 in regression in that it calculates the proportion of variance in the sample covariance matrix that is explained by the estimated population covariance matrix (Tabachnick & Fidell, 2007). Values range from 0 to 1 with values of .95 or higher indicating greater variance explained, and thus a better fitting model. The CFI assesses the relative reduction in lack of fit as estimated by

referencing the noncentral χ^2 of a target model to a baseline model. The RMSEA assesses the fit function of a target model adjusted by degrees of freedom. GFI and CFI values exceeding .90 and .95 are typically taken to reflect acceptable and excellent fits to the data (Hu & Bentler, 1999). For the RMSEA, values of less than .05 and .08 are taken to reflect, respectively a close fit and a reasonable fit (Brown & Cudeck, 1992).

(c) Reliability- The next step associated with scale development pertains to the assessment of reliability. The reliability of a scale is assessed by calculating its internal consistency using the Cronbach's alpha (Price & Mueller, 1986), as one of the main concerns with respect to reliability are the internal consistency of items within a measure. Internal consistency describes estimates of reliability based on average correlation among items within a test. Coefficient alpha (Cronbach's alpha) reflects both the number of items and their average correlation. It sets an upper limit for the reliability of tests constructed in terms of the domain sampling model based upon observed correlations. If the alpha is very low, the test is either too short or the items have very little in common (Nunnally, 1978). Almost 20 years ago Nunnally (1978) recommended that an alpha of .70 be the minimum acceptable standard for demonstrating internal consistency and there is little reason to believe that anything less than that is adequate today. An alpha of 70% essentially means that 30% of the variance in scale scores is due to random error. Items in the current scale would be dropped based on the value of the Cronbach's alpha. The item total statistics were also assessed in order to understand the implications of deleting certain items based on the Cronbach's alpha. In addition to that, if an item has a sufficiently lower than average correlation with the other items, it will be deleted, because if the average correlation with the other items is only slightly below, or equal to or above the overall average, then retaining the item increases the alpha. Therefore, items that contributed the least to

the internal consistency of the scale would be dropped. According to Hinkin (1995) low scale reliability is largely a byproduct of problems at the item generation and scale construction steps.

A second CFA was also carried out at this point to test the fit of the revised model on a holdout sample of 200 respondents. This was done to primarily assess model fit one more time, after conducting a reliability analysis, and, if required, condensing the scale to fewer items based on the results of the reliability analysis. The overall objective of this step was to evaluate the structure and the integrity of the final version of the scale and to be as transparent as possible with the various decisions made to retain or delete items, model fit, etc.

Results – Study 1

As stated in the introduction, even though there is strong agreement among researchers on the definition of flow, there is some level of disagreement as to how flow should be measured (Moneta, 2012). Qualitative and quantitative research over a variety of work and leisure activities has indicated that the experience of flow consists of the six components or dimensions discussed in the literature review (Nakamura & Csikszentmihalyi, 2009). These six dimensions of flow include:

1. ***Concentration***: Total concentration on the task at hand occurs when in flow (Csikszentmihalyi, 1990).
2. ***Merging of Action and Awareness***: Involvement in the flow activity is so deep that it becomes spontaneous or automatic (Jackson & Marsh, 1996).
3. ***Sense of Control***: A sense of exercising control is experienced without the person actively trying to exert control (Jackson & Marsh, 1996).
4. ***Loss of Consciousness***: Concern for the self disappears during flow as the person becomes one with the activity (Jackson & Marsh, 1996).

5. ***Time Distortion***: Time may simply become irrelevant and out of one's awareness when performing the activity (Jackson & Marsh, 1996).
6. ***Enjoyment***: This dimension is described by Csikszentmihalyi (1975) as the end result of being in flow.

Three preconditions necessary to induce flow were also identified:

1. ***Challenge Skill Balance***: Flow tends to occur when there is a balance between perceived challenges and perceived skills (Csikszentmihalyi, 1975).
2. ***Clear Goals***: The second precondition of flow is that the activity engaged in should have clear and proximal goals (Csikszentmihalyi, 1990).
3. ***Unambiguous Feedback***: Flow is dependent on the task providing immediate feedback. The individuals need to continually negotiate the changing task demands (Csikszentmihalyi, Abuhamdeh & Nakamura, 2005).

These preconditions may be argued to be structural task characteristics rather than components of the subjective experience of flow (Nakamura & Csikszentmihalyi, 2009).

To begin with, means and standard deviations of the variables, and the zero order correlations were examined, which can be seen in Tables 8 & 9. This was followed by a reliability analysis of the original pool of 27 items to guide the first stage of item reduction. Reliability analysis was conducted for the eighteen items that measured the dimensions of flow, for which the value of the Cronbach's alpha was 0.806. A second reliability analysis was carried out on the nine items that measured the preconditions of flow. The value of the Cronbach's alpha was 0.833. None of the items were lowering the internal consistency of the dimensions and the preconditions of flow. Nunnally, (1994) recommends a 0.70 as a minimum cutoff value for Cronbach's alpha, and given that the value of alpha was higher than .70 for the dimensions and

the preconditions the total item pool of 27 items was retained. Data screening procedures following Tabachnick & Fidell (2007), were conducted. There were missing data, but none of the variables had more than 5% of missing values. If only a few data points such as 5% or less are missing in random pattern from a large data set, the problem of missing data is less serious (Tabachnik & Fidell, 2007). Since the data were missing in a random pattern, in that very few cases had missing data, and those cases had data missing on different variables, the expectation maximization technique was used to fill in the missing data. The next assumption tested was that of multivariate normality, which essentially means that each variable and all linear combinations of the variables are normally distributed. Since it is impractical to test an infinite number of linear combinations of variables for normality, skewness and kurtosis tests were done for each item instead, the results of which are included in Table 10.

Table 8. Means and Standard Deviations

	Mean	Std. Deviation
Dimensions		
C1	4.28	.672
C2	4.24	.793
C3	4.02	.963
MAA1	2.67	1.209
MAA2	3.97	.924
MAA3	3.20	1.177
SC1	4.34	.709
SC2	4.39	.724
SC3	4.23	.687
LC1	3.80	1.255
LC2	3.39	1.161
LC3	2.28	1.194
E1	3.57	1.082
E2	3.54	1.199
E3	3.02	1.221
TD1	3.38	1.191
TD2	4.01	.973
TD3	3.57	1.151
Preconditions		
CS1	4.49	.676
CS2	4.08	.881
CS3	4.26	.785
CG1	4.42	.698
CG2	4.48	.649
CG3	4.49	.604
UF1	4.34	.662
UF2	4.38	.682
UF3	3.75	.952

Note. C – Concentration, MAA- Merging of action and awareness, SC – Sense of Control, LC – Loss of Consciousness, E – Enjoyment, TD – Time Distortion, CS – Challenge & Skill, CG – Clear goals, UF – Unambiguous Feedback

Table 9. Zero Order Correlations for Dimensions and Preconditions of Flow

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1. C1	1																										
2. C2	.634*	1																									
3. C3	.369*	.435**	1																								
4. MAA1	.058	.082	.169**	1																							
5. MAA2	.168**	.221**	.197**	.103	1																						
6. MAA3	.185**	.147*	.190**	.119*	.251**	1																					
7. SC1	.314**	.338**	.409**	.014	.394**	.154**	1																				
8. SC2	.309**	.342**	.313**	.060	.363**	.258**	.676**	1																			
9. SC3	.305**	.258**	.228**	.056	.347**	.192**	.573**	.546**	1																		
10. LC1	.031	.057	.051	.018	.003	.129*	.032	.069	.000	1																	
11. LC2	.203**	.220**	.271**	.036	.097	.397**	.163**	.205**	.133*	.338**	1																
12. LC3	-.072	-.053	.043	.292**	.020	.226*	(-).173**	-.106	(-).123*	.077	0.135*	1															
13. E1	.194**	.213**	.215**	.041	.105	.227**	.203**	.158**	.220**	-.005	.180**	-.020	1														
14. E2	.267**	.296**	.318**	.117	.242**	.272**	.205**	.245**	.278**	-.067	.277*	.102	.621**	1													
15. E3	.126*	.130*	.175**	.150	.152*	.227**	.079	.062	.230**	-.044	.151*	.208**	.598**	.657**	1												
16. TD1	.128*	.194**	.237**	.232**	.230**	.220**	.143*	.177**	.117*	.198**	.255**	.245**	.243*	.278**	.275**	1											
17. TD2	.193**	.189**	.231**	.053	.170*	.278**	.234**	.229**	.163**	.108	.360*	-.035	.256**	.330*	.267**	.259**	1										
18. TD3	.209**	.172**	.192**	.006	.182**	.314**	.224**	.212**	.271**	.079	.421**	.023	.322**	.390**	.318**	.305**	.583**	1									
19. CS1	.270**	.253**	.299**	-.017	.399**	.099	.601**	.548**	.504**	-.018	.103	(-).224**	.014	.078	-.070	.044	.179**	.112	1								
20. CS2	.240**	.290**	.347**	-.010	.183**	.086	.471**	.371**	.370**	.081	.184**	(-).130*	.335**	.288**	.185**	.115	.224**	.117*	.374*	1							
21. CS3	.259**	.315**	.293**	.068	.262**	.095	.443**	.387**	.378**	-.016	.116	(-).174**	.228**	.267**	.094	.124*	.190**	.136*	.453**	.626*	1						
22. CG1	.240**	.299**	.392**	-.031	.251**	.112	.494**	.455**	.349**	.107	.180**	(-).224**	.111	.135*	-.017	.070	.205**	.130*	.482**	.404**	.327**	1					
23. CG2	.274**	.345**	.197**	-.029	.338**	.108	.513**	.461**	.429**	.133*	.119*	(-).218**	.049	.021	-.074	.096	.158**	.119*	.522**	.276**	.356**	.507**	1				
24. CG3	.281**	.366**	.260**	-.023	.325**	.064	.512**	.479	.434	.138*	.159**	(-).271**	.061	.025	-.055	.014	.170**	.133*	.523**	.349**	.384**	.484**	.608**	1			
25. UF1	.259**	.350**	.350**	.061	.324**	.127*	.497**	.513**	.476**	.056	.163**	(-).192**	.176**	.174**	.065	.138*	.251**	.202**	.522**	.371**	.381**	.477**	.521**	.500**	1		
26. UF2	.317**	.359**	.300**	-.039	.249**	.143*	.620**	.598*	.469**	.063	.136*	(-).285**	.135*	.134*	-.019	.072	.146*	.185**	.5498*	.330**	.341**	.490**	.569**	.543**	.526**	1	
27. UF3	.059	.120*	.115	-.041	-.020	-.050	.104	.053	.035	-.051	-.006	-.114	.104	.024	.036	-.013	.048	.062	.091	.143*	.217**	.137*	.170**	.176**	.145*	.114	1

** p < 0.01 level

*p < 0.05 level

Note. C – Concentration, MAA- Merging of action and awareness, SC – Sense of Control, LC – Loss of Consciousness, E – Enjoyment, TD – Time Distortion, CS – Challenge & Skill, CG – Clear goals, UF – Unambiguous Feedback

Table 10. Tests of Normality

Items	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
C1	-1.038	.145	2.210	.289
TD2	-1.158	.145	1.148	.289
CG1	-1.049	.145	.767	.289
E3	-.024	.145	-1.012	.289
SC3	-.735	.145	.849	.289
CS2	-.910	.145	.598	.289
E1	-.465	.145	-.523	.289
UF1	-.793	.145	.800	.289
CG3	-1.047	.145	1.553	.289
LC1	-.887	.145	-.341	.289
C3	-1.108	.145	.915	.289
CS1	-1.178	.145	.972	.289
SC1	-.900	.145	.622	.289
UF2	-1.129	.145	1.809	.289
SC2	-1.201	.145	1.520	.289
C2	-1.054	.145	1.005	.289
MAA1	.432	.145	-.859	.289
CS3	-1.247	.145	2.207	.289
TD1	-.394	.145	-.850	.289
CG2	-1.007	.145	.603	.289
E2	-.560	.145	-.622	.289
LC2	-.326	.145	-.905	.289
MAA3	-.173	.145	-.950	.289
LC3	.757	.145	-.379	.289
UF3	-.981	.145	.963	.289
MAA2	-.926	.145	.562	.289
TD3	-.537	.145	-.666	.289

Note. C – Concentration, MAA – Merging of Action and Awareness, TD – Time Distortion, E – Enjoyment, SC – Sense of Control, LC – Loss of Self- Consciousness, CS – Challenge and Skill, CG – Clear Goals, UF – Unambiguous Feedback

Some of the variables in this dataset were found to be non-normal, whereas some had no issues with skewness or kurtosis. Even though there was univariate non-normality in the case of some variables, even if transformations were attempted, it would not have necessarily addressed issues of multivariate normality (Tabachnik & Fidell, 2007). Therefore, no transformations were

made to the data. Next, multicollinearity was evaluated using a conservative variance inflation factor (VIF) threshold of three (larger VIF values indicate higher standard error). Using an iterative process, 26 of the 27 independent variables (IV) were regressed onto one IV which was used as a dependent variable (DV). All VIF values were below 3 indicating no issues with multicollinearity in the data set. Data were also checked for univariate outliers, by converting item scores to zscores. Outliers were those cases that exceeded the z +/- 3.29 criterion. There were no univariate outlier cases in the data set. Multivariate outliers were checked using Mahalonobis Distance (MD), which were computed by regressing all 27 scale items against a dummy dependent variable (Organization type). This variable was created as a dummy dependent variable primarily, to compute multivariate outliers. MD values were then compared against a chi square distribution table. Any values that fell below a $p < .001$ were identified as outliers. There were 18 multivariate outliers which were deleted from the dataset. Outliers are observations or measures that are suspicious because they are much smaller or much larger than the vast majority of the observations. These observations are problematic because they may not be caused by the mental process under scrutiny or may not reflect the ability under examination. The problem is that a few outliers are sometimes enough to distort the group results (Cousineau et al, 2010). It is important to eliminate outliers as they can influence the outcome of the statistical analyses. Finally, 282 cases were retained for model development and confirmatory factor analysis (CFA).

As mentioned, 282 cases were retained for model development and confirmatory factor analyses. Factor models were tested with the structural equation modeling software program AMOS 26 (Arbuckle, 2009) using maximum likelihood estimation (MLE), as it is the most commonly used method. A primary concern in CFA is assessing the fit of the proposed model(s)

to the data (more specifically, the fit between the sample and estimated population covariance matrices). "Fit", as noted by Tabachnick & Fidell (2007), is commonly tested against a non-significant χ^2 as the criterion. However, with large sample sizes trivial differences between the sample and estimated covariance matrices are often significant because the calculation of χ^2 involves multiplying the minimum of the function by N – 1 (in the current research N – 1 = 281). Thus, researchers have proposed a variety of other descriptive model fit indices; and which indices are used is a matter of personal preference for the researcher (Tabachnick & Fidell, 2007). Fortunately, good-fitting models tend to produce consistent results on the various indices, so if several indices suggest good model fit to the data, chances are the other indices will be good as well. For the current research, the following test statistics and indices were used to assess goodness of fit: χ^2, χ^2 / *df* comparative fit index (CFI), goodness-of-fit index (GFI), and root mean squared error of approximation (RMSEA). CFI is important because it is a relative index i.e., it compares the estimated population covariance matrix against both an independent model (comprised of unrelated variables) and a saturated (perfect fitting) model. The resulting fit index lies in the 0 to 1 range with values approaching 1 considered optimal. Hu & Bentler (1999), recommend a CFI value of .90 (or higher) as indicative of a good fitting model. RMSEA is also important because it provides a slightly different fit assessment. RMSEA estimates the lack of model fit compared to a saturated (perfect) model. When model fit is perfect the RMSEA yields a value of zero; as model misspecification increases the RMSEA value increases indicating a poor fitting model. Hu & Bentler (1999), recommend a RMSEA value of .06 (or less) as indicative of a well-fitting model. The final fit index used in the current research (GFI), as mentioned in the introduction, is analogous to R^2 in regression in that it calculates the proportion of variance in the sample covariance matrix that is explained by the estimated population

covariance matrix (Tabachnick & Fidell, 2007). Values range from 0 to 1 with values of .95 or higher indicating greater variance explained, and thus a better fitting model. In sum, the current research uses a variety of model fit indices as criteria for testing model fit: χ^2, χ^2/df F <= 2 (Tabachnick & Fidell, 2007); for CFI, GFI, and RMSEA, the current research also follows the cut-off recommendations of Hu & Bentler (1999) mentioned above.

Second order confirmatory factor analysis, which is a statistical method used to confirm that the theorized construct loads into certain number of underlying sub-constructs or components (Awang, 2014), was conducted to assess for model fit. In order to give good reason for the measurement of flow with two separate models, a unidimensional second order model of flow was tested first, which included Flow as the main construct, and the dimensions of flow and the preconditions of flow as two latent factor indicators of which all loaded on a single factor of Flow, followed by a second order two dimensional model of flow, where the first second order model included Experiential Flow, and the Preconditions of Flow as main constructs, and the dimensions, and preconditions of flow as the sub constructs. The first second order unidimensional model including the dimensions and the preconditions of flow demonstrated a moderate level of fit: [$\chi2(317)= 841.437$, p=.000; $\chi2/DF = 2.65$; RMSEA=.07; CFI=.812; GFI=.806], however, none of the model fit indices were in the range discussed by Hu & Bentler (1999). This model is shown in Figure 5.

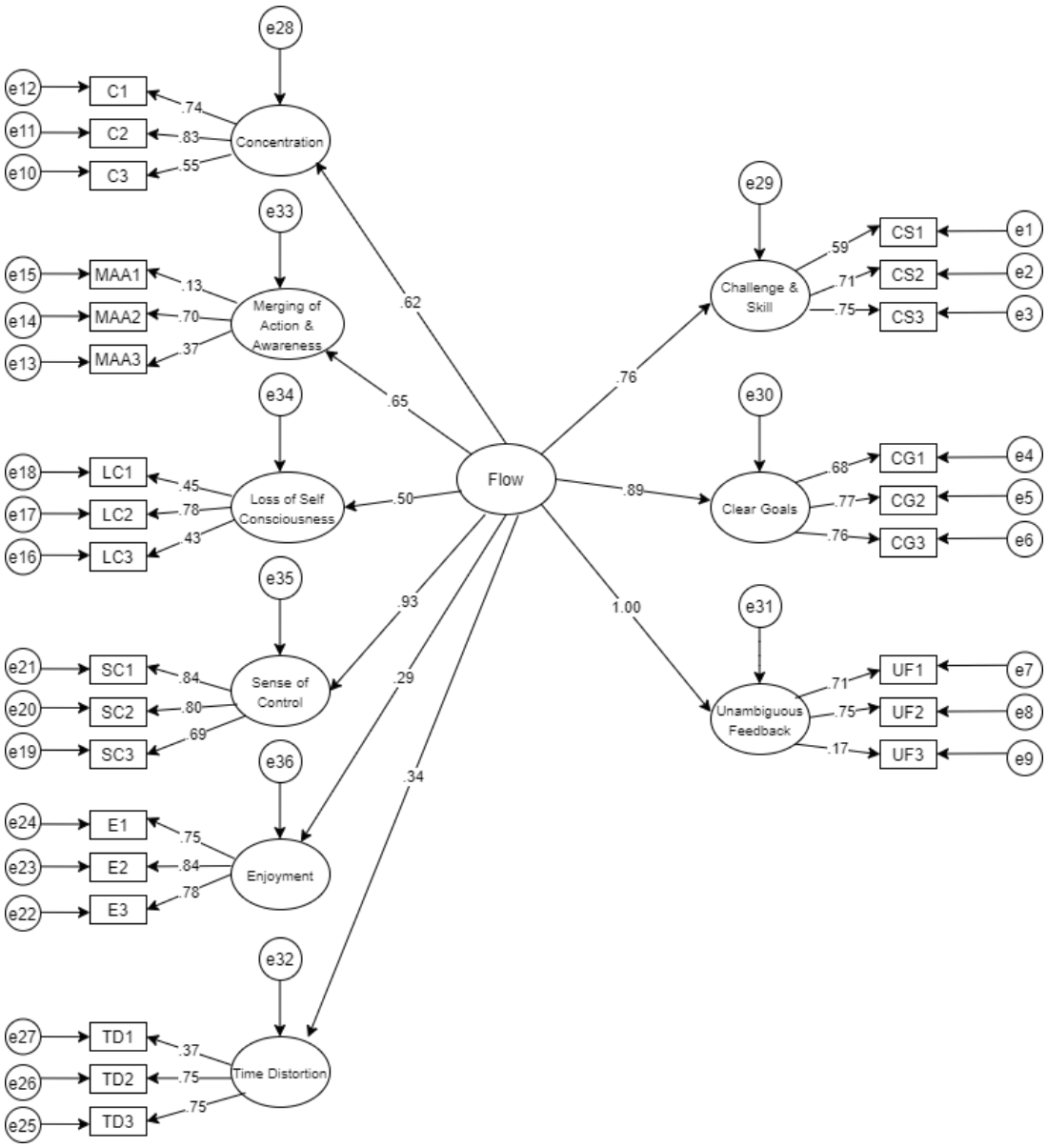

Figure 5. A second order unidimensional confirmatory factor analysis model of Flow

Note. Items on the right measure Preconditions of Flow and the items on the left measure Dimensions of Flow. The model shows associations between the preconditions of flow (CS: Challenge and Skill, UF: Unambiguous Feedback, CG: Clear Goals), flow, and the dimensions of flow (C: Concentration, MAA: Merging of Action and Awareness, SC: Sense of Control, LC: Loss of Consciousness, TD: Time Distortion, E: Enjoyment)

Modification indices were examined for this model to possibly provide better fit, however too many modifications were suggested which could not theoritically be justified. It is

not regarded as appropriate to add every modification into a model in confirmatory factor analysis; therefore, no changes were made to the model (Simsek, 2007).

A second order two-dimensional model of flow was tested next, with indicators of the dimensions and the preconditions of flow, loading on two latent factors (Preconditions of Flow, and Experiential Flow). This model can be seen in Figure 6. The two dimensional model also showed a moderate level of fit, however it was better than the unidimensional second order model, but fit indices were still not within the range suggested by Hu & Bentler (1999); [$\chi 2(316)= 802.227$, p=.000; $\chi 2/DF = 2.53$; RMSEA=.07; CFI=.826; GFI=.808].

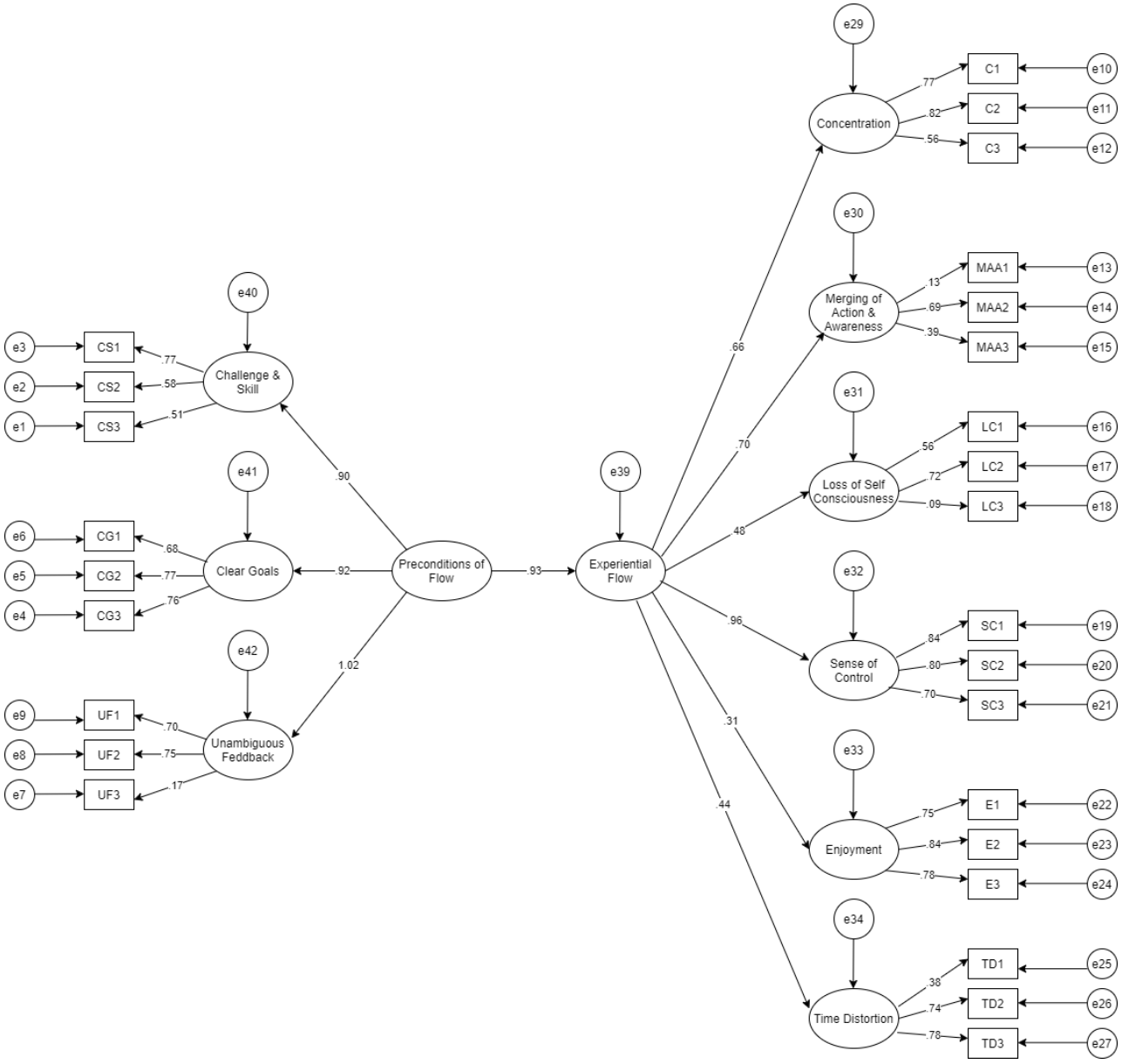

Figure 6. A second order two-dimensional confirmatory factor analysis model of flow with Experiential Flow and Preconditions of Flow as latent variables

Note. The model shows associations between two latent variables; PF: preconditions of flow (CS: Challenge and Skill, UF: Unambiguous Feedback, CG: Clear Goals), flow, and the EF: Experiential Flow (C: Concentration, MAA: Merging of Action and Awareness, SC: Sense of Control, LC: Loss of Consciousness, TD: Time Distortion, E: Enjoyment)

On examining the modification indices for the second order two-dimensional model, correlating error terms e13 with e18, error terms e15 with e17, and e2 and e1 showed an improvement in model fit. Scale items e2 and e1 included "*I felt the challenges the task offered*

and my skill level were equal" and "*my skills matched the challenges of the task*", from the sub-dimension of Challenge and Skill from Preconditions of Flow. Since the items belonged to the same sub-dimension they could have been viewed as similarly worded. The scale items for e13 and e18 were "*I did not have to make an effort to complete on the task*", and "*I forgot myself while working on the task*", which came from separate dimensions, the former being one from Merging of Action and Awareness, and the latter from Loss of Self Consciousness. Scale items for error terms e15, and e17 include "*things happened spontaneously when performing the task*" and "*I was not conscious of how I physically looked while working on the task*". According to Simsek (2007) modifications added to the model should possess a certain theoretical background. In this context two items could be interpreted to have a similar meaning; for the sum-dimensions of Merging of action and awareness, and Loss of Consciousness the items could have been viewed at similarly worded, given that both dimensions measure being completely immersed in an activity. The modified 27-item second order two-dimensional model, demonstrated an improved level of fit compared to the previous model: [$\chi 2(313)= 677.174$, $p=.000$; $\chi 2/DF = 2.16$; RMSEA=.06; CFI=.870 :GFI=.840]. This model appears in Figure 7.

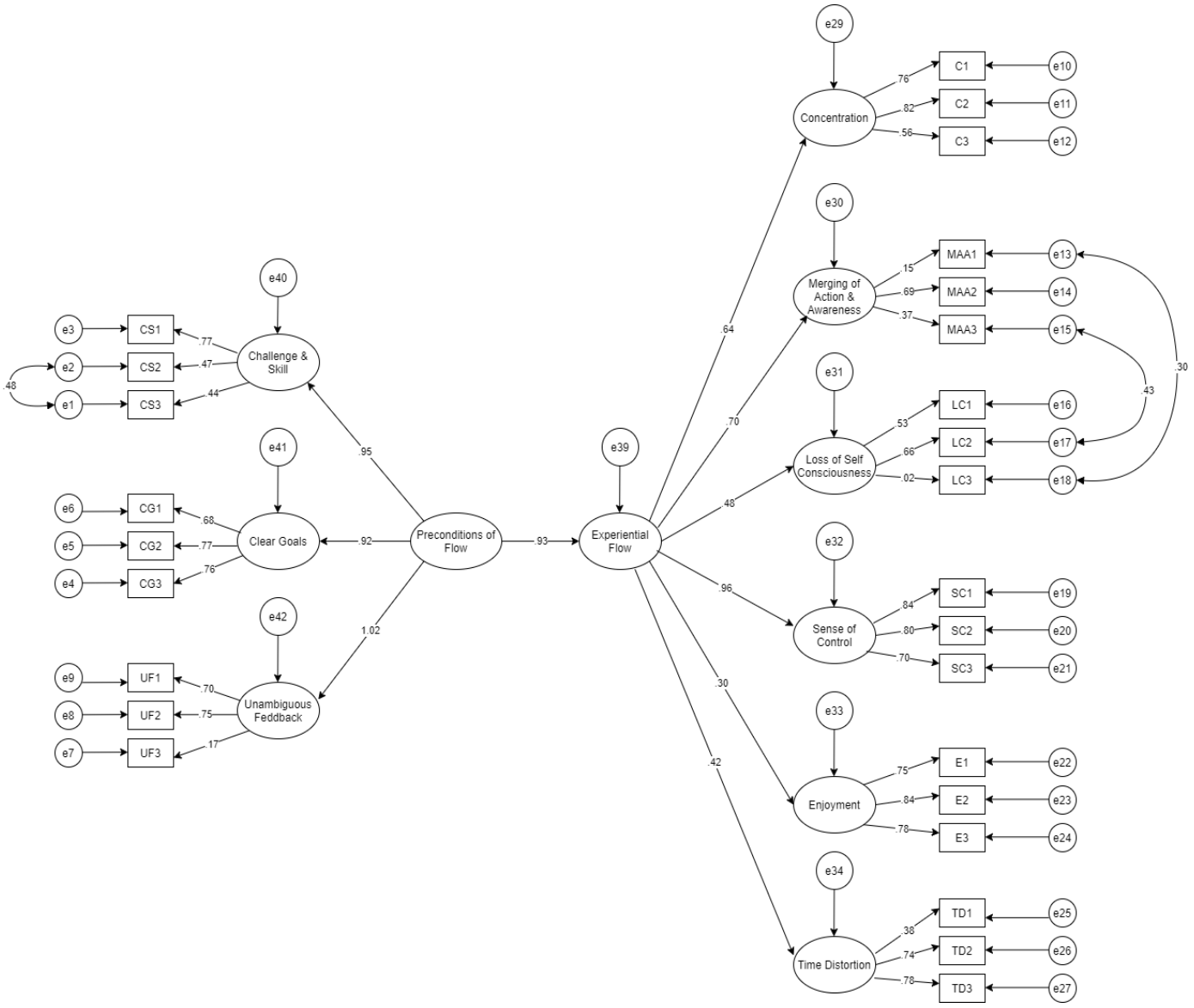

Figure 7. A modified second order two- dimensional confirmatory factor analysis model of Flow with Experiential Flow and Preconditions of Flow as latent variables

Note. The model shows associations between two latent variables; Preconditions of flow (CS: Challenge and Skill, UF: Unambiguous Feedback, CG: Clear Goals), and Experiential Flow (C: Concentration, MAA: Merging of Action and Awareness, SC: Sense of Control, LC: Loss of Consciousness, TD: Time Distortion, E: Enjoyment)

In comparing the levels of the fit indices of the unidimensional model and the two-dimensional model of flow, fit indices for both models did not meet the cut-offs suggested by Hu & Bentler (1999). However, the two-dimensional model did show an improved level of fit once

it was modified by correlating the necessary error terms. As mentioned above, on examining the modification indices for the unidimensional model, too many modifications were suggested which had no theoritical justification, therefore no changes could be made to the model to improve the fit. As stated previously, the preconditions may be argued to be structural task characteristics rather than components of the subjective experience of flow (Nakamura & Csikszentmihalyi, 2009), and given that the two dimensional model did show a better level of fit, with modifications, further confirmatory factor analyses were conducted, which examined the dimensions of flow (Experiential Flow) and the preconditions (Preconditions of Flow) in separate models. Model fit to responses to the 27 items included second order models for dimensions, and preconditions of flow as shown in Figure 8, 9 & 10.

Second Order Factor models

As indicated previously, second order confirmatory factor analysis models were examined to assess model fit. The first second order model included Experiential Flow as the main construct, and the dimensions of flow as the sub constructs. In other words, experiential flow was the second order construct, while the dimensions of flow were the first order constructs. The model demonstrated a moderate level of fit: [$\chi 2(126) = 324.336$, $p=.000$; $\chi 2/DF = 2.51$; RMSEA=.07; CFI=.870; GFI=.883]. This model appears in Figure 8. The RMSEA, CFI, and GFI were not within the cut-off range recommended by Hu and Bentler (1999) but were acceptable. The chi-square test was significant for this model.

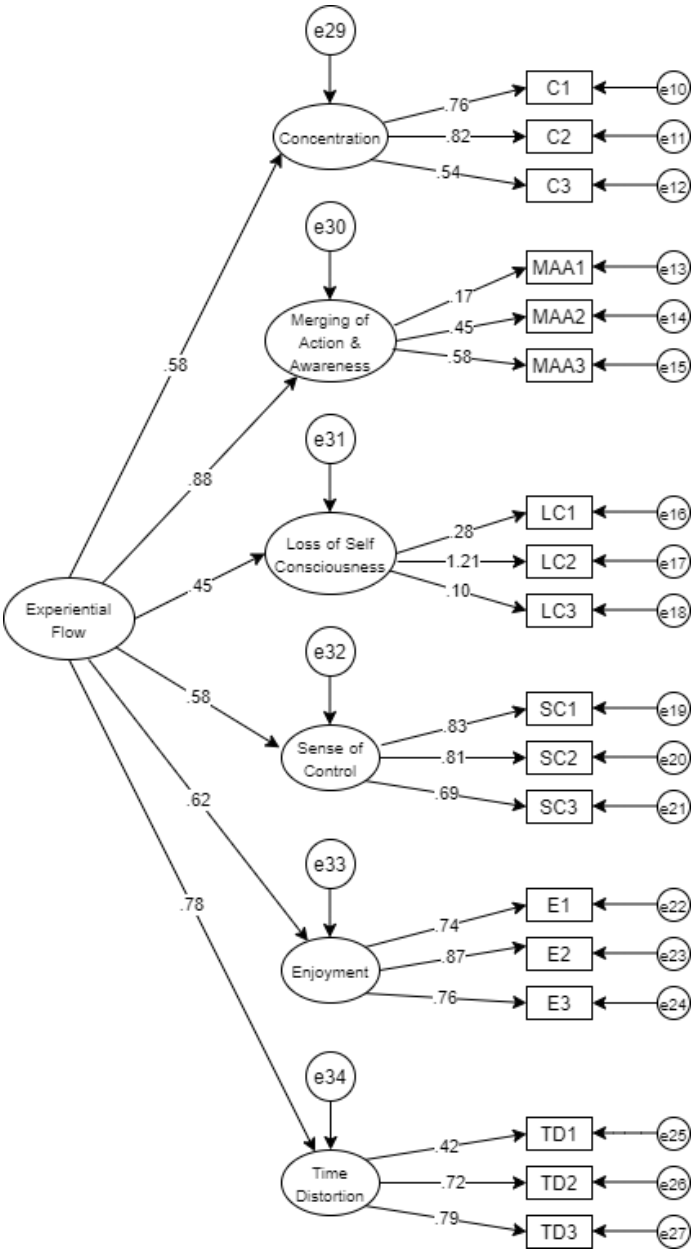

Figure 8. Second Order Six Factor Experiential Flow SEM AMOS Model with standardized loadings

Note. C: Concentration, MAA: Merging of Action and Awareness, SC: Sense of Control, LC: Loss of Consciousness, TD: Time Distortion, E: Enjoyment

On examining the modification indices for the second order model of Experiential Flow, correlating error terms e15 with e18, and error terms e13 with e18, e18 and e25 showed an improvement in model fit. The scale items included "*things happened spontaneously when performing the task*", and "*I forgot myself while working on the task*" for the sub-dimension

Merging of Action and Awareness and Loss of Self-Consciousness, respectively. Scale items for e13 and e18 were "*I did not have to make an effort to complete the task*", and "*I forgot myself while working on the task*" again for sub-dimensions, Merging of Action and Awareness and Loss of Self-Consciousness, respectively, were also correlated. The scale items for e18, and e25 included "*I forgot myself while working on the task*" and "*Time did not matter when I was working*". To reiterate, modifications added to the model should possess a certain theoretical background (Simsek, 2007). In this context, as well, two items could be interpreted to have a similar meaning, where both items indicate *"*losing a sense of self*"* for the sub-dimensions Merging of Action and Awareness, and Loss of Self-Consciousness. Scale items for e18, and e25 could also have been interpreted to mean to have a similar meaning, such as "being unaware of how quickly time passed, because of being completely immersed in the task". The modified 27-item second order experiential model of flow, demonstrated an improved level of fit compared to the previous model: [$\chi 2(126)= 271.418$, $p=.000$; $\chi 2/DF = 2.15$; RMSEA=.06; CFI=.903; GFI=.904]. This model appears in Figure 9.

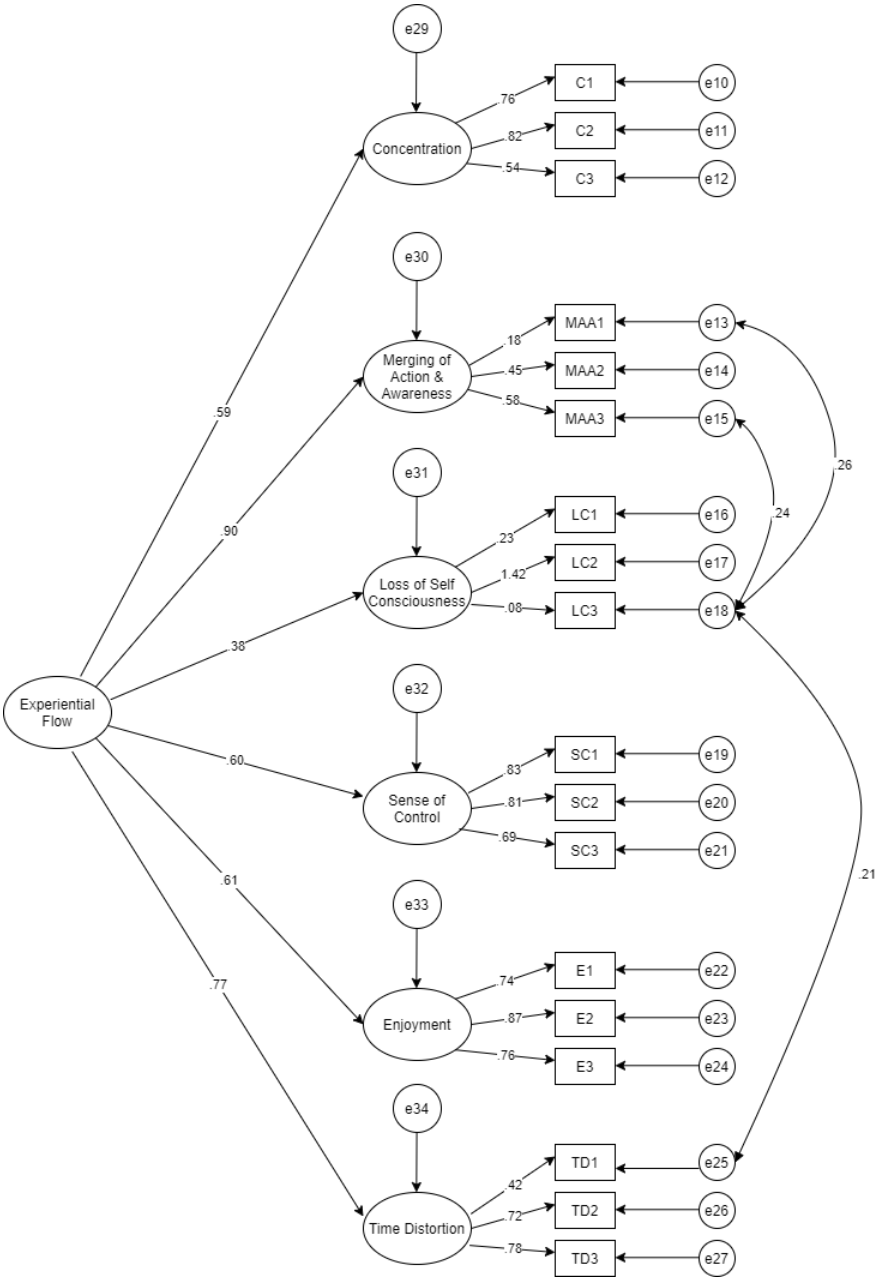

Figure 9. Modified Second Order Six Factor Experiential Flow SEM AMOS Model with standardized loadings

Note. C: Concentration, MAA: Merging of Action and Awareness, SC: Sense of Control, LC: Loss of Consciousness, TD: Time Distortion, E: Enjoyment

A second order model, which included the Preconditions of Flow as the main construct was also tested for model fit. The first order factors in this model were the preconditions. The second order three factor model demonstrated a reasonable level of fit, however the RMSEA did

not demonstrate a good fit: [$\chi 2(23)= 91.364$, p=.000; $\chi 2/DF = 3.80$; RMSEA=.10; CFI=.927; GFI=.930]. This model appears in Figure 10. The CFI was above whereas the GFI was close to the cut-off range recommended by Hu and Bentler (1999). The chi- square test was significant for this model.

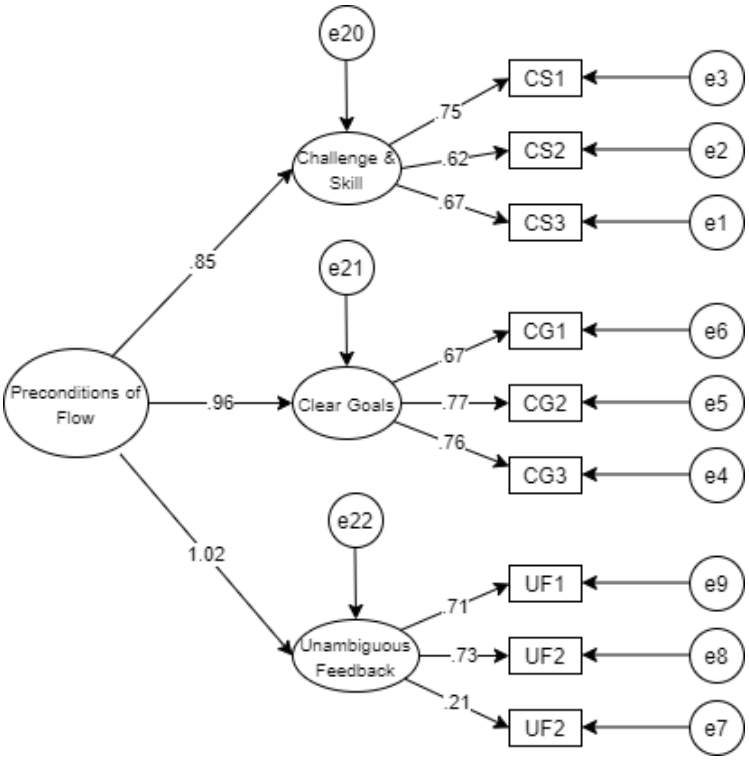

Figure 10. Second Order Three Factor SEM AMOS Model with Preconditions of Flow with standardized loadings.

Note. CS: Challenge and Skill, UF: Unambiguous Feedback, CG: Clear Goals

Modification indices were examined for this model too, which improved the model fit after correlating error terms e2 and e3. The modified second order three factor model, demonstrated an improved fit: [$\chi 2(23) = 30.87$, p=.000; $\chi 2/DF = 1.34$; RMSEA=.03; CFI=.991, GFI=.976]. This model appears in Figure 11.

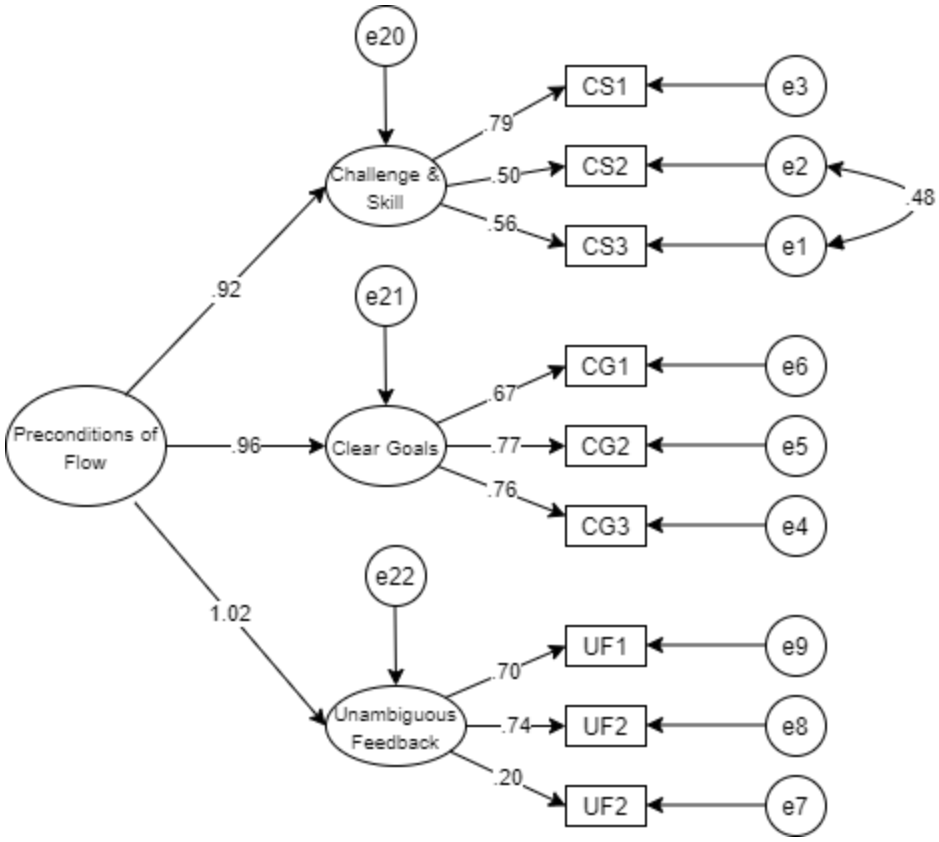

Figure 11. Modified Second Order Three Factor SEM AMOS Model with Preconditions of Flow with standardized loadings.

Note. CS: Challenge and Skill, UF: Unambiguous Feedback, CG: Clear Goals

After testing the models shown above and comparing the fit indices of the second order model of unidimensional and two-dimensional model for Experiential and the Preconditions of Flow, the latter showed better model fit overall, with modifications that could theoretically be justified, as items were similarly worded. These modified second order models with the correlated error terms, were selected and tested on an independent holdout sample (N=200) to test for replicability based on the preliminary analyses. Data screening procedures following Tabachnick & Fidell (2007), were conducted on the holdout sample too. Data were analyzed for missing values, normality, outliers, linearity and multicollinearity. One response had to be deleted because the respondent did not provide any response to the questionnaire, except the

demographics. Nine responses were deleted because of multivariate outliers. Thus, 190 cases were retained for model development and confirmatory factor analysis (CFA).

Table 11. Model fit for selected models of Flow on the first sample, and holdout sample

	2nd order models of Flow			
	Holdout sample (N = 190)		First sample (N = 282)	
Model Fit Indices	Dimensions	Preconditions	Dimensions	Preconditions
χ^2	254.545	43.69	271.418	30.87
P value	.000	.000	.000	.000
χ2/DF	2.02	1.90	2.15	1.34
CFI	.868	.953	.903	.991
GFI	.875	.953	.904	.976
RMSEA	.07	.06	.06	.03

The fit of the hypothesized models, which was better after being modified, by correlating the necessary error terms, was tested on the holdout sample (N = 190) to confirm the fit indices, results of which can be seen Table 11. As mentioned in the beginning, the preconditions may be argued to be structural task characteristics rather than components of the subjective experience of flow (Nakamura & Csikszentmihalyi, 2009), therefore it made more sense to measure them separately, in separate models. This was confirmed first, by examining second order unidimensional and two-dimensional models of flow. The two-dimensional model with the dimensions, and the preconditions of flow as latent variables did show better fit on being modified. These modifications were theoretically justified, as items were either similarly worded or were meaningfully close items, in the same factor. To reiterate, the concept of flow has been measured differently by different scales, some scales aiming to tap in to all the dimensions making up flow, whereas some scales tapping into a few or just one dimension of flow

(challenge and skill). Given the reasons stated above it would be appropriate to use the modified second order six factor and three factor models to measure flow in the workplace. The path coefficients of the second order six factor (Dimensions of Flow) model can be seen in Table 12, and the path coefficients of the second order three factor (Preconditions of Flow) model can be seen in Table 13 below. To summarize, results found in the current study indicate the importance of the distinction between in the dimensions and the preconditions of flow in operationalizing the construct with the bidimensional models showing better model fit compared to the unidimensional models. Second order models, as can be seen in Figure 9, and Figure 11, which measured the experience of flow, and the preconditions of flow, separately, showed the best level of fit.

Table 12. Second Order Six Factor Model with the Dimensions of Flow

Dimensions of Flow			
Relationship between dimensions and their items			Path Coefficients
Concentration	→	Concentration Item 1	.76
Concentration	→	Concentration Item 2	.82
Concentration	→	Concentration Item 3	.54
Merging of Action & Awareness	→	Merging of Action & Awareness Item 1	.18
Merging of Action & Awareness	→	Merging of Action & Awareness Item 2	.45
Merging of Action & Awareness	→	Merging of Action & Awareness Item 3	.58
Loss of Self-Consciousness	→	Loss of Self-Consciousness Item 1	.23
Loss of Self-Consciousness	→	Loss of Self-Consciousness Item 2	1.42
Loss of Self- Consciousness	→	Loss of Self-Consciousness Item 3	.08
Sense of Control	→	Sense of Control Item 1	.83
Sense of Control	→	Sense of Control Item 2	.81
Sense of Control	→	Sense of Control Item 3	.69
Enjoyment	→	Enjoyment Item 1	.74
Enjoyment	→	Enjoyment Item 2	.87
Enjoyment	→	Enjoyment Item 3	.76
Time Distortion	→	Time Distortion Item 1	.42
Time Distortion	→	Time Distortion Item 2	.72
Time Distortion	→	Time Distortion Item 3	.78

Note. This table shows the path coefficients between the dimensions of flow and their indicators

Table 13. Second Order Three Factor Model with the Preconditions of Flow

Preconditions of Flow			
Relationship between preconditions and their items			Path Coefficients
Challenge & Skill	→	Challenge & Skill Item 1	.79
Challenge & Skill	→	Challenge & Skill Item 2	.50
Challenge & Skill	→	Challenge & Skill Item 3	.56
Clear Goals	→	Clear Goals Item 1	.67
Clear Goals	→	Clear Goals Item 2	.77
Clear Goals	→	Clear Goals Item 3	.76
Unambiguous Feedback	→	Unambiguous Feedback Item 1	.70
Unambiguous Feedback	→	Unambiguous Feedback Item 2	.74
Unambiguous Feedback	→	Unambiguous Feedback Item 3	.20

Note. This table shows the path coefficients between the preconditions of flow and their indicators

Discussion – Study 1

The purpose of Study 1 was to develop a scale that measures flow in the workplace. The process of scale development followed principles put forth by Hinkin (1995). One of the main challenges with the measurement of flow has been the inadequate theoretical representation of the construct. This dissertation adds to the literature primarily by presenting a scale of workflow which encompasses the dimensions and the preconditions of flow as well as developing appropriate items that represent the underlying theory of flow. Previous measures of flow have either been developed to be used only in the sports context (Jackson & Marsh, 1996), or have had issues with the operationalization of flow (Bakker, 2008). To add to that, the current scale that is being used to measure flow in the workplace is the Work-Related Flow Scale (Bakker, 2008), does not operationalize flow according to its original theoretical conceptualization. It operationalizes flow as absorption, work enjoyment and intrinsic motivation, which according to Hapell (2015) is an issue. To reiterate, including enjoyment and intrinsic motivation conflicts

with mounting evidence that, during times of optimal experience at work, enjoyment and intrinsic motivation can be quite low. Second, enjoyment is innate in the definition of intrinsic motivation. These two constructs conceptually overlap since enjoying oneself is a central aspect to what it means to be intrinsically motivated. The WOLF (Bakker, 2008) also highlights the issue of construct irrelevance by measuring flow with items that are not representative of its original definition. Bakker (2008) deviates from the original conceptualization of flow in defining flow as "a short term peak experience that is characterized by absorption, work enjoyment, and intrinsic motivation", which is not similar to the original definition put forth by Csikszentmihalyi, (1975). The current scale developed items based on the original definition of flow (Csikszentmihalyi (1975), thereby addressing construct irrelevance. The WOLF (Bakker, 2008) operationalizes flow as absorption, enjoyment and intrinsic motivation, dimensions which conceptually overlap with employee engagement. Engagement is usually conceptualized as a relatively stable disposition that varies considerably between individuals (Christian, Garza, & Slaughter, 2011). Flow, on the other hand, shows substantial within-individual variance, and relatively less variations between persons (Fullagar & Kelloway, 2009). Another important issue that the current scale addressed was measuring the preconditions, that the WOLF (Bakker, 2008) does not. The WOLF (Bakker, 2008) in addition to not measuring the preconditions of flow, which are necessary to induce the experience of flow, does not address some of the dimensions that make up the experience of flow as well. As mentioned in the introduction, in examining the construct validity of the WOLF (Bakker, 2008), examination of the confirmatory factor analysis of the results raises doubts about the adequacy of the WOLF in clearly measuring the three separate aspects of workflow (absorption, work enjoyment, and intrinsic motivation) that the scale measures. Findings have also raised issues regarding the discriminant validity of the WOLF

(Bakker, 2008). Bakker (2008) reported that the three-factor model outperformed alternative two- factor and one-factor models, drawing this conclusion referring to a statistically significant $\chi 2$, which is highly sensitive to a large sample size, while ignoring other fit indices. In order to address this issue, not only has this research examined unidimensional and bidimensional models of flow, but also conducted convergent and discriminant analyses in order to assess construct validation of the measure. Lastly, even though the current scale has addressed all the issues that are associated with the WOLF (Bakker, 2008), by developing a psychometrically sound, short scale to measure the experience of flow in the workplace, one of the main strengths of the current is that it was developed based on the original theory of flow developed by Csikszentmihalyi (1975), and without differing from it at any step.

Study 1 developed a short-scale measure of work-related flow and its preconditions. The scale development process followed the guidelines put forth by Hinkin (1995). Hinkin (1995) provides a review of scale development procedures and describes the stages necessary for the development of scales in accordance with established psychometric principles and the current dissertation followed these steps. One of the main strengths of the methodology utilized to develop the current scale was the rigorous statistical analysis performed in order to understand the construct, and how it should be measured. Confirmatory factor analysis models enabled the understanding of unidimensional and bi-dimensional models of flow, and the appropriate way flow should be measured. Also, one of the main focuses of this study was to develop a short scale to measure flow in the workplace. The main goal in keeping the length of the scale short was reducing fatigue and producing a scale that is more convenient to apply on a daily/weekly basis in the workplace

In conducting the analysis, the models that measured the preconditions and the dimensions separately showed better fit, compared to the models that measured them together as part of one model. The reliability of the scale was assessed next by calculating its internal consistency using the Cronbach's alpha (Price & Mueller, 1986). The value of Cronbach's alpha for the eighteen items that measured the dimensions of flow was .80, and the nine items that measured the preconditions of flow was .83. Based on Nunnally's (1978) recommendation, the items showed a good level of internal consistency. To summarize, the tasks completed in Study 1 included developing the items to be included in the scale, getting feedback from SMEs to assess the content validity of the items, conducting reliability analysis on the scale and, measuring the dimensions and the preconditions of flow separately, thereby supporting previous research findings, to enable the measurement of the experience of flow, based on the theoretical definition of the construct.

Theoretical Implications

Since the inception of the concept of flow by Csikszentmihalyi (1975) there have been several issues and changes related to the conceptualization and measurement of flow. This dissertation mainly adds to the literature and contributes to existing theory by presenting a scale of workflow which encompasses the dimensions and the preconditions of flow by developing appropriate items that represent the underlying theory of flow. Given the prevalence of the level of disagreement as to how flow should be measured (Moneta, 2012), this study shows evidence that the dimensions and the preconditions of flow should be measured separately, rather than together, as is done in a number of scales that measure flow. An example of such a scale would be the one developed by Jackson and Marsh (1996) where the final version of the scale measures flow with nine dimensions, which include the six dimensions and the three preconditions

together. Lastly, the main goal of this study was to develop a short scale that would enable the measurement of flow in the workplace, based on the original definition of flow put forth by Csikszentmihalyi (1975). The results obtained provide evidence that a flow scale which is developed based on its original definition, successfully measures the experience of flow.

Furthermore, most measurement models of flow have merged the preconditions with the dimensions of flow, in measuring the construct. The Flow State Scale (Jackson & Marsh, 1996), which represents one of the most comprehensive work to examine flow as a multidimensional experience, does not provide a distinction between the dimensions and the preconditions of flow. Failure to include the preconditions of flow along with its dimensions is also an important issue that this dissertation has attempted to resolve, by including all the dimensions and the preconditions and measuring them separately, rather than together as characteristics of flow. Based on the findings of this study, where models that measured the preconditions and the dimensions separately showed better fit, compared to the models that measured them together as part of one model, shows evidence that in order to appropriately measure the experience of flow, it is essential to separate the dimensions of flow as components that make up the construct, and the preconditions as structural task characteristics that are essential to induce the experience of flow (Fullagar & Van Krevelen, 2017). This is an important theoretical contribution also given the fact that several scales that measure flow do not consider all the dimensions, or all the preconditions of flow in measuring it. An issue with questionnaires that have attempted to measure all the components of flow was that some components of flow were being considered as more central than others. In other words, some components were probably considered the core of flow and therefore it was assumed that measuring other components would make the assessment less valid (Schiepe- Tiska & Engeser, 2017). An example would be the Experience Sampling

Form (Csikszentmihalyi & Csikszentmihalyi, 1988) which measures flow based on the level of challenge and skill leading to issues with construct validity of the instrument, particularly construct underrepresentation. The current scale addresses the issue of construct underrepresentation by including all the components of flow, by not only ensuring that items are representative of the all the components of flow but also are central and essential to the measurement of flow.

Practical Implications

Practically, having a scale that assesses flow at work, according to its original conceptualization, can enable organizations to measure it as theory suggests it should. Also, based on the results of the study, that the preconditions of flow should be measured separately, will provide organizations details on whether they should change or modify factors in the workplace to enable their employees to experience flow. Organizations can also determine whether the tasks that their employees are working are conducive to them being able to experience flow. With a separate scale to measure the experience of flow, which includes the dimensions of flow, organizations will be able to assess whether their employees are in fact experiencing flow once the necessary modifications have been made to the environment and tasks. The short length of the scale will also enable the assessment of flow daily or weekly, as required, because of its short completion time. The shorter length of the current scale will maintain respondent motivation to complete the scale, as motivation has been found to presumably decline beyond an optimal point (Cannell & Kahn, 1968). In their study Cannell and Kahn (1968) also found that short versions of questionnaires also had a higher response rate than the long versions. Also, common sense suggests that longer questionnaires will obtain lower response rates than shorter questionnaires, as they demand more time from the respondent

(Cannell and Kahn, 1968). Meade and Craig (2012) have also suggested that participant disinterest and questionnaire length are possible causes of careless responding. Given the short length of the current scale, and the inclusion of attention check items, ensures the quality of responses obtained as well. Lastly, flow is a dynamic phenomenon that depends on momentary, personal, and contextual stimuli (Csikszentmihalyi, 1990), therefore organizations would most likely measure it on a daily/weekly basis. The short length of the current scale will enable the measurement of flow on a daily/weekly basis because it will not cause fatigue in respondents. Response fatigue can cause measurement error and misclassification problems in research. Also, longer questionnaires, compared to shorter questionnaires, are more prone to misclassification and measurement error (Egleston et al, 2011). Therefore, the response given is a function of both the true response and participant response fatigue (Egleston et al, 2011). One of the main advantages of using a short scale to measure the experience of flow in the workplace is the level of fatigue associated with completing the scale, which will be less. Lastly, organizations will also be able to administer the scale to their employees without it hindering them from completing their daily tasks.

Chapter 3 - Study 2 - An Assessment of the Construct Validity of Work-Flow

The main objective in all the processes in the first study above was mainly to establish the scale's content validity and reliability. Once the scale has been established the focus then needs to shift to the evaluation of the scale, which is the final step in scale construction (Hinkin, 1995). This includes assessing the construct validity of the scale. The idea of a nomological network was developed by Cronbach and Meehl (1995) as a part of the APA's effort to build standards of psychological testing. A nomological net, or network, translates as a "lawful network", and in a psychological context, a nomological net is a form of construct validity. The term refers to the ways in which different constructs relate to each other hypothetically (Goering et al, 2013). The nomological network was Cronbach and Meehl's (1995) view of construct validity. Construct validity attempts to determine how well a psychological scale actually measures its theoretical construct, which can be assessed by how the new measure relates to other similar and dissimilar constructs (Nunnally & Bernstein, 1994). The construct validity of the newly developed work-flow scale in the current study was assessed through a nomological network.

A nomological net essentially reveals the usefulness of a theory's measure, depending on whether the theory's place in the network is as predicted. In other words, this network will indicate whether the operational definitions adequately represent the theory. As more measures are compared and related to each other, a "net" is designed; in this manner, an abstract representation forms delineating the relationships between the various variables (Cronbach & Meehl, 1955). For the purposes of this study, both positive and negative correlational relationships were explored in a nomological network, which essentially served to better

determine the true nature of flow. If the results indicate that flow theory is related to other theories that it should by definition, and that have been established to have something in common, then construct validity will be successfully established via the nomological network. Alternatively, if flow is found to not relate to constructs that it should not be related to, construct validity will be successfully established via the nomological network. These are important matters because if a scale is not a valid measure of a theoretical construct, there is no reason to continue using the scale. For the purposes of the current dissertation, establishing the construct validity of flow included examining the relationship between flow and several of its antecedents and consequences, as a part of the nomological network. The network also included concepts dissimilar to flow. The relationships between these constructs were hypothesized based on previous research that has been conducted and presented below in the form of a path diagram in Figure 12.

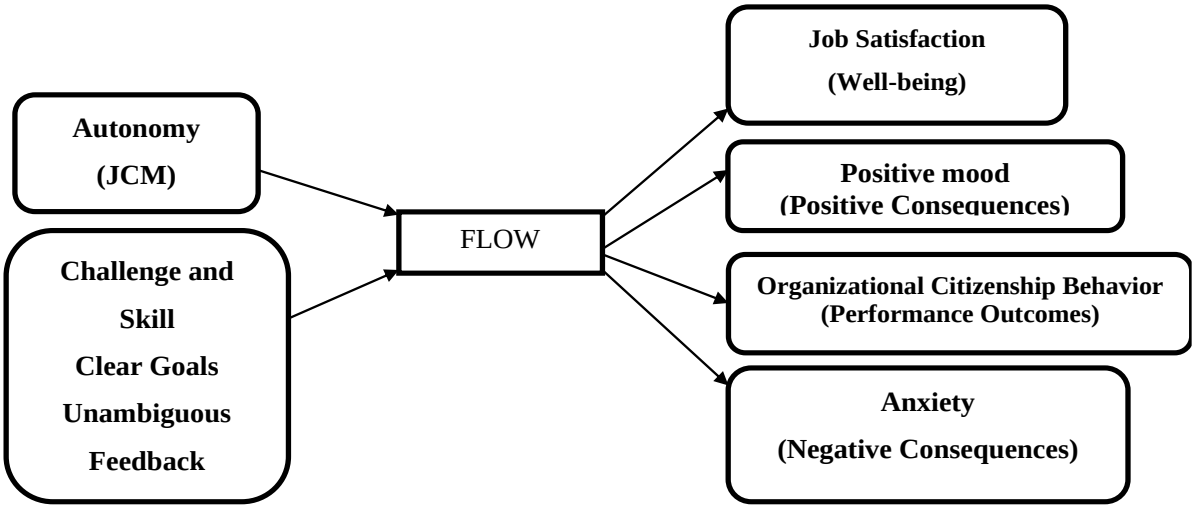

Figure 12. Path Diagram of the nomological network that will be examined to establish the construct validity of flow.

- Autonomy and Preconditions +ve relationship with flow
- Flow +ve relationship with job satisfaction, and positive mood
- Flow +ve relationship with organizational citizenship behavior
- Flow –ve relationship with anxiety

Antecedents and Preconditions of Flow (Autonomy and Preconditions)

In the organizational context, the most popular model used to identify the characteristics of tasks that generate flow is the Job Characteristics Model (JCM) developed by Hackman & Oldham (1980). This model recognizes five core characteristics of work tasks that induce critical psychological states (CPS) that in turn influence affective and behavioral outcomes (Hackman & Oldham, 1975, 1980). The first characteristic of ***skill variety*** refers to the level at which a job requires various activities, requiring the worker to develop a variety of skills and talents. ***Task identity*** is the extent to which the job requires the jobholders to identify and complete a piece of work with a visible outcome. ***Task significance*** means the extent to which the job impacts the workers life. ***Autonomy*** is the amount which the job offers the employee with freedom, liberty, and responsibility to plan out the work and ascertain the procedures in the job (Hackman &

Oldham, 1980). Finally, ***feedback*** is the extent to which the job provides the worker with feedback concerning how he/she is performing (Hackman & Oldham, 1975; 1980). The critical psychological states include "*experienced relevance of the work, experienced responsibility for consequences of the work*, and the *knowledge of the actual outcomes of the work activities"* (Fried & Ferris, 1987). Research has found that some job characteristics are associated with the experience of flow. Fullagar and Kelloway (2009) found in their study that autonomy made a unique contribution to the experience of flow. A meta-analysis conducted by Bakker (in press) which included 49 research articles aimed at understanding the conceptualization of flow in the work context. Findings identified that conceptualizing flow as core factors (primarily intrinsic motivation, absorption, work enjoyment) was the most commonly utilized in studies, with nearly two-thirds of all studies employing this approach. According to Hapell et al (2015) four main reasons why this conceptualization of flow could be problematic are first, the inclusion of enjoyment and intrinsic motivation seems to conflict with mounting evidence that, during times of optimal experience at work, enjoyment and intrinsic motivation can be quite low. Second, enjoyment is inherent in the definition of intrinsic motivation. That is, enjoying oneself is a central aspect to what it means to be intrinsically motivated; these two constructs conceptually overlap. Third, within the work-related flow literature, Rodriguez-Sanchez et al. (2011) have proposed that intrinsic interest may be an antecedent to enjoyment (an emotional component) as well as absorption (a cognitive component). Fourth, it is unclear how this three-component model of flow is conceptually distinct from other constructs measured in workplaces, such as employee engagement (Macey & Schneider, 2008). The components that are measured in the WOLF (Bakker, 2008) also have a conceptual overlap with employee engagement that is defined as "a positive, fulfilling, and a work-associated state of mind that is characterized by vigor,

dedication, as well as absorption" (Schaufeli, Salanova, & González-Romá, & Bakker, 2002, p.74; Schaufeli & Bakker, 2010; Borst et al, 2017). The meta-analysis also aimed at identifying the personal and organizational constructs associated with flow at work, and attempted to determine the magnitude, and direction of those relationships. This study also found autonomy strongly correlating to the experience of flow at work. The study mainly reported that work environments that provide sufficient trainings that increase the variety of skills, opportunities to learn new things, and environments that encourage the use of personal strengths help increase the occurrence of flow experiences at work. In another study, Colombo and Zito (2014) investigated the influence of personal resources such as self-efficacy at work, optimism, job competencies, supervisors' support, job autonomy, organizational equity on flow at work. The influence of job demands such as workload, cognitive load, patients' demands, and emotional dissonance on flow was also investigated in this study. According to their findings job autonomy was positively associated with the experience of flow, which is in line with literature and particularly with Csikszentmihalyi's studies that highlight the significance of control and discretion in doing a work activity. One of the main dimensions that make up the construct of flow includes a 'sense of control over what one is doing' (Csikszentmihalyi, 1975), thereby making autonomy an important factor involved in the experience of flow. Demerouti (2006) also found a positive relation between a global measure of motivating core job characteristics and flow at work, which included skill job autonomy. Indeed, autonomy or employees' freedom in scheduling their work and in determining work methods has repeatedly been found to increase positive affect (Saavedra & Kwun, 2000). Csikszentmihalyi (1997) also sees *sense of control* or *autonomy* as an important element promoting the experience of flow. Given the fact that autonomy have been found to be the most positively associated with flow in several studies, this study focused on job autonomy

as an antecedent leading to the experience of flow, in order to establish the construct validity of the Work-Flow Scale. It is important to mention here that the two main reasons that the JCM was employed to examine the construct validity of flow are first, both flow theory and the JCM propose characteristics inherent in work tasks that make work meaningful and that foster positive experiences. Second, flow theory and JCM both theories emphasize (a) balance between challenge and skill, (b) that the activity should be goal directed or have task identity, and (c) the importance of job-specific feedback (Fullagar & Van Krevelen, 2017).

The preconditions of flow are also worth mentioning because they are important in inducing the experience of flow (Nakamura & Csikszentmihalyi, 2009). The preconditions of flow differ from the six experiential components that are considered essential indicators of flow (Fullagar & Van Krevelen, 2017). These six indicators of flow have been discussed in an earlier section. The indicators of flow are experienced simultaneously. The preconditions of flow may be considered structural task characteristics rather than components of the subjective experience of flow (Nakamura & Csikszentmihalyi, 2009). The first precondition - one of the core tenets of flow theory (Csikszentmihalyi, 1990, 1997) is represented by an optimal balance between the challenges that individuals identify in the task and the skills that they perceive to possess in performing the task (Fullagar & Delle Fave, 2017). Typically, the level of skills and challenge must be moderate to high, to experience flow (Csikszentmihalyi, 1975; Massimini & Carli, 1988). When the task is exceedingly challenging, there is a higher likelihood that individuals will experience anxiety and stress (Sartori & Delle Fave, 2014). On the other hand, if the task is too easy, there is an inclination for the individual to experience boredom, as well as apathy (Delle Fave & Massimini, 2005). The second precondition of flow is that the task should have "clear intrinsic and proximal goals" (Csikszentmihalyi, 1990; 1997). A considerable amount of

empirical evidence suggests that goals are a crucial component of human motivation and are strongly associated with the effort, persistence, and direction of work-related behavior (Pinder, 2008). The final precondition to flow is that the task should provide the individual with clear feedback, particularly with respect to how much progress is being made toward achieving the goals inherent in the task (Csikszentmihalyi, 1990, 1997). However, to amplify the impact of feedback in facilitating flow, it is important that the individual believes that it is their own skills, efforts, and abilities that are instrumental in the effective performance of the task (Thomas & Mathieu, 1994). Since, as mentioned, these preconditions are important in inducing the experience of flow, they were also a part of the nomological network in assessing the construct validity of flow at work.

Outcomes of Flow (Well-being, Positive Consequences, Performance Outcomes, Negative Consequences)

The traditional definition of flow describes it as an experience occurring while performing any activity that makes a person feel good and motivated because they are doing something meaningful for its own sake (Llorens & Salanova, 2017). The application of flow to the workplace reveals that flow could be experienced at work in a similar manner (Fullagar & Van Krevelen, 2017). In addition to the prerequisites and experience of flow at work, there is also empirical evidence regarding positive consequences of flow at work (Llorens & Salanova, 2017). These positive consequences were also demonstrated through the nomological network, as seen in the path diagram above. Different research studies have highlighted the significance of flow in the development of well-being at work. The literature on well-being distinguishes between hedonic and eudaimonic well-being (Fullagar & Kelloway, 2009). Hedonic approaches are pleasure-based and define well-being in terms of the presence of pleasure and the absence of

pain. Hedonic well-being has been primarily operationalized as subjective well-being (SWB) or happiness (Diener & Lucas, 1999). An important element of SWB is the presence of positive mood (Fullagar & Kelloway, 2010). Results do give evidence for the direct and positive impact of flow on subjective well-being "*by fostering the experience of happiness in the here and now*" from a hedonic perspective (Moneta, 2004, p.116). A number of studies have also been conducted that have indicated the positive outcomes flow experience can have. In a study conducted by Fullagar and Kelloway (2009), the authors longitudinally studied architectural students over the course of a semester in order to establish the causal, cross-lagged relationship between flow and positive affect. The results of this study indicated that flow was a precursor to positive mood rather than mood being predictive of experiencing flow. Csikszentmihalyi (1999), has also suggested that repeated experience of flow might have a persistent incremental effect on positive mood (Csikszentmihalyi et al., 1993). Given this, positive mood was a part of the nomological network in assessing the construct validity of the work-flow scale.

Eudaimonic approaches on the other hand put emphasis on optimal functioning and personal expressiveness (Waterman, 1993). For example, Ryff (1989) has defined psychological well-being from a eudaimonic perspective. It mainly consists of six dimensions, autonomy; personal growth; self-acceptance; life purpose; mastery; and positive relatedness (Ryff, 1989; 1995; Ryff & Keyes, 1995). Flow could also be regarded as a momentary form of eudaimonic well-being. It consists of many of the same aspects of psychological wellbeing; a sense of control and mastery over the task, clarity of purpose, a belief that one possesses the skills to perform well, engagement in and relatedness to the task, and a sense of enjoyment (Csikszentmihalyi & Csikszentmihalyi, 1988). Different research studies have highlighted the relevance of flow in the development of well-being at work as well. In a study carried out on 770 workers from different

occupational sectors (education and production sectors), higher frequency of the dimensions of flow was related to the perception of a more positive environment, psychosocial well-being, and reduced ill-being (Llorens & Salanova, 2017). More specifically, workers who experienced flow at work more frequently, seemed to perceive a better job context with more job resources and experience better well-being, and lower levels of burnout and anxiety (Salanova, Martinez, Cifre et al, 2005). Maeran and Cangiano (2013) developed a model of flow where this psychological state was considered critical in redesigning interventions at work in order to promote job satisfaction. Their results showed a strong impact of flow as a key predictor of job satisfaction. Bakker (2008) in his study, also found a strong positive association between flow and job satisfaction. In another study conducted by Burker, Koyuncu and Fiskenbaum (2016), on a sample of nurses, where flow was found to associate with higher levels of job satisfaction. Based on the research discussed, well-being was operationalized as job satisfaction for the purpose of this study. The positive consequences of flow such as well-being (job satisfaction), and positive mood were also used to assess the convergent validity of the flow scale by examining the association between these constructs and flow. Positive mood was assessed with the Positive Affect subscale of the Positive and Negative Affect Schedule (PANAS; Watson and Clark, 1988). Job satisfaction was measured with the Job Satisfaction Survey (Spector, 1985,1994, 2020). Details regarding all these scales will be explained in the later section.

Lastly, the relationship between flow and performance outcomes has also been assessed in studies. This study assessed the relationship between flow and organizational citizenship behavior (OCB) as an outcome, as a part of this nomological network in examining the construct validity of flow. According to Organ (1988, p.4) OCB is “individual behavior that is optional, not directly or clearly recognized by the formal reward system, and that in the aggregate

encourages the effective functioning of the organization". In terms of job performance, it is considered as an extra role performance. Extra role performance is defined as discretionary behaviors on the part of an employee that are believed to directly promote the efficient functioning of an organization without necessarily directly influencing an employee's level of productivity or output (MacKenzie, Podsakoff, & Fetter, 1991). Examples are the willingness to help colleagues who have heavy workloads or the avoidance of problems with colleagues (this is also known as a specific form of organizational citizenship behavior; Organ & Paine, 1999).In a study conducted by Demerouti (2006), the relationship between work-related flow and extra role performance was investigated. Results showed that frequent flow experiences were beneficial to extra role performances. Eisenberger, Jones, Stinglhamber, Shanock and Randall (2005) also found that high skill and challenge is related to employee performance. Their study essentially found that high perceived skill and challenge was most strongly associated with organizational spontaneity among achievement-oriented employees. These activities included the degree to which employees looked for ways to improve the effectiveness of their work, made constructive suggestions to improve the overall functioning of their workgroups, and encouraged other employees to try new and more effective ways of carrying out their jobs. Furthermore, George and Brief (1992) also suggested that positive mood primes employees to think of positive characteristics of their co-workers and organization, thereby promoting helping behavior (George & Brief, 1992). This made it important to include OCB, as part of the nomological network, which was measured with the Organizational Citizenship Behavior Checklist (Fox, Spector, Goh, Bruursema, & Kessler, 2012), details of which will provided in the later section.

Flow is essentially a very positive psychological state that, as mentioned previously, occurs when a person perceives a balance between the challenges associated with the situation

and their capability to accomplish or meet these demands (Csikszentmihalyi, 1990). Anxiety is the antithesis of flow in Csikszentmihalyi's (1975) flow model. Anxiety can be defined as "the tendency to perceive competitive situations as threatening and to respond to these situations with feelings of apprehension and tension (Martens, 1977, p.23). An individual cannot be in flow while experiencing high anxiety. Physiologically, the state of extreme arousal generated by anxiety has been found to be associated with "disintegrated" attention rather than the focused attention that is characteristic of flow (Izard, 1977; Fullagar, Knight & Sovern, 2012). According to Nakamura and Csikszentmihalyi (2002) anxiety shifts attention from the focused activity to the self and one's task-related shortcomings and creates a state of mind that is extremely self-conscious and prevents the performer from experiencing flow. In a study conducted by Jackson, Kimiecik and Marsh (1998), the authors studied the relationship between anxiety and the experience of flow, in a group of athletes. Their results showed that when athletes experience high levels of anxiety, several components of flow were negatively affected. Jackson's (1992, 1995) qualitative work on factors that disrupt or prevent flow also supports the significance of athletes' avoiding thoughts that lead to anxiety. In another study conducted by Fullagar, Knight and Sovern (2013), the authors proposed that felt anxiety while working towards the recital of a piece of music could suppress the experience of flow. Their results indicated that when flow was highest, anxiety was lowest, and vice versa, thereby indicating that task-specific anxiety and flow are incompatible states. Given the fact that research has established anxiety as an anti-thesis of flow, the relationship of this construct was examined to assess the discriminant validity of flow because construct validity includes both convergent and discriminant validity. The STAI (State-Trait- Anxiety Inventory (Spielberger & Gorsuch, 1966) was used to measure anxiety in this

study. The Anxiety- State Inventory ((Spielberger & Gorsuch, 1966) was employed for the purposes of this study to assess how the participant was feeling at a particular moment in time.

The Role of Job Satisfaction

In a study conducted by Maeran and Cangiano (2013), flow has also been found to predict job satisfaction. The rationale for why job satisfaction may influence the relationship between the experience of flow and its consequences can be demonstrated by studies conducted by Gavin & Axlerod, (1977); and O'Brien and Dowling (1980) where the authors identified that skill utilization, involving the equivalence between the challenge of one's work and the ability to meet that challenge, as a task characteristic could contribute to job satisfaction. The equivalence of challenge and skill is one of the preconditions necessary to induce the experience of flow (Csikszentmihalyi, 1975). Accordingly, O'Brien (1983) found that skill utilization accounted for a significant portion of the variance in job satisfaction beyond the job characteristics enumerated by Hackman and Oldham (1976). A large body of research has also investigated the extent to which a person is satisfied with their job, and how that can influence performance at work (Brown & Peterson, 1993).

In examining the consequences of the experience of flow in the nomological network, the relationship between job satisfaction and organizational citizenship behavior has also been well established in the literature (Foote & Tang, 2008). In conducting their study, Foote & Tang (2008), hypothesized a positive relationship between job satisfaction, and organizational citizenship behavior, which was also found to be statistically significant. Additionally, a meta-analysis conducted by Organ and Ryan (1995), found a positive association between job satisfaction and organizational citizenship behavior.

In terms of negative consequences of flow, included in the mediation models, a study conducted by Conolly and Visweswaran (2000), correlations between job satisfaction and positive affectivity, and job satisfaction and negative affectivity were examined. Job satisfaction correlated with positively with positive affect (r = 0.49), and negatively with negative affect (r = -0.33). In a study by Faragher, Cass and Cooper (2002) a systematic review and meta-analysis of 485 studies and a combined sample size of 267, 995 individuals was conducted, evaluating the research evidence linking self-report measures of job satisfaction to measures of physical and mental wellbeing (Faragher et al, 2005). Job satisfaction was most strongly associated with mental health and had the strongest relationship with anxiety.

Mediation models are mainly utilized to investigate how and why two things are related. Intermediate variables that come between independent variables and dependent variables are known as mediating variables, or mediators. A mediator acts as a third variable and represents the mechanism through which an independent variable influences an outcome (Baron & Kenny, 1986). The most basic model (MacKinnon, 2008) involves three key variables: an independent variable (X), a mediating variable (M), and a dependent variable (Y). In the framework of an intervention designed to understand the consequences of flow, the mediator, in the present study, is job satisfaction, which is the mechanism of understanding the effect that the experience of flow has, on its consequences. Thus, statistical mediation analysis was utilized in the present study to develop two empirical models, mainly a partial and a full mediation model, as seen in Figure 13 & 14, to better understand the effect that flow has on the consequences, with job satisfaction as the mediator. Both mediation models in the present study were latent variable models because the use of latent variables improves the reliability of the measures (MacKinnon, 2008). These models are also less likely to be biased by random or correlated measurement error

(Russell et al., 1998). Mediational analysis allows researchers to conduct scientific investigations, which in turn provide researchers with an understanding of the sequence of effects that lead to certain consequences (Kenny, 2008). Given previous findings mentioned above, job satisfaction was examined as a possible mediator between the experience of flow and the consequences of flow, with partial and full mediation models. The hypothesized models can be seen in Figures 13 & 14.

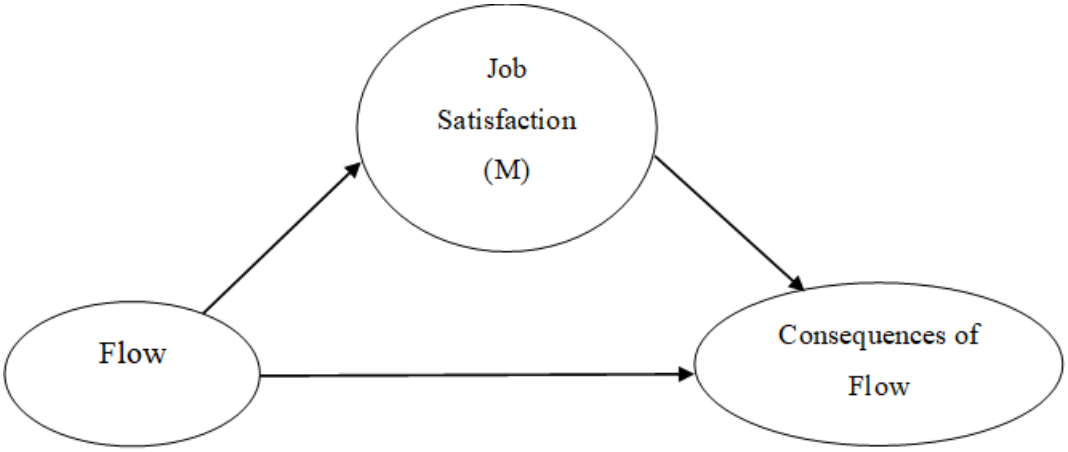

Figure 13. The Partial Mediation Model

Note. M – Mediator

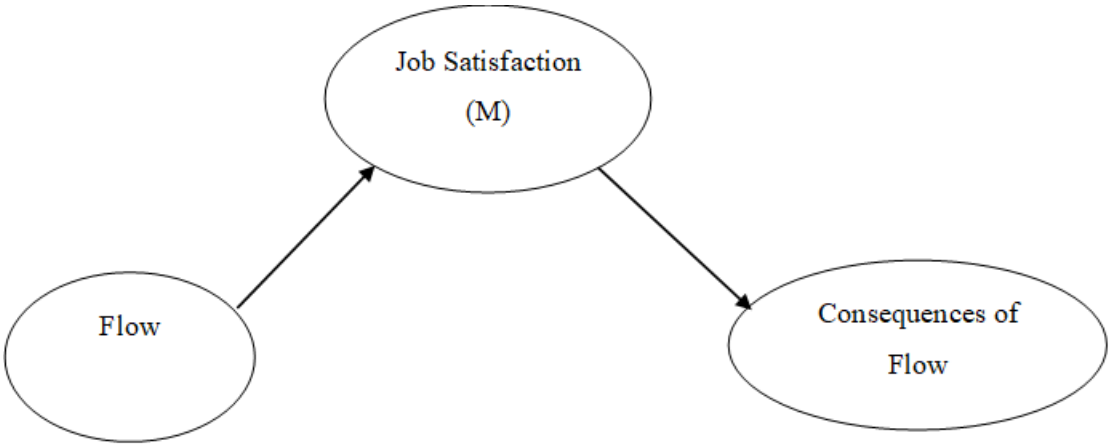

Figure 14. The Full Mediation Model

Note. M - Mediator

Methodology

The nomological network in this study was examined with structural equation modeling (SEM). SEM is essentially a collection of techniques that allow a set of relationships between one or more constructs to be examined. One of the advantages of using SEM is that when relationships among constructs are examined, the relationships are free of measurement error because the error has been estimated and removed, leaving only common variance. Reliability of measurement can be accounted for explicitly within the analysis by estimating and removing the measurement error. The second advantage is that when the phenomena of interest are complex and multidimensional, SEM is the only analysis that allows complete and simultaneous tests of all the relationships (Tabachnik & Fidell, 2000). That makes SEM the appropriate method to examine the proposed nomological network.

Sample and Procedure

The sample for the purpose of assessing the nomological network was collected from Amazon Mechanical Turk (MTurk), which included 200 working professionals from varying occupations. Since this scale will primarily be used in an organizational context this sample was representative of such a population. The scales were available to the participants, including males and females, who were over 18 years of age and currently a part of the workforce, through MTurk, and they were reimbursed $1, as an incentive to participate. Participants included males (54.6%) and females (44.9%), between the age group of 18-65. A higher percentage (67.3%) of respondents also worked in private for-profit organizations. To reiterate, even though scholars have raised concerns about online samples (Couper, 2000), arguing mainly that they tend to suffer from self-selection bias and thus could limit generalizability. Highhouse & Gillespie (2009) have shown findings from five meta-analyses and make an empirical argument that the specific nature of the sample does not impact the (theoretical) generalizability of research findings. Also, the ability to recruit from diverse backgrounds can alleviate the concerns regarding the oversampling of participants from WEIRD (Western, Educated, Industrialized, Rich, and Democratic) backgrounds (Henrich et al. 2010; Landers and Behrend 2015). In addition, Horton (2011) found that experiments conducted on Mechanical Turk were as valid (both internally and externally) as other kinds of experiments (i.e., laboratory and field experiments), while reducing researcher time, costs, and inconvenience. These findings, coupled with the ease of data collection associated with online samples, and the fact that online samples are likely more demographically diverse than a typical introductory psychology course sample, justifies the use of an online sample for the current research.

Once data from these scales and the work-flow scale was obtained then the path diagram that has been discussed in the previous section was examined in IBM AMOS in order to assess convergent and discriminant validity through correlations and model fit. The fit indices included the χ^2 test statistic, the goodness of fit index (GFI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) to evaluate the model fit. As mentioned previously, the χ^2, which is an absolute fit index, provides the basis for statistical tests of the lack of fit resulting from over-identifying restrictions placed on models. The GFI calculates the proportion of variance in the sample covariance matrix that is explained by the estimated population covariance matrix (Tabachnick & Fidell, 2007). The CFI assesses the relative reduction in lack of fit as estimated by referencing the noncentral χ^2 of a target model to a baseline model. The RMSEA assesses the fit function of a target model adjusted by degrees of freedom. GFI and CFI values exceeding .90 and .95 are typically taken to reflect acceptable and excellent fits to the data (Hu & Bentler, 1999). For the RMSEA, values of less than .05 and .08 are taken to reflect, respectively a close fit and a reasonable fit (Browne & Cudeck, 1993).

Measures

Antecedents of flow. The Job Diagnostics Survey (Hackman & Oldham, 1980) will be used to measure the job characteristic of autonomy. The scale developed by Hackman and Oldham (1980) uses four items to assess autonomy, for example, "*How much autonomy is there in your job?",* that is, to what extent does your job allow you to decide on your own how to go about doing your work? (autonomy). The answer possibilities ranged from 1 to 7, with higher scores indicating higher prevalence of the characteristic. The reported internal consistency of this scale is .88 (Hackman & Oldham, 1980). The currently developed Work-Flow Scale will be used to measure preconditions of flow.

Consequences of Flow

Well-Being. The Job Satisfaction Survey (JSS) developed by Spector (1985) was used to measure job satisfaction. JSS is a 36-item scale including nine facets to assess employee attitudes about the job and aspects of the job. Each facet is examined with four items, and a total score is calculated from all items. A summated rating scale format is used, with six choices per item varying from "strongly disagree" to "strongly agree" (Spector, 1985, 1994). Half the items in this scale are reverse scored, so there are items written in both directions. The nine components of job satisfaction that this scale measures are Pay, Promotion, Supervision, Fringe Benefits, Contingent Rewards (performance-based rewards) (Spector, 1985,1994, 2020); Operating Procedures (required rules and procedures) (Spector, 1985,1994, 2020); Coworkers, Nature of Work, and Communication (Spector, 1985,1994, 2020). Although the JSS was originally developed by Spector (1985) for use in human service organizations, it is applicable to all organizations. Internal consistency of this scale based on a sample of 2870 participants was found to be .91(Spector, 1985, 1994).

Positive consequences. Positive Affect subscale of the Positive and Negative Affect Schedule (PANAS) developed by Watson and Clark (1988) was used to measure positive mood. 10 items are markers of positive affect (6 high positive affect markers and 4 low positive affect markers, for example, active, and enthusiastic). For each item, the respondent was asked to indicate how she or he felt at work during the past week, using a 5-point scale ranging from very slightly or not at all (1) to very much (5). The level of Cronbach's alpha for the Positive Affect subscale was found to be between 0.86 and 0.90 by Watson (1988).

Performance Outcomes. Organizational Citizenship Behavior Checklist (OCB-C) developed by Fox, Spector, Goh, Bruursema, and Kessler (2012), was used to measure OCB.

The OCB-C is a causal indicator scale that consists of items that are not all parallel assessments of a single underlying construct (Fox et al, 2012). Fox et al. (in press) stated coefficient alphas for the 20-item version of the OCB-C of .89 and .94 for two self-report samples, and .94 for a coworker sample (coworkers reporting on the target employee). OCB is measured using a 5-point frequency scale, ranging from 1 = Never to 5 = Every day. Scores are computed by summing responses across items. A total score is the sum of responses to all items (Fox & Spector, 2012). Subscale scores are the sum of items within each subscale (Fox et al, 2012).

***Negative consequences*.** The State-Trait Anxiety Inventory (STAI; Spielberger & Gorsuch, 1966) was used to measure anxiety. The State-Trait Anxiety Inventory (STAI) was created by Spielberger and his associates (Spielberger & Gorsuch, 1966; Spielberger, et al., 1970) to provide reliable, relatively brief, self-report measures of both Anxiety-State (A-State) and Anxiety-Trait (A-Trait). The STAI A-State scale includes 20 statements which ask people to describe how they feel at a particular moment in time, measured with a 4-point Likert scale. The essential qualities evaluated by this scale involve the intensity of a person's feelings of tension, nervousness, worry and apprehension. This scale has an internal consistency of .92 (Spielberger & Gorsuch, 1966).

Results – Study 2

After developing and establishing the psychometric properties of the scale in Study 1, in Study 2 the focus shifted to the evaluation of the validity of the scale, which is the final step in scale construction (Hinkin, 1995). This included assessing the construct validity of the scale. Construct validity attempts to determine how well a psychological scale actually measures its theoretical construct, which can be assessed by how the new measure relates to other similar and dissimilar constructs (Nunnally & Bernstein, 1994). The construct validity of the newly

developed work-flow scale in the current study was assessed through a nomological network. The hypothesized nomological network included the antecedents and the consequences of flow. The antecedents of flow were the preconditions associated with the experience of flow, and one components of the job characteristics model (JCM); autonomy. The consequences of flow included well-being (job satisfaction), positive consequences (positive mood), performance outcomes (organizational citizenship behavior), and negative consequences (anxiety). Flow has been found to be positively associated with the consequences, therefore in order to examine convergent validity, these variables were incorporated in the nomological network (Maeran and Cangiano ,2013; Salanova, Martinez, Cifre et al, 2005; Salanova et al, 2005; MacKenzie, Podsakoff, & Fetter, 1991). Additionally, flow has been found to be negatively associated with anxiety (Jackson, Kimiecik & Marsh, 1998; Schuler, 2007), which was a part of the negative consequences in the nomological network. Zero order correlations of the variables used in analyzing the nomological network can be seen in Table 14.

To begin with, assumptions of multivariate normality and linearity were assessed, and no outliers were found. One response was deleted from the subsequent analysis because the respondent did not complete the entire survey. There were missing data, but none of the variables had more than 5% of missing values. Since the data were missing in a random pattern, i.e. very few cases had missing data, and those cases had data missing on different variables, the expectation maximization methods were used to fill in the missing data. None of the variables showed VIF indexes greater than 3, therefore there were no issues with multicollinearity as well. The means, standard deviations and correlations between the variables used in the analyses, can be seen in Table 14.

Table 14. Correlations between Study 2 variables

Variable	*M*	*SD*	1	2	3	4	5	6	7
1.Preconditions	4.20	.541	---						
2. Autonomy	3.64	.800	.423*	---					
3. Flow	3.67	.534	.451*	.194*	---				
4. Job Satisfaction	4.25	1.41	.242*	.238*	.423*	---			
5. Positive Affect	3.23	.934	.250*	.203*	.433*	.557*	---		
6. OCB	2.88	.849	-.038	-.067	.242*	.276*	.416*	---	
7. Anxiety	2.04	.586	-.331*	-.217*	-.345*	-.486*	-.587*	-.122	---

*Correlation is significant at 0.01 level
Note. OCB = Organizational Citizenship Behavior

A SEM analysis was carried out on a sample of 199 respondents (200 responses were collected) of working professionals, obtained from Amazon Mechanical Turk to examine model fit for the hypothesized model. Single-indicator models were used assuming that the formative indicator, which was a composite score of the scale used to measure the different latent variables, fully determined the measured phenomenon, by examining measurement models and, taking account of the unexplained variance of the latent variable (Sagan & Pawelek, 2014). To account for imperfect reliability of the scale scores, latent variables were created to represent the constructs with each latent variable being measured by its corresponding scale score and "the residual variance of the scale score fixed to (1-scale reliability)*scale variance" (Hayduk, 1987). The formula used to calculate the variance for the latent variables was $\delta x = (1-\alpha) \times \sigma x$; where:

δx = indicator variable,

α = reliability coefficient of the scale,

σx = indicator variance (Sagan & Pawelek, 2014)

The factor loading of each observed indicator per latent variable was fixed at unity for purposes of identifying the models (Choi et al, 2011). Maximum likelihood parameter estimation

over other estimation methods was chosen because the data were distributed normally (Kline, 2005). The hypothesized model showed a poor fit to the data, [$\chi 2$ (14) = 160.806; p=.000; $\chi 2$/DF = 11.48; RMSEA=.23; CFI=.589; GFI=.802]. Modification indices were examined to improve model fit. Even though a modified model should ideally be tested on a holdout sample, for the purposes of this study, the modified model was tested on the same sample, and will be discussed in the limitations section of this dissertation. As mentioned in Study 1, modifications added to a model should possess a certain theoretical background (Simsek 2007). On examining the modification indices, error terms for job satisfaction and positive affect were correlated. In a study conducted by Brief et al. (1995), the authors found a positive correlation between job satisfaction and positive affect, therefore these error terms were correlated in modifying the model. Error terms for positive mood and organizational citizenship behavior were also correlated, as these two variables have also been found to positively correlate in previous studies. In a study conducted by Williams and Shiaw (1999), the authors found that the amount of positive affect experienced by an employee significantly influenced the employee's intention to perform specific acts of organizational citizenship. Lastly, error terms for job satisfaction and organizational citizenship behavior were correlated because there is substantial support for the relationship between job satisfaction and OCB (Bateman & Organ, 1983; Organ, 1988; Williams & Anderson, 1991). After correlating the necessary error terms the modified model, as shown in Figure 15, showed a much better fit compared to the previous model, [$\chi 2$ (11) = 96.394; p=.000; $\chi 2$/DF = 8.763; RMSEA=.19; CFI=.761; GFI=.887]. Parameter estimates can be seen in Table 15.

Table 15. Standardized and Unstandardized Path coefficients for the hypothesized model

Dependent Variable	Independent variable	Unstandardized Path Coefficients	Standardized Path Coefficients	R squared	p
Flow	Preconditions	.451	.477	.23	<.001
Flow	Autonomy	.011	.016	.23	.828
Job Satisfaction	Flow	.802	.463	.21	<.001
Positive Affect	Flow	.802	.477	.22	<.001
OCB	Flow	.431	.247	.06	<.001
Anxiety	Flow	-.460	-.399	.15	<.001

Note. OCB = Organizational Citizenship Behavior

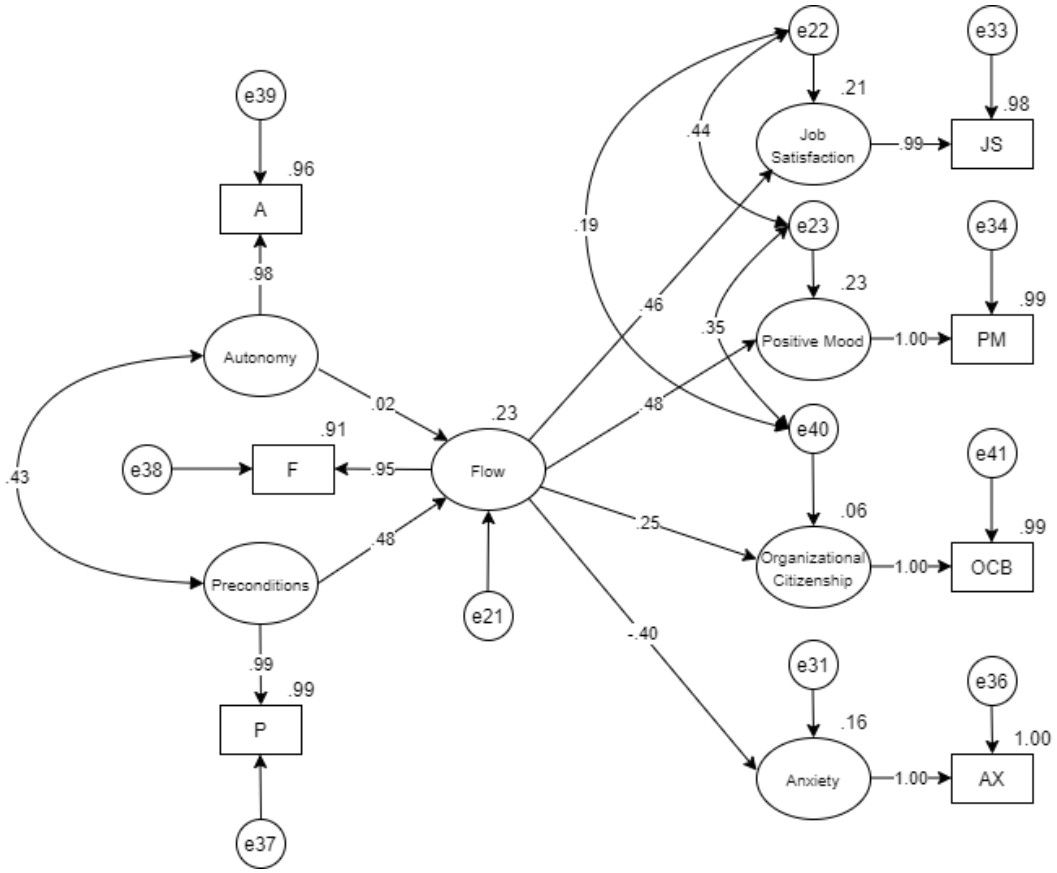

Figure 15. The modified model with standardized path coefficients

Note. A: Autonomy; F: Dimensions of Flow; P: Preconditions of Flow; JS: Job Satisfaction; PM: Positive Mood; OCB: Organizational Citizenship Behavior; AX: Anxiety.

According to the parameter estimates, the antecedents of flow, preconditions and the job characteristics model, were positively related to flow. The relationship between autonomy and flow, even though positively associated was not statistically significant. Flow also showed a positive relationship with well-being, positive consequences, and performance outcomes. As hypothesized, flow did show a negative association with negative consequences, mainly anxiety, which was also statistically significant.

Alternative Mediation Models

As stated above, a large body of research has investigated the extent to which a person is satisfied with their job, and how that can influence performance at work (Brown & Peterson, 1993). Additionally, job satisfaction has been found to be positively associated with citizenship behavior (Organ & Ryan, 1995). Given previous findings, job satisfaction was examined as a possible mediator, with partial and full mediation models, to compare with the hypothesized model. Non- parametric bootstrapping was also done to test the statistical significance of indirect effects, in order to examine the effects the mediator had on the relationships between the antecedents and the consequences of flow. Preacher and Hayes' (2004) non-parametric mediation bootstrapping technique provides more statistically powerful and accurate results when compared against traditional approaches to mediation modeling. The partially mediated model, shown in Figure 16, demonstrated an improved level of fit; [$\chi 2(11)= 84.129$; $p=.000$; $\chi 2/DF = 7.648$; RMSEA=.18; CFI=.795; GFI=.905], even though model fit was not within the parameters suggested by Hu & Bentler (1999). Parameter estimates can be seen in Table 16.

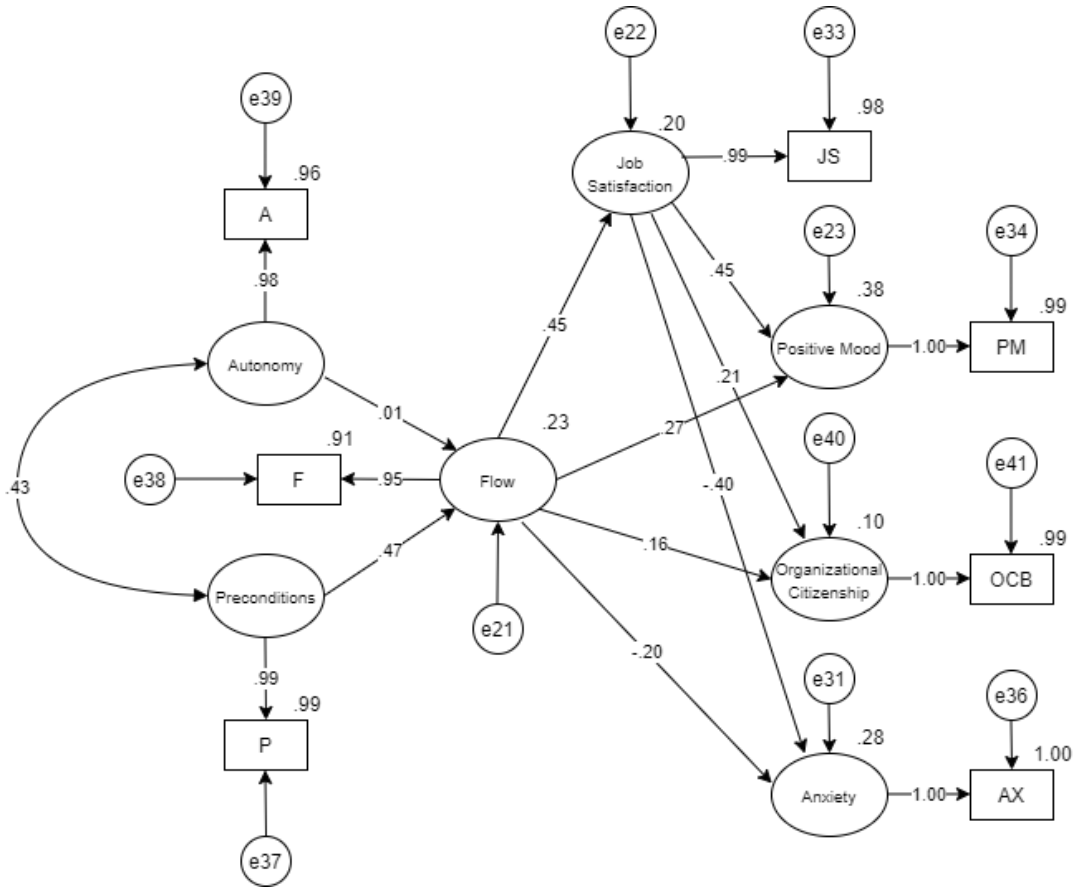

Figure 16. The partial mediation model with standardized path coefficients

Note. A: Autonomy; F: Dimensions of Flow; P: Preconditions; JS: Job Satisfaction; PM: Positive Mood; OCB: Organizational Citizenship Behavior; AX: Anxiety.

Table 16. Standardized and Unstandardized Path Coefficients of the Partial Mediation Model

Dependent Variable	Independent variable	Unstandardized Path Coefficient	Standardized Path Coefficients	R squared	p
Flow	Preconditions	.449	.474	.23	<.001
Flow	Autonomy	.007	.011	.23	.879
Job Satisfaction	Flow	.775	.449	.20	<.001
Positive Affect	Job Satisfaction	.472	.447	.37	<.001
Anxiety	Job Satisfaction	-.268	-.403	.27	<.001
OCB	Job Satisfaction	.211	.209	.09	.007
Positive Affect	Flow	.491	.269		<.001
Anxiety	Flow	-.230	-.200		.005
OCB	Flow	.279	.160		.047

Note. OCB – Organizational Citizenship Behavior

According to the results of the partial mediation model, path coefficients showed a positive relationship between the experience of flow with well-being, performance outcomes, and positive consequences. However, the positive relationship found between flow and performance outcomes was not statistically significant. Negative path coefficients were seen between job satisfaction and negative consequences, which were statistically significant. Negative path coefficients, however, between flow and anxiety, were not statistically significant. Positive relationships between job satisfaction and performance outcomes were not statistically significant either. In assessing partial mediation, direct and indirect effects were also examined, which can be seen in Table 17. In order to examine the significance of the indirect effects, non-parametric bootstrapping was done. As mentioned previously, Preacher and Hayes' (2004) non-parametric mediation bootstrapping technique provides more statistically powerful and accurate results. Table 18 shows the statistical significance (p values) of the indirect effects of the mediation model.

Table 17. Standardized Direct and Indirect effects of the partial mediation model

Dependent variable	Independent variable	
		Total Effects
Flow	Autonomy	.011
Flow	Preconditions	.474
Positive Mood	Flow	.469
OCB	Flow	.209
Anxiety	Flow	-.382
		Direct effects
Flow	Autonomy	.011
Flow	Preconditions	.474
Positive Mood	Flow	.269
OCB	Flow	.160
Anxiety	Flow	-.200
		Indirect effects
Positive Mood	Flow	.200
OCB	Flow	.094
Anxiety	Flow	-.181

Note. OCB – Organizational Citizenship Behavior

Table 18. Significance of indirect effects of the antecedents of flow, the experience of flow, on the consequences of flow, with job satisfaction as a mediator in a partial mediation model

Consequences	
	Flow
Direct Effects	
Positive Mood	.010*
OCB	.083
Anxiety	.072
Indirect Effects	
Positive Mood	.008*
OCB	.006*
Anxiety	.005*
Total effects	
Positive Mood	.009*
OCB	.009*
Anxiety	.018*

*refers to the indirect (mediated) effect of the independent variable on the dependent variable as significantly different from zero at the 0.05 level
Note. OCB – Organizational Citizenship Behavior

According to Rucker et al (2011), if there remains a significant direct effect between the independent variable (IV) and the dependent variable (DV), after controlling for the mediator, researchers typically report that the mediator only partially mediates the effect between the IV and the DV. A statistically significant direct effect was found between the experience of flow and positive mood. Statistically significant direct effects were not found between the experience of flow and OCB, and between flow and anxiety, which suggests that job satisfaction could be partially mediating the relationship between flow and positive mood. In examining the table above, there were statistically significant indirect effects between experience of flow and positive mood, OCB, and anxiety. These results suggest a full mediation for anxiety and OCB, because the direct effects for these consequences were not statistically significant, while showing statistically significant indirect effects.

A full mediation model was examined next, to assess if the effect on these consequences of flow was completely mediated by, job satisfaction, given that the previous model did show a statistically significant indirect effect between the experience of flow, well-being and negative consequences. The full mediation model can be seen in Figure 17. The fully mediated model, did not demonstrate a good level of fit, compared to the partially mediated model. [$\chi 2(14)= 109.098$; $p=.000$; $\chi 2/DF = 7.79$; RMSEA=.18; CFI=.733; GFI=.870] The direct and indirect effects between the independent and dependent variables can be seen in Table 19, and the path coefficients can be seen in Table 20.

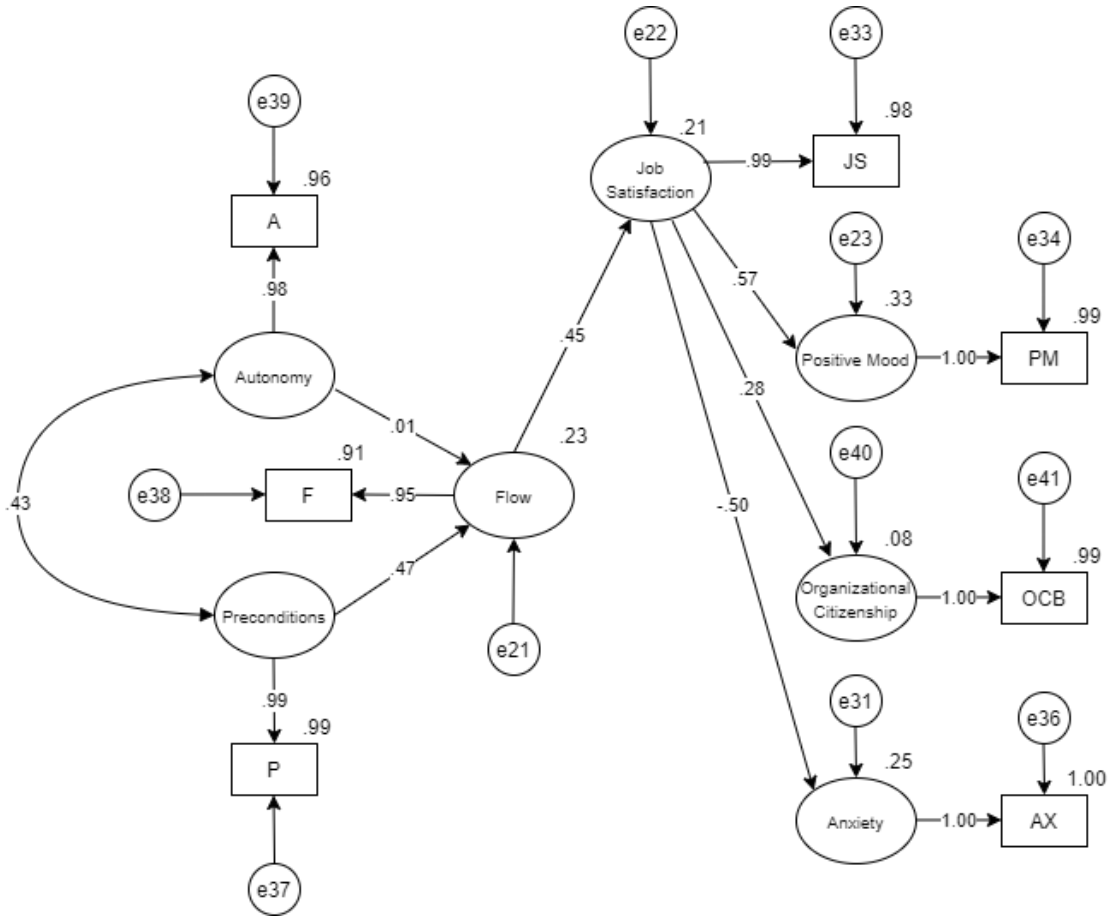

Figure 17.The full mediation model with standardized path coefficients

Note. A: Autonomy; F: Dimensions of Flow; P: Preconditions; JS: Job Satisfaction; PM: Positive Mood; OCB: Organizational Citizenship Behavior; AX: Anxiety.

Table 19. Standardized Direct and Indirect effects of the full mediation model

Dependent variable	Independent variable	
		Total Effects
Flow	Autonomy	.011
Flow	Preconditions	.473
Job Satisfaction	Flow	.454
Positive Mood	Flow	.259
OCB	Flow	.128
Negative Outcomes	Flow	-.225
		Direct effect
Flow	Autonomy	.011
Flow	Preconditions	.473
Positive Mood	Flow	.000
OCB	Flow	.000
Anxiety	Flow	.000
		Indirect effect
Positive Mood	Flow	.259
OCB	Flow	.128
Anxiety	Flow	-.225

Note. OCB – Organizational Citizenship Behavior

Table 20. Path coefficients in the fully mediated model

Dependent Variable	Independent variable	Unstandardized Path Coefficients	Standardized Path Coefficients	R squared	p
Flow	Preconditions	.448	.473	.22	<.001
Flow	Autonomy	.007	.011	.22	.886
Job Satisfaction	Flow	.783	.454	.20	<.001
Positive Mood	Job Satisfaction	.603	.570	.32	<.001
OCB	Job Satisfaction	.286	.283	.08	<.001
Anxiety	Job Satisfaction	-.330	-.496	.24	<.001

Note. OCB – Organizational Citizenship Behavior

According to the results of the full mediation model, all the path coefficients between job satisfaction and, the consequences of flow were statistically significant. Autonomy, which is an antecedent off flow, showed a positive relationship with flow, although not statistically significant. Job satisfaction also showed a negative, statistically significant correlation with anxiety. In examining full mediation, direct and indirect effects were also determined, which can be seen in Table 19. Table 21 shows the results obtained after conducting non-parametric bootstrapping to examine the statistical significance (p values) of the indirect effects of the full mediation model.

Table 21. Significance of indirect effects of the antecedents of flow, the experience of flow, on the consequences of flow, with job satisfaction as a mediator in a full mediation model

Consequences	
	Flow
Direct Effects	
Positive Mood	
OCB	
Anxiety	
Indirect Effects	
Positive Mood	.008*
OCB	.006*
Anxiety	.009*
Total Effects	
Positive Mood	.008*
OCB	.006*
Anxiety	.009*

*refers to the indirect (mediated) effect of the independent variable on the dependent variable as significantly different from zero at the 0.05 level
Note. OCB – Organizational Citizenship Behavior

According to the table above, the indirect effects between the experience of flow and positive mood, OCB, and anxiety were statistically significant. As mentioned by Rucker et al (2011), if there remains a significant direct effect between the independent variable (IV) and the dependent variable (DV), after controlling for the mediator, researchers typically report that the mediator only partially mediates the effect between the IV and the DV. To conclude, job satisfaction partially mediated the relationship between the experience of flow, and positive mood. Job satisfaction fully mediated the relationship between flow and OCB, and anxiety because no significant direct effects were found between flow and OCB, and anxiety in the partial mediation model. The partial mediation model showed the best fit, even though the values were not within the range suggested by Hu & Bentler (1999) compared to the nomological network and the full mediation model. Based on the fit indices, the partial mediation model showed the best fit. In it is important to note that the RMSEA for all three models was not

indicative of good fit. However, research conducted by Chen et al. (2008), found that sample size influences the performance of the root square error of approximation (RMSEA). Kenny et al. (2014) has also indicated that researchers should proceed with caution when using the RMSEA with SEM models with small degrees of freedom and small sample sizes. On examining the $\chi 2$ difference between the partial and the full mediation model, the difference between the two mediation models was found to be statistically significant, thereby confirming that there was a significant difference in model fit between the partial mediation model and the full mediation model. Another point to mention here is also that the degrees of freedom of the nomological network and the partial mediation model were the same. However, since the nomological network and the partial mediation model are not meant to be nested models, and for which the $\chi 2$ difference test was not computed this was not an issue.

Table 22. Model Fit Summary Statistics

Model no.	χ 2	p value	GFI	CFI	RMSEA
Model 1	98.394	.000	.887	.761	.19
Model 2	84.129	.000	.905	.795	.18
Model 3	109.098	.000	.870	.733	.18

Note. Model 1 = The hypothesized model; Model 2 = Partial Mediation Model; Model 3 = Full Mediation Model
χ 2 = Chi Square; GFI = Goodness of Fit Index; CFI = Comparative Fit Index; RMSEA= Root Mean Square Error of Approximation; OCB – Organizational Citizenship Behavior

Lastly, in order to evaluate the criterion validity of the newly developed flow scale, mainly concurrent validity, correlations between the WOLF (Bakker, 2008), and the current scale were examined. Concurrent validity is determined by comparing the score on the instrument of interest; in this case the currently developed flow scale, with the score on an existing measure, also a measurement tool that is known to accurately measure that same construct (Godwin et al, 2013). As mentioned in the introduction, work-related flow has been

defined as a developmental and dynamic phenomenon that undergoes continuous change over time (Fullagar & Van Krevelen, 2017; Rathunde & Csikszentmihalyi, 2006). This could possibly be due to work having a greater potential to offer tasks that promote the perception of an optimal balance between high challenges with high skills. In the workplace the WOLF, developed by Bakker (2008), is the scale that is primarily used to measure flow. The current flow scale was found to moderately correlate ($r = 0.66$) of with the WOLF (Bakker, 2008), which indicated a moderate level of concurrent validity.

The main goal of Study 2 was to examine the construct validity of the workflow scale, and to assess job satisfaction as a mediator between the experience of flow and its consequences. To summarize the results, overall, main findings indicated that flow did show convergent and divergent validity with its antecedents and consequences, as hypothesized in the nomological network, thereby demonstrating construct validity. Furthermore, in assessing the mediation models, job satisfaction was essentially found to show partial, as well as full mediation effects with the consequences of flow. Job satisfaction was found to partially mediate the relationship between flow and positive mood, and fully mediate the relationship between flow and anxiety, and flow and organizational citizenship behavior. However, the partial mediation model showed the best level of fit, compared to the nomological network, and the full mediation model, as seen in Table 22, thereby indicating the job satisfaction in an important variable to consider when measuring the experience of flow in an organizational context. Lastly, the moderate level of concurrent validity found also suggests that the current scale does not operationalize flow as the WOLF (Bakker, 2008) does, thus does not use the same approach.

Discussion – Study 2

The main goal of Study 2 was establishing the construct validity of the Work-Flow Scale by examining it's convergent and discriminant validity. Study 2 examined the construct validity of the workflow scale by investigating the relationship that flow has with its antecedents and consequences by performing structural equation modeling. The antecedents in the nomological network comprised of autonomy and the preconditions of flow, which are considered essential to induce the experience of flow. The consequences of flow included job satisfaction, to be measured as well-being at work. Positive mood was also one of the consequences included in the nomological network. Organizational citizenship behavior was included as performance outcomes in the nomological network. The nomological network also included negative consequences, in order to assess discriminant or divergent validity. Negative consequences associated with the experience of flow included anxiety, and negative affect. Single indicator models were used to examine model fit because focusing on single indicators encourages attention to each latent and indicator and constitutes a call to theorize carefully (Hayduk & Litvay, 2012).

To begin with, in examining the nomological network, flow was found to positively relate to job satisfaction, positive mood, and organizational citizenship behavior. This relationship was not only statistically significant but also consistent with existing research, especially with Maeran and Cangiano (2013), where the authors found flow as one of the key predictors of job satisfaction. Moving on to organizational citizenship behavior, flow and OCB were also positively related and this relationship was also statistically significant. These findings were also consistent with existing research (Demerouti, 2006; Eisenberger, Jones, Stinglhamber, Shanock & Randall, 2005). The positive relationship between flow and positive mood was also

statistically significant. The positive relationships that the experience of flow had with job satisfaction, positive mood and OCB indicated that the current scale showed convergent validity. Flow was also found to negatively correlate with anxiety. This relationship was statistically significant as well and demonstrated that scale showed discriminant validity as well. This negative relationship was also consistent with Nakamura and Csikszentmihalyi (2002) views, where the authors state that anxiety shifts attention from the focused activity to the self and one's task-related shortcomings, and creates a state of mind that is extremely self-conscious and prevents the performer from experiencing flow. In terms of factors that led to the experience of flow, regarding the antecedents of flow, especially autonomy, did have a positive relationship with flow, however it was not statistically significant. In examining the zero order correlations between autonomy and the experience of flow, it is highly similar to the correlation of 0.18 found by Bakker (2005). Another reason also could be the fact that demographically, the job positions represented in the sample probably did not allow for a high degree of autonomy in performing job functions, which could have resulted in a non-statistically significant correlation. The preconditions of flow, which were also the antecedents of flow, in the nomological network positively correlated with the experience of flow, and this relationship was found to be statistically significant. Therefore, the path coefficients obtained through the nomological network, in examining the relationships flow had with its antecedents and consequences not only supported existing research findings, but also suggested that the current scale demonstrated convergent and discriminant validity.

In addition to the nomological network, alternate partial and full mediation models, with job satisfaction as a mediator were also evaluated in Study 2, as previous research has found relationships between not only between job satisfaction and the experience of flow but also

between job satisfaction and the consequences of flow, as discussed in the introduction. The partial mediation model did show better fit compared to the full mediation model, and the nomological network, thereby supporting previous findings. Results indicated job satisfaction as a partial mediator, based on the fit indices of the partial mediation model. According to the results of the partial mediation model, path coefficients showed positive relationships between the experience of flow and job satisfaction, organizational citizenship behavior, and positive mood. In terms of affect (positive and negative affect), job satisfaction has been found to correlate positively with positive affect (r = 0.49), in a study conducted by Conolly and Visweswaran (2000). The path coefficient in the partial mediation model between job satisfaction and positive affect (r = .45) was close to the correlation reported by Conolly and Visweswaran (2000). The relationship between job satisfaction and organizational citizenship behavior has also been well established in the literature (Foote & Tang, 2008). However, the positive relationship between the experience of flow and organizational citizenship behavior was not statistically significant in the current study. One reason for this could be that even though ample evidence for a relationship between job satisfaction and organizational citizenship behavior exists, the directional causality of this relationship remains uncertain (Foote & Tang, 2008). In examining the relationship between job satisfaction and anxiety, negative path coefficients were seen which were also statistically significant. However, the negative path coefficient between the experience of flow and anxiety was not statistically significant. In order to understand why this happened it was essential to examine the direct and indirect effects of the partial mediation model. Preacher and Hayes' (2004) non-parametric mediation bootstrapping technique was used as it provides more statistically powerful and accurate results. Results showed significant indirect effects between the experience of flow and positive mood,

organizational citizenship behavior, and anxiety. Additionally, statistically significant direct effects were not found between the experience of flow and organizational citizenship behavior, and between flow and anxiety, which indicated that job satisfaction could be partially mediating the relationship between flow and positive mood. Therefore, the reason why the experience of flow did not show statistically significant path coefficients with anxiety, was because there was no significant direct effect found, with job satisfaction as a mediator. Furthermore, the partial mediation model also showed the best model fit compared to the nomological network, and the full mediation model. In examining the direct and indirect effects of the full mediation model, the indirect effects between the experience of flow and positive mood, organizational citizenship behavior, and anxiety were statistically significant. Therefore, job satisfaction partially mediated the relationship between the experience of flow, and positive mood and fully mediated the relationship between flow and organizational citizenship behavior and anxiety because no significant direct effects were found between flow and organizational citizenship behavior, and anxiety in the partial mediation model. The findings also support existing theory for why job satisfaction may influence the relationship between the experience of flow and its consequences which has been shown in studies conducted by Gavin & Axlerod, (1977); and O'Brien and Dowling (1980) where the authors identified that skill utilization, involving the equivalence between the challenge of one's work and the ability to meet that challenge, as a task characteristic that could contribute to job satisfaction. The equivalence of challenge and skill is also one of the preconditions necessary to induce the experience of flow (Csikszentmihalyi, 1975). To summarize, based on the values of the fit indices and compared to the nomological network, and the full mediation model, the partial mediation model, with job satisfaction as the

mediator showed the best fit, supporting the hypothesis that job satisfaction did indeed play a role in influencing the effect that flow had on its consequences.

Theoretical Implications

The appropriate measurement of flow in the workplace will open doors in examining the different effects that flow can have on job performance, particularly motivation, and goal setting, to name a few (Knight & Waples, 2017). One of the main focusses of this dissertation, after developing the workflow scale, was also to address the construct validity of the scale. On examining the nomological network, results indicated that flow was indeed, positively associated with job satisfaction, organizational citizenship behavior, and positive mood, and negatively related to anxiety. The hypothesized nomological network, however, did not show a good level of model fit. This could be attributed to the small sample size (N = 199), as it is generally accepted that problems may arise due to a small sample size, with model fit indices being one of them (Wang & Wang, 2012). Alternate mediation models, with job satisfaction as a mediator were also assessed, because previous research has found job satisfaction to associate positively and negatively with some of the consequences of flow. The partial mediation model showed the best fit, compared to the original model and the full mediation model.

The first theoretical contribution of Study 2 sheds light on the relationship that job satisfaction can possibly mediate the relationship between the experience of flow and its consequences in the workplace. Overall, results showed job satisfaction partially mediating the relationship that the experience of flow has on its consequences. These findings have important theoretical implications because existing research does not mention the possibility of job satisfaction influencing such a relationship, especially regarding the outcomes included in the mediation models. In a study conducted by Maeran and Cangiano (2013), the authors found that

flow predicted job satisfaction in the workplace. Examining job satisfaction as a mediator between the experience of flow and its consequences takes this a step forward by understanding if the consequences of flow in the model are mediated by job satisfaction, or not. According to the results, job satisfaction partially mediated the relationship between the experience of flow, and positive mood and fully mediated the relationship between flow and organizational citizenship behavior, and anxiety. The finding that job satisfaction fully mediated the relationship between the experience of flow and organizational citizenship behavior, because statistically significant direct effects were not found between the experience of flow and OCB in the partial mediation model, whereas statistically significant indirect effects were found between flow and OCB in the full mediation model, provides insight into situations where environmental and certain job characteristics may enable the experience of flow, but may not essentially lead to employees engaging in any extra-role behaviors. In such cases, increasing levels of job satisfaction can possibly lead to these employees performing extra-role behaviors. In terms of anxiety, even though it has been found to be the antithesis of flow, job satisfaction did fully mediate this relationship because statistically significant direct effects were not found between flow and anxiety, in the partial mediated model and the full mediation model did show statistically significant indirect effects between flow and anxiety. Job satisfaction is essentially a positive psychological state that an individual gets from their job (Locke, 1976). In a work context, if individuals are experiencing flow, they are likely to experience higher levels of job satisfaction, and lower levels of anxiety. Given that this dissertation examined state anxiety in a job-related situation, and that job satisfaction has been found to be negatively associated with anxiety in previous research, explains why job satisfaction fully mediated the relationship between the experience flow and anxiety in the workplace. Even though job satisfaction has

been found to relate to outcomes included in the mediation model in previous research, these findings still contribute to existing literature because these are the first findings that suggest that job satisfaction can be a mediator between the experience of flow and positive mood, OCB, and anxiety in the workplace.

In order to assess concurrent validity of the measure, the relationship between WOLF (Bakker, 2008), and the current scale was also examined. A moderate level of positive correlation was found between these two scales. Since there is no other scale that measures the experience of flow in a work context currently being used, the WOLF (Bakker, 2008) was the only one that could be used to analyze concurrent validity. The two measures were moderately correlated, indicating that the current scale does not measure the experience of flow as the WOLF (Bakker, 2008), which operationalizes flow as employee engagement, by deviating from its original definition.

Practical Implications

On examining the results of the partial mediation model, job satisfaction was found to partially mediate the relationship between the experience of flow and its consequences. The results essentially suggest that employees who experience flow, are more likely to be satisfied with their jobs, and consequently are more likely to engage in organizational citizenship behavior, experience higher levels of positive mood, and experience lower levels of anxiety. Employees who are satisfied with their jobs will most likely experience positive consequences associated with the experience of flow as well and report lower levels of anxiety. Therefore, in terms of practical implications of these findings, organizations should consider creating workspaces, to include tasks that will enable employees to experience flow, leading to higher levels of job satisfaction. Organizations can do this firstly, by ensuring that short term goals, and

an overall goal are set for tasks that employees need to work on. The goals should be specific, and should require skills, that are equivalent to how challenging the task is. In discussing the importance of job satisfaction for organizations, it helps organizations to reduce employee turnover, which can include direct financial costs for an organization such as the loss of the performance and expertise of the employee, recruitment costs, and training of new hires (Weisberg & Kirschenbaum, 1991). Job satisfaction is also closely related with many organizational phenomena such as motivation, performance, leadership, attitude, conflict, etc. (Parvin and Kabir, 2011). Based on the findings from previous research, as well as the findings in this dissertation, flow does show significant positive, and negative associations with its consequences, and being in an organizational context, or a workplace setting, job satisfaction, along with flow, should also be taken into consideration given its importance in retaining employees mainly, and other factors.

Chapter 4 - General Discussion

The results of Study 1 and 2 individually have largely been discussed in their respective discussion sections. The discussion here examines the results across both studies and assesses what it means for the workflow scale that was developed in this dissertation and moves to discuss limitations and future research.

The main objective of this dissertation was to develop a psychometrically sound, short and reliable measure, that will enable the measurement of flow in the workplace, by conceptualizing the construct based on its original definition by Csikszentmihalyi (1975). The results from Study 1 and Study 2 suggest that this was largely achieved. As mentioned previously in the separate discussions of the two studies, particularly in Study 1, the process adopted to develop the items of the scale, followed by examining the model fit indices, support the hypothesis that the dimensions and the preconditions of flow should be measured separately, as opposed to together. In examining the construct validity of the scale in Study 2 through a nomological network, the measure did show convergent and discriminant validity as hypothesized, supporting previous research as well. Overall, the results obtained in both studies not only show evidence of the fact that the dimensions represent the components that make up the construct, whereas preconditions are required to induce the experience of flow, but also indicate that the scale was psychometrically sound.

In addition to examining the nomological network, Study 2 also examined alternate mediation models, with job satisfaction as a mediator between the experience of flow and its consequences. Given the fact that this measure was primarily developed to be used in an organizational context, and that previous research has found flow as a predictor of job satisfaction, mediation models were examined. Job satisfaction was found to partially mediate

the effects that the experience of flow had on its consequences. The partial mediation model showed the best level of fit compared to the full mediation model. As part of Study 2, concurrent validity between the WOLF (Bakker, 2008) and the current scale was also assessed. Furthermore, as stated previously, the current scale that is being used to measure flow in the workplace is the Work-Related Flow Scale (Bakker, 2008), which, to begin with, does not operationalize flow according to its original conceptualization. The scale developed in this dissertation not only takes in to account the original definition of flow, but also addresses the issue of construct irrelevance by developing items based on the original conceptualization of flow, ensuring that the conceptualization of flow does not overlap with any other construct. The moderate correlation between the current scale and the WOLF (Bakker, 2008) is indicative that the relationship between the Work-Flow Scale developed in the current dissertation and the WOLF (Bakker, 2008) is not a strong one, and that the current scale does not measure flow in the same manner as the WOLF (Bakker, 2008) does, as employee engagement.

To summarize the findings of both studies, this dissertation was successful in developing a psychometrically sound scale to measure the experience of flow in the workplace, and in addition to that also found that job satisfaction should be considered when trying to evaluate the experience of flow in an organizational setting, based on the model fit indices of the alternative models.

Limitations and Recommendations for Future Research

Even though the current research does have a number of interesting findings, some important limitations should be discussed. It is essential to mention, that the modified nomological network was examined on the same sample, instead of a holdout sample, therefore the modified model should be tested on a holdout sample, for cross-validation in future research.

Given the small sample size for the previous model, an anticipated lower response rate was a possibility, as a result of which the same sample was utilized to cross-validate the modified nomological network. Cross-validation is a method to maintain validity, reliability, and the replicability of measurement (Thompson, 1994; Thompson, 2013). Replicating a factor analytic solution on a holdout sample is generally considered the preferable method of demonstrating generalizability (DeVellis, 2017). The purpose of cross-validating a factor analysis is to examine whether the parameter estimates of the calibration sample can replicate in the validation sample (Byrne, 2012, 2006; Byrne et al., 1989). The process is equally applicable during scale validation. On the calibration sample, the hypothesized factor structure is tested, as well as any post hoc analyses for achieving a well-fitting model. Once a viable solution is found, its validity is verified by testing it on the validation sample, as Byrne (2012) describes. In cross-validation, a sufficiently large sample can also be randomly split into two subsamples (Kyriazos, 2018). However, in Study 2, the sample being too small (N = 199), splitting the sample was also not a viable option. In Study 2, to examine the construct validity of the scale, the modified nomological network was tested on the same sample. Therefore, this is an important limitation that should be addressed in future research. Furthermore, the sample size used in Study 2 being small, did influence the results, in terms of the root mean square error of approximation (RMSEA), in assessing model fit. Research conducted by Chen et al. (2008), found that sample size influences the performance of the root square error of approximation (RMSEA). Hu and Bentler (1999) also have indicated that with a small sample size, RMSEA is oversensitive in rejecting true population models (Byrne, 2012). A Monte Carlo study by Curran et al. (2002) also reported that when N > 200 the RMSEA was accurate for models with moderate misspecifications. Kenny et al. (2014) has also suggested that researchers proceed with caution

when using the RMSEA with SEM models with small degrees of freedom and small sample sizes. Given that this was the case with Study 2, the results should be cross validated on a larger sample, in future research. A second limitation that should be discussed is associated with using an online sample. Researchers have noted that some Turkers might not pay sufficient attention to the tasks they are performing or are simply clicking through surveys and experiments as quickly possible (Goodman, Cryder, and Cheema 2013). In order to address concerns regarding the quality of data, attention check items were included in the questionnaire, responses to which indicated whether the respondent completed the questionnaire appropriately. Also, while Mechanical Turk does provide a sample that is representative whereas gender is concerned, Ross and colleagues (2010) found that approximately 57 percent of Turkers were from the United States and 32 percent from India. Another limitation when it comes to collecting data on Mechanical Turk included the potential external validity limitations of crowdsourced data. Responses are provided by interested Turkers who have already self-selected themselves into the Turker population (Strich et al, 2017). These issues were handled by collecting demographic data including job position, gender, location, age and industry, in order to ensure that the respondents represented a diverse population. Being an online sample, it was also important to ensure that the quality of data was appropriate to conduct the necessary statistical analyses. Data screening procedures following recommendations suggested by Tabachnick & Fidell (2007) were conducted. These procedures included examining the data for missing values, normality, univariate and multivariate outliers, and multicollinearity. From a demographic perspective, most respondents did have a technical background in terms of their occupation. In order to understand how employees experience flow in different fields, future research should look at a broader demographic regarding job positions, as well as occupations. This broad demographic will not

only enable understanding the occupations, but also which job positions employees are more likely to experience flow in.

Based on the findings of the mediation models, that job satisfaction partially and fully mediated the relationship between flow and its consequences, brings to light the importance of why job satisfaction is important in understanding the positive and negative outcomes of flow in the workplace. In their study, O'Brien and Dowling (1980) identified that skill utilization, involving the equivalence between the challenge of one's work and the ability to meet that challenge, as a task characteristic could contribute to job satisfaction. The relationship between job satisfaction and organizational citizenship behavior has also been well established in the literature (Foote & Tang, 2008). In terms of job performance, organizational citizenship behavior is considered as an extra role performance. According to MacKenzie, Podsakoff, and Fetter (1991), extra role performance is defined as discretionary behaviors on the part of an employee that are believed to directly promote the effective functioning of an organization without necessarily directly influencing an employee's productivity. Based on the findings of the mediation models, job satisfaction fully mediated the relationship between the experience of flow and organizational citizenship behavior. Future research should examine whether experiencing flow predicts behaviors that are a requirement of the role or job description, or extra role behaviors. In examining this relationship job satisfaction should be included as a mediator. Findings will enable organizations to not only assess how they need to change the characteristics of the tasks, and the environment in which employees perform their tasks, based on whether they are experiencing flow, but also whether they are more likely to perform expected tasks based on their job requirement, or engage in extra role behaviors based on how satisfied they are with their jobs, if they are experiencing flow.

The three preconditions of flow, *challenge-skill balance, clear goals, and unambiguous feedback* are determined wholly, or in part, as task characteristics or situational factors, and define circumstances under which flow is most likely to emerge (Knight & Waples, 2017). According to goal-setting theory, specific, difficult goals will result in higher performance than less difficult or less specific goals (Locke & Latham, 1990). The potential relationships among the performance benefits of goal setting and the subjective experience of flow can be seen in the apparent parallels between the preconditions of flow and the prescriptions of goal setting theory. Challenge-skill balance is analogous to goal-setting's recommendation that goals should be difficult yet attainable, requirement of clear goals, and the emphasis placed on performance feedback (Knight & Waples, 2017), a standardized task, once with specific, difficult goals, and once with do-your-best goals. The goal conditions were counterbalanced, with half of the participants first performing a trial with a goal, and half performing a do-your-best trial first. This study is the only one to examine the relationship between goal setting and flow that suggests complex relationships between the two constructs. Future research should investigate job satisfaction as a possible mediator, influencing the relationship between the experience of flow and goal setting.

Conclusions

One of the major issues in the measurement of flow has been operationalizing the construct appropriately, to be able to measure the experience of flow. The Work-Flow Scale in this dissertation was developed keeping in mind the original conceptualization of flow as put forth by Csikszentmihalyi (1975), which makes it the first scale of its kind that assesses flow at work, according to its original dimensions and preconditions. This dissertation has attempted to address the psychometric issues that compromised the appropriate measurement of flow. The results of this study show evidence that the experience of flow should be measured with six

dimensions, which make up the construct of flow, and three preconditions which are structural task characteristics, and are not sub-dimensions that make up the construct. This is a significant contribution in terms of how flow should be measured in the workplace as well, as opposed to the WOLF developed by Bakker (2008), where the conceptualization of flow is a problem (Hapell et al, 2005), because the components that are measured in the WOLF (Bakker, 2008) have a conceptual overlap with employee engagement (Schaufeli, Salanova, González-Romá, & Bakker, 2002). In examining alternate mediation models, job satisfaction was found to influence the consequences of flow in an organizational context. Pfeffer (1998) argues that the key to long-term success has been, and will continue to be, how organizations manage their employees, since creating meaningful work and otherwise keeping employees happy is central to fostering organizational effectiveness. Given the fact that organizations today are always working towards enabling their employees improve the quality of their performance the current research not only provides a theoretically developed short measure of flow that organizations can use, but also, by examining job satisfaction as a mediator, provides insight and evidence into how job satisfaction can influence certain consequences faced by employees, in spite of experiencing flow at work.

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Appendix A - Scales for Study 1

KANSAS STATE UNIVERSITY
INFORMED CONSENT

PROJECT TITLE : Development and Validation of a Work Flow Scale

APPROVAL DATE OF PROJECT: 11/18/2018

PRINCIPAL INVESTIGATOR: DR. CLIVE FULLAGAR

CO-INVESTIGATORS: DEVYANI MAHAJAN

CONTACT FOR ANY PROBLEMS/ QUESTIONS: Devyani Mahajan, Industrial and Organizational Psychology Doctoral Candidate, Kansas State University,devyani@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 Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224

PURPOSE OF THE RESEARCH: The purpose of this study is to ask you questions about your experience at work.

PROCEDURES OR METHODS TO BE USED: You will be asked to recall a task that you worked on and will be presented with some statements which you will need to respond to based on your experience in completing the task.

LENGTH OF STUDY: About 10 - 15 minutes

RISKS ANTICIPATED : The risks of this study are no different from those that would be expected to occur in everyday life.

BENEFITS ANTICIPATED: Although there are no benefits to participating, this information can help researchers better understand the the experience of flow in the workplace.

EXTENT OF CONFIDENTIALITY: We will not ask for any personal information such as name or employer. Responses to this survey will only be presented in aggregate form, such that individual responses cannot be identified.

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 by clicking the arrow button below, that I have read and understood this consent form and willingly agree to participate in this study under the terms described. I may print a copy of this form for my records if desired.

The following questions were asked before administering the Work-Flow Scale:

1) Think of a particular day in the last week when you spent a lot of time working on a particular work-related task.

   _____

2) What was the task you worked on?

   _____

3) How long did you work on the task?

   _____

Work-Flow Scale

Instructions: Please answer the following questions in relation to your experience on completing the task. These questions relate to the thoughts and feelings you may have experienced while performing the task. There are no right or wrong answers. Think about how you felt during the event and answer the questions using the rating scale provided below. Select the option that best matches your experience.

	Items	**Responses**				
1)	I was concentrating exclusively on the task at hand	1	2	3	4	5
2)	Time just passed when I was working	1	2	3	4	5
3)	I had a strong sense of what I wanted to accomplish	1	2	3	4	5
4)	I worked on the items because I get pleasure from doing it	1	2	3	4	5
5)	I was in control of the situation while working on the task	1	2	3	4	5
6)	I felt the challenges the task offered, and the level of my skills were equal	1	2	3	4	5
7)	I felt the experience was very rewarding	1	2	3	4	5
8)	I knew what course of action to take based on how the task progressed	1	2	3	4	5
9)	Please choose 'Neutral' as your answer choice	1	2	3	4	5
10)	My goals concerning the task were very clear	1	2	3	4	5
11)	I was not conscious of how I physically looked while working on the task	1	2	3	4	5
12)	It was not difficult for me to concentrate	1	2	3	4	5
13)	I felt I was skilled enough to perform the task well	1	2	3	4	5
14)	I felt completely in control of my actions while working on the task	1	2	3	4	5
15)	I knew how I was progressing with the task	1	2	3	4	5
16)	I was in total control of my actions	1	2	3	4	5
17)	My attention was centered completely on the task	1	2	3	4	5
18)	I did not have to make an effort to complete the task	1	2	3	4	5
19)	My skills matched the challenges of the task	1	2	3	4	5
20)	Time did not matter when I was working	1	2	3	4	5
21)	I knew exactly what the objectives of the task were	1	2	3	4	5
22)	I enjoyed the experience of working on the task	1	2	3	4	5
23)	I forgot myself while working on the task	1	2	3	4	5
24)	Things happened spontaneously when performing the task	1	2	3	4	5
25)	I was not concerned with how I was performing	1	2	3	4	5
26)	I was aware of the mistakes I made while working on the task	1	2	3	4	5
27)	The activities to perform the task came automatically to me	1	2	3	4	5
28)	Time seemed to speed up when I was working	1	2	3	4	5

Note: 1 - Strongly Disagree, 2 - Disagree, 3 - Neutral, 4 - Agree, 5 - Strongly Agree

Demographic Questions

Please indicate your gender: 1) Male
2) Female
3) Prefer not to answer

Please indicate your country: Dropdown menu with options which included all countries.

Please indicate your age: 1) Less than 18
2) 18-24
3) 25-34
4) 35-44
5) 45-54
6) 55-64
7) 65+

Which of the following best describes where you were employed?

1) Private for-profit company, business or individual, for wages, salary or commissions
2) Private not for profit company, tax-exempt, or charitable organization
3) Local government employee (city, county, etc.)
4) State government employee
5) Federal government employee
6) Self-employed in own not incorporated business, professional practice, or farm
7) Self-employed in own incorporated business, professional practice, or farm
8) Working without pay in a family business, or farm
9) Other (specify) _____

What is your job title?

_____

Could you please describe your primary tasks or responsibilities at work?

_____

On average, how many hours per week do you work?

_____

How long have you worked at this organization?

_____

Appendix B - Scales for Study 2

Job Diagnostics Survey (Autonomy: Hackman & Oldham, 1975, 1980)
Instructions: Please read the statements below and using the scale indicate whether each statement is an adequate or inadequate description of your present or most recent job.

Items	Responses				
1) I have almost complete responsibility for deciding how and when the work is to be done	1	2	3	4	5
2) I have very little freedom in deciding how the work is to be done.	1	2	3	4	5
3) My job does not allow me an opportunity to use discretion or participate in decision making.	1	2	3	4	5
4) My job gives me considerable freedom in doing the work	1	2	3	4	5

Note. 1 – Very non-descriptive, 2 – Mostly non-descriptive, 3 – Somewhat descriptive, 4 – Mostly descriptive, 5 – Very descriptive

Flow Scale – Same scale used in Study 1, to measure the dimensions of flow at work

Job Satisfaction Survey (Spector, 1985, 1994)
Instructions: Based on the statements provided please select the option that best reflects your opinion about your current job.

Items	Responses					
1) I feel I am being paid a fair amount for the work I do.	1	2	3	4	5	6
2) There is really too little chance for a promotion on my job.	1	2	3	4	5	6
3) My supervisor is quite competent in doing his/her job.	1	2	3	4	5	6
4) I am not satisfied with the benefits I receive.	1	2	3	4	5	6
5) When I do a good job, I receive the recognition for it that I should receive.	1	2	3	4	5	6
6) Many of our rules and procedures make doing a good job difficult.	1	2	3	4	5	6
7) I like the people I work with.	1	2	3	4	5	6
8) I sometimes feel my job is meaningless.	1	2	3	4	5	6
9) Communications seem good within this organization.	1	2	3	4	5	6
10) Raises are too few and far between.	1	2	3	4	5	6
11) Those who do well on the job stand a fair chance of being promoted.	1	2	3	4	5	6
12) My supervisor is unfair to me.	1	2	3	4	5	6
13) The benefits we receive are as good as most other organizations offer.	1	2	3	4	5	6
14) I do not feel that the work I do is appreciated.	1	2	3	4	5	6
15) My efforts to do a good job are seldom blocked by red tape.	1	2	3	4	5	6

16) I find I have to work harder at my job because of the incompetence of people I work with.	1	2	3	4	5	6
17) I like doing the things I do at work.	1	2	3	4	5	6
18) The goals of this organization are not clear to me.	1	2	3	4	5	6
19) I feel unappreciated by the organization when I think about what they pay me.	1	2	3	4	5	6
20) People get ahead as fast here as they do in other places.	1	2	3	4	5	6
21) My supervisor shows too little interest in the feelings of subordinates.	1	2	3	4	5	6
22) The benefit package we have is equitable.	1	2	3	4	5	6
23) There are few rewards for those who work here.	1	2	3	4	5	6
24) I have too much to do at work.	1	2	3	4	5	6
25) I enjoy my coworkers	1	2	3	4	5	6
26) I often feel that I do not know what is going on with the organization.	1	2	3	4	5	6
27) I feel a sense of pride in doing my job.	1	2	3	4	5	6
28) I feel satisfied with my chances for salary increases.	1	2	3	4	5	6
29) There are benefits we do not have which we should have.	1	2	3	4	5	6
30) I like my supervisor.	1	2	3	4	5	6
31) I have too much paperwork.	1	2	3	4	5	6
32) I don't feel my efforts are rewarded the way they should be.	1	2	3	4	5	6
33) I am satisfied with my chances for promotion.	1	2	3	4	5	6
34) There is too much bickering and fighting at work.	1	2	3	4	5	6
35) My job is enjoyable.	1	2	3	4	5	6
36) Work assignments are not fully explained.	1	2	3	4	5	6

Note. 1 – Disagree very much, 2 – Disagree moderately, 3 – Disagree slightly, 4 – Agree slightly, 5 – Agree moderately, 6 – Agree very much

Positive Affect Schedule (Watson, Clark & Tellegen, 1988)

Instructions: Below are a number of words that describe different feelings and emotions. Please read each word and indicate the appropriate intensity in the options provided, based on how you have felt in the last one week.

Words	Responses				
1) Interested	1	2	3	4	5
2) Excited	1	2	3	4	5
3) Strong	1	2	3	4	5
4) Enthusiastic	1	2	3	4	5
5) Proud	1	2	3	4	5
6) Alert	1	2	3	4	5
7) Inspired	1	2	3	4	5
8) Determined	1	2	3	4	5
9) Attentive	1	2	3	4	5
10) Active	1	2	3	4	5

Note. 1 – Not at all, 2 – A little, 3 – Moderately, 4 – Quite a bit, 5 – Extremely

Organizational Citizenship Behavior Checklist (Fox & Spector, 2011)

Instructions: Please read the following question and based on the statements provided, select from the options provided, that you think indicates your behaviors in the last month. Please be as honest as you can as there is no right or wrong answer.

	Items	**Responses**				
	How often have you done each of the following things on your present job?					
1)	Picked up meal for others at work	1	2	3	4	5
2)	Took time to advise, coach, or mentor a co-worker.	1	2	3	4	5
3)	Helped co-worker learn new skills or shared job knowledge.	1	2	3	4	5
4)	Helped new employees get oriented to the job.	1	2	3	4	5
5)	Lent a compassionate ear when someone had a work problem.	1	2	3	4	5
6)	Lent a compassionate ear when someone had a personal problem.	1	2	3	4	5
7)	Changed vacation schedule, work days, or shifts to accommodate co-worker's needs.	1	2	3	4	5
8)	Offered suggestions to improve how work is done.	1	2	3	4	5
9)	Offered suggestions for improving the work environment.	1	2	3	4	5
10)	Finished something for co-worker who had to leave early.	1	2	3	4	5
11)	Helped a less capable co-worker lift a heavy box or other object.	1	2	3	4	5
12)	Helped a co-worker who had too much to do.	1	2	3	4	5
13)	Volunteered for extra work assignments.	1	2	3	4	5
14)	Took phone messages for absent or busy co-worker.	1	2	3	4	5
15)	Said good things about your employer in front of others.	1	2	3	4	5
16)	Gave up meal and other breaks to complete work.	1	2	3	4	5
17)	Volunteered to help a co-worker deal with a difficult customer, vendor, or co-worker.	1	2	3	4	5
18)	Went out of the way to give co-worker encouragement or express appreciation.	1	2	3	4	5
19)	Decorated, straightened up, or otherwise beautified common work space.	1	2	3	4	5
20)	Defended a co-worker who was being "put-down" or spoken ill of by other co-workers or supervisor.	1	2	3	4	5

Note. 1 – Never, 2 – Once or Twice, 3 – Once or Twice per Month, 4 – Once or Twice per Week, 5 - Everyday

State Anxiety Inventory (Spielberger & Gorsuch, 1966; Spielberger, et al., 1970)
Instructions: Read each statement and then select the appropriate option to indicate how you feel RIGHT now, that is, AT THIS MOMENT, and select from the options provided. There are no right or wrong answers.

Items	**Responses**			
1) I feel calm	1	2	3	4
2) I feel secure	1	2	3	4
3) I am tense	1	2	3	4
4) I am strained	1	2	3	4
5) I feel at ease	1	2	3	4
6) I feel upset	1	2	3	4
7) I am presently worrying about possible misfortunes	1	2	3	4
8) I feel satisfied	1	2	3	4
9) I feel frightened	1	2	3	4
10) I feel comfortable	1	2	3	4
11) I feel self-confident	1	2	3	4
12) I feel nervous	1	2	3	4
13) I feel jittery	1	2	3	4
14) I feel indecisive	1	2	3	4
15) I am relaxed	1	2	3	4
16) I feel content	1	2	3	4
17) I am worried	1	2	3	4
18) I feel confused	1	2	3	4
19) I feel steady	1	2	3	4
20) I feel pleasant	1	2	3	4

Note: 1 – Not at all, 2 – Somewhat, 3 – Moderately so, 4 – Very much so

The Work-Related Flow Scale (Bakker, 2008)

Instructions: The following statements refer to the way in which you experienced your work during the last two weeks. Please indicate how often you experienced each of the following statements based on the options provided.

Items	Responses						
1) When I am working, I think about nothing else	1	2	3	4	5	6	7
2) I get carried away by my work	1	2	3	4	5	6	7
3) When I am working, I forget everything else around me	1	2	3	4	5	6	7
4) I am totally immersed in my work	1	2	3	4	5	6	7
5) My work gives me a good feeling	1	2	3	4	5	6	7
6) I do my work with a lot of enjoyment	1	2	3	4	5	6	7
7) I feel happy during my work	1	2	3	4	5	6	7
8) I feel cheerful when I am working	1	2	3	4	5	6	7
9) I would still do this work, even if I received less pay	1	2	3	4	5	6	7
10) I find that I also want to work in my free time	1	2	3	4	5	6	7
11) I work because I enjoy it	1	2	3	4	5	6	7
12) When I am working on something, I am doing it for myself	1	2	3	4	5	6	7
13) I get my motivation from the work itself, and not from the reward for it	1	2	3	4	5	6	7

Note. 1 – Never, 2 – Almost never, 3 – Sometimes, 4 – Regularly, 5 – Often, 6 – Very Often, 7 – Always

Demographic Questions

Same questions asked in Study 1