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COMPARATIVE ASSESSMENT OF THE FLOW STATE SCALE AND THE WORK-RELATED FLOW INVENTORY: A RELATIVE WEIGHTS ANALYSIS

BY

SAMANTHA GILDEMEISTER

A thesis submitted in partial fulfillment of the requirements for the

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South Dakota State University

2019

COMPARATIVE ANALAYSIS OF THE FLOW STATE SCALE AND THE WORK-RELATED FLOW INVENTORY: A RELATIVE WEIGHTS ANALYSIS

SAMANTHA GILDEMEISTER

This thesis is approved as a creditable and independent investigation by a candidate for the Master of Science degree and is acceptable for meeting the thesis requirements for this degree. Acceptance of this does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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ABSTRACT

COMPARATIVE ASSESSMENT OF THE FLOW STATE SCALE AND THE WORK-RELATED FLOW INVENTORY: A RELATIVE WEIGHTS ANALYSIS

SAMANTHA GILDEMEISTER

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Flow experiences, or optimal experiences of intense concentration and enjoyment, were originally measured using qualitative measures. More recently, quantitative measures such as the Flow State Scale (FSS) and the Work-Related Flow Inventory (WOLF) allowed for structural assessment of the construct, but the vague definition of flow led to variability in the foundation of the measurement. As such, this study aimed to investigate the extent of overlap between the FSS and the WOLF at the factor level in a sample of working adults. Specifically, we investigated the relation between the nine FSS factors and the three WOLF factors using confirmatory factor analyses (CFA), correlations, relative weights analysis (RWA), dominance analysis, and frequency analysis for demographics. Evidence suggests the nine- and three-factor models of flow are acceptable, and the extent of overlap between the factors is highly variable. The ability of the scales categorize flow experiences was highly dependent upon the method of flow identification. As such, frequencies of flow were most variable between identification methods than between scales. In conclusion, the current study adds further support for the multidimensionality of flow while expanding on the extent that the factors of the FSS account for a proportion of the WOLF factors to better clarify the constituents of flow in organizational settings.

Keywords: Flow, Flow State Scale (FSS), Work Related Flow Scale (WOLF), Relative weights analysis

INTRODUCTION

Every year, each employee wastes around 144 hours of productive work at an organization, as reported in a 2012 study by Survey.com. After surveying over 3,000 working professionals, the study indicated a lack of motivation to work led employees to participate in presenteeism behaviors such as checking social media, replying to personal emails, or online shopping. However, these outcomes were not a result of poor workers; instead, the work situation failed to appropriately engage the employees. Specifically, 35% of respondents felt that their work lacked adequate challenges and 23% reported being chronically bored at work. This study is one of many in line with past investigations of how aligning the characteristics of a situation with the needs of workers can lead to higher productivity and even greater engagement.

During certain activities, individuals can reach a state of peak engagement, or flow (Csikszentmihalyi, 1975). For example, artists paint hours on end while holding intense concentration and complete immersion in their work (Csikszentmihalyi, 1965). In athletes, a flow state occurs when perceived skills match challenge of the task, and while in this state individuals experience energy creation, a loss of self-consciousness, and a feeling of reward (Csikszentmihalyi & Bennett, 1971). Furthermore, the emergence of flow theory has helped clarify the conditions needed to maximize flow experiences in leisure, play, and work (Csikszentmihalyi, 1975). As a result, researchers have obtained a clearer understanding of these periodic episodes of peak engagement, but the qualitative nature of this research could not provide empirical validation of the construct.

More recently, pioneering efforts to quantitatively research flow as a state resulted in development of psychometrically valid flow scales. In 1996, Jackson and Marsh developed and validated the Flow State Scale (FSS) to measure the level of flow from recent experiences in sport and physical activity settings. Following suit, Bakker (2008) focused specifically on flow in the workplace and developed the Work-Related Flow (WOLF) inventory. Despite relative alignment with flow theory, the facets differ between the FSS and the WOLF. In line with past calls for research on the overall structure of flow (Jackson & Eklund, 2002; Quinn, 2005), the current research will use an inductive approach to find support for flow theory. Specifically, I investigate the relative relationship of the FSS structure and the WOLF structure.

Flow

The concept of flow emerged as a way to explain the complexity of intrinsically motivating experiences of athletes, artists, and workers (Csikszentmihalyi, 1988). These optimal experiences of engagement are altered states of consciousness where the participant is “in the zone” and time seems to rapidly pass. The uniqueness of flow experiences comes from the “autotelic,” or self-rewarding, attributes of performing an activity simply for the sake of doing it. As a result, that participation is inherently rewarding. Moreover, the state of flow is understood to be a regulatory compatibility experience in which personal attributes interact with environmental requirements in a given situation (Keller & Bless, 2008). In other words, a flow state is dependent on both personal and situational characteristics, and this interaction sheds light on the natural complexity of flow experiences.

After identifying flow experiences as unique and distinct, researchers formulated a definition based on the observed characteristics. As a result, nine components of flow were identified: challenge-skill balance, clear goals, unambiguous feedback, concentration, merging of action and awareness, sense of control, loss of self-consciousness, distortion of time, and autotelic experience (Csikszentmihalyi, 1975; 1990). However, models of flow experiences indicate these nine characteristics do not occur simultaneously (Quinn, 2005). Rather, evidence suggests that some dimensions are antecedents of flow state experience while others are psychological characteristics or even results of the experience (Fong, Zaleski, & Leach, 2015).

Of the nine characteristics, four are considered to be antecedents of a flow state (Nakamura & Csikszentmihalyi, 2014; Fong et al., 2015), but this is not always agreed-upon (Quinn, 2005). The first antecedent we consider is *challenge-skill balance*, or an individual's perception of their ability to perform at the appropriate capacity relative to the demands of the situation. A comparison of the challenge-to-skill ratio resulted in four states of experience: boredom (low challenge, high skill), anxiety (high challenge, low skill), apathy (low challenge, low skill), or flow (high challenge, high skill; Massimini & Carli, 1988). Similar to a Yerkes-Dodson curve (Broadhurst, 1959), optimal experiences are achieved when an equilibrium between challenge and skill exist and any slight deviation was believed to result in a shift from flow to either boredom or anxiety (Nakamura & Csikszentmihalyi, 2010). However, this model oversimplifies the identification of flow and does not account for influential factors such as perceived task importance or individual differences in ability (Engese & Rheinberg, 2008; Fulmer & Tulis, 2016; Pfister, 2002).

The next antecedent is *a sense of control* which is described as an absence of worry for loss of control that facilitates the freedom to regulate the situation, personal behaviors, and one's consciousness. The third antecedent, the presence of *clear goals*, helps to direct behavior and create a sense of certainty for completion; however, achieving the goal is not necessarily important. Without clear goals, distractions may influence task completion and an individual may lose focus and direction. In organizations, providing clear goals has been found to increase the frequency of flow in employees (Salanova, Bakker, & Llorens, 2006). Lastly, goals even provide a foundation for *unambiguous feedback* which supplement awareness of progress. Fundamentally, individuals constantly seek feedback to become equipped with more accurate data and to achieve goals, (Ashford, Blatt, & VandeWalle, 2003). To ensure optimal results, feedback should be immediate and relevant as well as inform the performer that they are on the right track (Csikszentmihalyi, 1975). As such, challenge-skill balance, control, clear goals, and feedback offer narrow and specific guidelines to direct behavior toward a flow state.

During a flow state, the experience consists of characteristics including an intense focus and concentration, the merging of action and awareness, a loss of self-consciousness, and distortion of time (Csikszentmihalyi, 1975; Csikszentmihalyi, 1990; Jackson & Csikszentmihalyi, 1999). Flow can only occur with complete *concentration* on the task at hand. As attention narrows and concentration increases, distractions from everyday life fade away and only relevant information is interpreted. When *actions merge with awareness*, one becomes subconsciously aware of their performance. As such, the mind and body become a singular and unified mechanism such that thoughts and actions merge. As the focus of the mind becomes centered, a *loss of self-consciousness* takes place. This sense of self-forgetfulness leads to a divergence from the self as the center of attention and allows for a broadening of self-concept. Another unique characteristic is the *transformation of time*, or the sensation of flowing through time in which the past, present, and future feel distorted. Time may appear to stand still while in the moment, yet one may be uncertain of how they spent their time in retrospect. During flow, these characteristics build to create an enjoyable and rewarding experience.

Lastly, an *autotelic experience*, or the ultimate satisfaction and joy felt by performing an activity, is the result of a flow state (Tenenbaum, Fogarty, & Jackson, 1999). An activity is autotelic when one performs it solely for the purpose of having the experience without receiving external motivation or reward. The intense satisfaction of the activity emerges only once concentration breaks and awareness returns. In other words, when the experience is over, a flood of enjoyment acts as a motivational force to perform in greater and greater challenges, even to the point of addiction (Schuler, 2012). Even so, understanding the positive outcome of flow experiences has provided many beneficial avenues for researching optimal experiences.

After the establishment of flow characteristics, research transitioned its focus to differentiating flow from other types of experiences (Csikszentmihalyi & Csikszentmihalyi, 1988). Historically, researchers qualitatively measured flow using the experience sampling method (ESM); this method periodically alerted participants to respond to a questionnaire to produce a diary of daily activities, experiences, and associated feelings. ESM, although time consuming, offered a systematic method of measurement and became the most recommended tool to measure flow experiences (Csikszentmihalyi, 1997; Csikszentmihalyi & Larson, 1987). Even with a method to capture experiential information, actual identification of flow experiences may be dependent on subjective standards and definitions.

Some evidence has suggested that false classification of flow experiences may be the result of variations in the criteria of flow. A primary example of this variation was when researchers used ESM to develop a situation-based model of flow from the perceived challenge to skill ratio (Massimini & Carli, 1988). After originally proposing a 4-situation model, a slight change in the operationalization of flow resulted in support of an 8-situation model: flow, control, relaxation, boredom, apathy, worry, anxiety, or arousal. The researchers noted that arbitrary definitions may explain differentiation between a 4-, 8-, and even 16-situation model of flow (Massimini & Carli, 1988). The structure and identification of flow experiences appears foundationally precarious when the precision of experience categorization is left to the whims of the researcher.

In line with past criticisms of measuring flow, researchers identified that one main problem is a lack of agreed upon operationalization (Quinn, 2005; Fong et al., 2015). For instance, the operationalization of flow has deviated between researchers and across activities such as in art and science (Csikszentmihalyi, 1996), sport (Jackson & Marsh, 1996), and at work (Bakker, 2008). Without a clear definition, the development of a valid measurement tool and its use in quantitative research becomes dependent upon interpretations rather than a predictable set of factors. Therefore, the tools and definitions of measuring flow experiences need more attention to understand what constitutes a flow experience.

Flow State Scale (FSS)

The use of quantitative measures became the next step in validating the structure of flow. In the search of a standardized, single-measure approach that did not rely on complicated and time-consuming methods, Jackson and Marsh (1996) developed and validated the Flow State Scale (FSS; Appendix A). In treating flow as a state like experience, the purpose of the FSS was to assess flow as a multidimensional construct from recent experiences in sports and physical activity settings. This global approach to measuring flow strictly followed the nine-dimension structure of flow theory (Csikszentmihalyi, 1975; 1997). As such, high scores on each of the nine factors signify whether athletes experienced flow.

Empirical research continued to investigate the characteristics of flow. From this research, evidence suggests the nine dimensions vary in their centrality to the flow experience. For example, the easiest dimension to experience is the autotelic experience because of the salience of the sensation (Tenenbaum et al., 1999). Although the autotelic experience was originally conceived as a crucial component of flow (Csikszentmihalyi, 1990), evidence for the centrality of this characteristic is conflicting (Jackson & Marsh, 1996; Jackson, 1996; Tenenbaum et al., 1999). Interestingly, these results have been attributed to athletes' disregard of their feelings of satisfaction, despite the high frequency (Jackson & Marsh, 1996). Other easily experienced and central dimensions include clear goals and unambiguous feedback, followed by the balance of challenge to skill, concentration, and sense of control (Tenenbaum et al., 1999). In line with meta-analytical results of flow antecedents (Fong et al., 2015), these may be easier for respondents to identify because of the early encounter with the characteristics. Additionally, deeper levels of flow may be harder to experience, such as the merging of action and awareness, but remain central to the experience (Tenenbaum et al., 1999). The last two dimensions, loss of self-consciousness and transformation of time, may occur less frequently or even at a later point in flow experiences (Tenenbaum et al., 1999), and the structural importance of these factors are ambiguous (Jackson & Marsh, 1996; Kowal & Fortier, 1999). Therefore, the nine dimensions of the FSS support the multidimensionality as well as a hierarchical nature of flow, but the importance and occurrence of some factors remains.

Despite the alignment with flow theory, more recent investigation of the FSS suggests conflicting evidence for the overall structure of the scale. For instance, some researchers have indicated support of the nine-factor structure (e.g., Doganis, Iosifidou, & Vlachopoulos, 2000; Vlachopoulos, Karageorghis, & Terry, 1999), but others have found only partial support (e.g., Staurou, Zervas, Kakkos, Psychountaki, & Georgiadls, 1996). For example, some researchers found support for only four (i.e., unambiguous feedback, loss of self-consciousness, transformation of time, and autotelic experience) of the original nine factors (Staurou et al., 1996). In light of the inconsistent results of the 9-factors of flow, more evidence is needed to confirm the structure of the FSS.

Work-Related Flow Inventory (WOLF)

Optimal experiences at work represent a distinct area of research on flow. As one progresses through their day, flow experiences occur most often during working hours and less frequently during leisure time (Rodríguez-Sánchez, Schaufeli, Salanova, Cifre, & Sonnenschein, 2011). A possible explanation for the special occurrence of flow at work is that working conditions often facilitate an environment with clear guidelines and reserved productivity time. Despite higher frequency of flow experiences at work (Csikszentmihalyi & LeFrevre, 1998), both work and leisure experiences share some similar antecedents and characteristics (Csikszentmihalyi, 1997). Of these similar characteristics, organizational researchers have identified that the three most common elements of flow experience are absorption, enjoyment, and intrinsic motivation (Bakker, 2005; 2008).

Bakker (2008) used these three elements as the foundation for the development of the Work-Related Flow (WOLF) inventory (Appendix B). In contrast to the FSS, the purpose of the WOLF was to quantify flow experiences within the past two weeks at work based on high scores on absorption, work enjoyment, and intrinsic motivation. The support for this structure of the WOLF has also been inconsistent. Some researchers have found adequate fit for a three-factor model, but others suggest a two-factor model has a greater fit due to an insufficient distinction between work enjoyment and intrinsic motivation (Bakker, 2008; Zito, Bakker, Colombo, & Cortese, 2015; Happell, Gaskin, & Platania-Phung, 2015).

The most identified factor, *absorption*, is a state of total concentration and immersion in a task. In terms of the original categorization of flow, absorption appears to encompass many dimensions such as the merging of action and awareness, concentration, clear goals, loss of self-consciousness, and transformation of time. For instance, absorption occurs when one is free to focus on the clearly defined task without awareness of behavior, self-consciousness, and time. At the conclusion of the experience, the intense absorption feels enjoyable and rewarding.

Work enjoyment is understood to be a positive judgment of quality of work life. This second facet may partially represent the autotelic outcome as well as the challenge-skill balance, clear goals, and unambiguous feedback in that an individual gains satisfaction and energy from performing at a peak level. When employees have the necessary resources and competence, they can enjoy their work. High work enjoyment has been found to lead to positive outcomes such as better self-efficacy and higher standard job-related performance (Salanova et al., 2006; Bakker, 2008). Outside of work, an investigation of daily flow suggests that enjoyment is more prominent dimension during leisure activities than work (Rodríguez-Sánchez et al., 2011). Although this evidence seems to undermine the importance of this factor in measuring work-specific flow, it may actually provide further support for the possibility of context-specific work enjoyment. Specifically, work enjoyment may only be a characteristic of flow when employees are challenged and motivated to perform their job.

The *intrinsic work motivation* aspect of flow is the desire to perform a specific activity to generate a feeling of self-satisfaction. In line with self-determination theory, intrinsic motivation is a distinct, motivational force that requires autonomy, competence, and social relatedness (Deci, 1971). Moreover, intrinsic motivation as well as related constructs (e.g., task-involved goal orientation) positively relate to the general psychological state of flow (e.g., Csikszentmihalyi & LeFrevre, 1998; Kowal & Fortier, 1999). In terms of the construct of flow, the intrinsic motivation factor captures the self-rewarding, autotelic aspect that is apparent in discussions of the WOLF, the FSS, and the original preposition of flow.

Despite the situational differences, the intent of the FSS and the WOLF both attempt to identify flow experiences using quantitative, holistic scales. An issue with quantitative measures of flow pertains to the inability to isolate antecedents of the situation from the psychological experiences. Due to the complexity of the regulatory compatibility experience of flow, the situational distinction may be a key aspect in experiential classification. On the other hand, either scale should be capable of such identification regardless of situation in order to support flow theory. Because the FSS and WOLF are both reliable measures (Table 1), we can assume the multidimensional nature of flow remains supported. Still, the extent of overlap between the varying facets is unknown.

Research question: What is the relative contribution of the nine FSS factors to each of the three factors of the WOLF?

Table 1. Original factor reliability and validity

Scale	*Factor*	*α*
WOLF		
	Absorption	.75 - .86
	Work enjoyment	.88 - .96
	Intrinsic work motivation	.63 - .82
FSS		
	Challenge-skill	.80
	Action-awareness	.84
	Clear goals	.84
	Unambiguous feedback	.85
	Concentration	.82
	Sense of control	.87
	Loss of self-consciousness	.81
	Transformation of time	.82
	Autotelic experience	.81

Note. Obtained from Bakker, 2008; Jackson, & Marsh, 1996.

Method

Participants

Participants (*n* = 332) were recruited through Mturk, an online crowdsourcing database for participant recruitment, and participated through Qualtrics, an online survey provider took. Participants received $1.00 for participation. A total of 22 participants with incomplete surveys, completing the survey too quickly, duplicate IP addresses, or repetitive demographics were removed from analyses. Ultimately, a sample size of 310 individuals was used for data analysis. Most participants (53.5%) were female and the average age was 35.12 years (SD = 11.33). Additionally, the majority of participants identified as white (68.4%), while the rest identified as Black (11.9%), Asian (9.0%), Hispanic (6.5%), Middle Eastern or Arab (0.3%), Native Hawaiian or other Pacific Islander (0.3%), or multiple ethnicities (3.2%). Additionally, 0.3% preferred not to disclose. The vast majority worked full time (82.9%) while the rest worked part time (17.1%) and the average hours worked per week were 40.34 (SD = 10.4).

Measures

As aforementioned, all items for the FSS and the WOLF can be found in Appendices A and B, respectively. Alpha reliability scores are provided in Table 2.

Flow State Scale (FSS). The FSS (Jackson & Marsh, 1996) consists of 36 items across 9 factors with 4 items per factor: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on task at hand, sense of control, loss of self-consciousness, transformation of time, and autotelic experience. Responses were recorded on a 5-point Likert-type scale (1 = *Disagree*, 5 = *Agree*).

Work-Related Flow (WOLF) Inventory. The WOLF (Bakker, 2008) measures flow on a 13-item, 3-factor scale. The absorption and work enjoyment factors both consist of four items and the intrinsic work motivation factor consists of five items. Responses were recorded on a 7-point Likert-type scale (1 = *Never*, 7 = *Always*).

Results

Due to structural replication issues of the FSS (e.g., Doganis et al., 2000; Staurou et al., 1996; Vlachopoulos et al., 1999), the nine-factor structure was tested. Examination of the factor structure was conducted via confirmatory factor analysis (CFA) using R studio, a free computer software. In line with traditional methods, we report goodness of fit (χ^2), chi-squared divided by degrees of freedom (CMIN/DF), comparative fit index (CFI), Tuker-Lewis Index (TLI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and confidence intervals (CI). Following previously reported values, χ^2 should not be significant to indicate model fit but this coefficient is sensitive to sample size and model complexity (Satorra & Bentler 1994). Additionally, CMIN/DF should fall between 2 and 3 (McIver & Carmines, 1981, p. 80), CFI and TLI should be greater than 0.90 to be considered acceptable and above 0.95 to be considered good (Bentler & Bonett, 1980; Tucker & Lewis, 1973), and RMSEA and SRMR should be less than 0.08 to be considered acceptable and below 0.05 to be considered good (Browne & Cudeck, 1989; Hu & Bentler, 1999). Lastly, if the CI includes the value 0, the statistic is not significant.

CFA revealed support for the nine-factor structure of the FSS (χ^2 = 1,195.775, p < .01, df = 557, CMIN/DF = 2.07, CFI = .894, TLI = .881, RMSEA = .062, SRMR = .068; 90% CI [.057, .066]). Additionally, we conducted CFA with AMOS, a statistical module of SPSS specifically used for CFA, and results were comparable (χ^2 = 1,432.944, p < .01, df = 585, CMIN/DF = 2.449, CFI = .863, TLI = .844, RMSEA = .068; 95% CI [.064, .073]). Differences were most likely due to mean estimation for missing data. When those mean estimated data were removed, results were nearly identical. In line with conflicting research on the importance of transformation of time (e.g., Jackson & Marsh, 1996), the individual contribution of the factor was small yet significant (β = .147, p = .025). To put this value in perspective, the standardized regression weight for action awareness was the next closest at more than double the value (β = .406, p <.001). Removal of transformation of time from CFA indicated slight improvement for support of the model, but the difference was not substantial (χ^2 = 917.658, p < .001, df = 496, CMIN/DF = 1.85, CFI = .910, TLI = .898, RMSEA = .061, SRMR = .071; 90% CI [.055, .066]). Overall, the nine-factor model of the FSS was supported.

Additionally, CFA was conducted to confirm the three-factor structure of the WOLF as results from past research have been conflicting (e.g., Bakker, 2008; Zito et al., 2015; Happell et al., 2015). The results for R indicated support for the three-factor structure of the WOLF (χ^2 = 155.06, p < .01, df = 62, CMIN/DF = 2.501, CFI = .971, TLI = .964, RMSEA = .070; 90% CI [.056, .083]). These were nearly identical to results from AMOS (χ^2 = 155.560, p < .01, df = 62, CMIN/DF = 2.493, CFI = .971, TLI = .964, RMSEA = .070; 95% CI [.056, .083]). These results indicate the three-factor structure of the WOLF has a good fit for our data.

As a precautionary measure, both scale structures for the FSS and the WOLF were tested simultaneously. Results were similar to the individual factor structures. R indicated potential support for the individuality of the 12 total factors (χ^2 = 1778.817, p < .001, df = 890, CMIN/DF = 1.99, CFI = .901, TLI = .890, RMSEA = .058; 90% CI [.054, .061]). Additionally, results from AMOS were comparable (χ^2 = 2,550.89, p < .01, df = 1,114, CMIN/DF = 2.290, CFI = .856, TLI = .841, RMSEA = .065; 95% CI [.061, .068]) with differences due to mean estimation for missing data. This analysis shows the necessity of the relative weights analysis because it accounts for multicollinearity and thus provides a more accurate representation of individual contribution of the factors which controlling for chance.

The primary analysis of the current research investigated the relationship between the FSS and the WOLF. An internal consistency reliability analysis and a correlational analysis of the factors provided an insight to the relationship between the facets of the two scales. As a rule of thumb, internal consistency estimates above 0.70 are acceptable, above .80 are good, and above .90 are excellent (Cicchetti & Sparrow, 1990). As for correlations, the coefficient may be identified as weak (r = ± .1), moderate (r = ± .3), or strong (r = ± .5; Cohen, 1988). The factors of the FSS and WOLF proved to be reliable as well as intercorrelated in that all correlation values ranged from 0.21 to 0.80 and were significant at $p < .01$ (Table 2).

Table 2. Flow State Scale and Work-Related Flow factor correlations

Factor	1	2	3	4	5	6	7	8	9	10	11	12
FSS												
1. Challenge-skill	**(.81)**											
2. Action-awareness	.50	**(.78)**										
3. Clear goals	.77	.54	**(.84)**									
4. Feedback	.71	.55	.80	**(.84)**								
5. Concentration	.65	.46	.71	.63	**(.79)**							
6. Sense of control	.63	.59	.68	.70	.63	**(.83)**						
7. Self-conscious.	.60	.47	.60	.63	.68	.57	**(.76)**					
8. Transformation	.31	.51	.26	.28	.30	.48	.27	**(.81)**				
9. Autotelic	.64	.59	.58	.59	.56	.61	.59	.58	**(.87)**			
WOLF												
10. Absorption	.25	.22	.23	.23	.31	.34	.24	.35	.38	**(.88)**		
11. Work Enjoyment	.48	.27	.42	.40	.43	.43	.47	.28	.61	.55	**(.95)**	
12. Work Motivation	.29	.21	.22	.25	.29	.32	.33	.32	.51	.54	.73	**(.90)**

Note. All correlations are significant at $p < .01$; internal consistency estimates (α) are provided along diagonal in bolded parentheses. FSS is the flow state scale and WOLF is the work-related flow inventory.

Next, we examined the incremental importance of each facet of the FSS for each dimension of the WOLF. Due to the redundancy between the factors of the scales, a relative weights analysis (RWA) allowed for control of overestimated R^2 while indicating the relative contribution of each of the FSS factors to the three dimensions of the WOLF. The process to compute the relative weight values begins by transforming each FSS factor into a set of orthogonal variables using an unweighted least squares method (Johnson 2000). Next, the three WOLF dimensions were regressed onto each of the nine transformed FSS factors providing a value to indicate the relative importance of the factor while controlling for chance. Using the recommended bootstrapping method (Tonidandel, LeBreton, & Johnson, 2009), a relative weight is significant if the confidence interval does not include 0 (Johnson, 2004). As such, raw relative weights and significance are provided in Table 3.

Table 3. Raw relative weights for Flow State Scale factors on Work Related Flow Inventory dimensions

	Absorption	Work Enjoyment	Intrinsic Work Motivation
Challenge-skill	.0102	.0489*	.0181
Action-awareness	.0083	.0155	.0118
Clear goals	.0082	.0290*	.0097
Feedback	.0075	.0252*	.0121
Concentration	.0278	.0348*	.0182
Sense of control	.0291	.0363*	.0235*
Loss of self-consciousness	.0102	.0558*	.0318*
Transformation of time	.0552*	.0215	.0396*
Autotelic experience	.0492*	.1571*	.1288*
Model R^2	.21	.42	.29

Note. * CI does not include 0; *n* = 310.

The analysis of the relative contribution of the FSS factors for absorption revealed only two significant predictors; transformation of time, which had the greatest relative weight, followed by autotelic experience. In terms of work enjoyment, seven factors displayed significant relative weights (i.e., challenge-skill, clear goals, unambiguous feedback, concentration, sense of control, loss of self-consciousness, autotelic experience) while only two were not significant (i.e., action-awareness, transformation of time). Lastly, the analysis revealed that sense of control, loss of self-consciousness, transformation of time, and autotelic experience displayed significant relative weights for intrinsic work motivation. Additionally, it is worth mentioning that action awareness was not a significant predictor for any of the three WOLF factors. In contrast, autotelic experience was significant for each of the three WOLF dimensions, and it was most influential factor for work enjoyment and intrinsic work motivation. Interestingly, the full 9-factor model of the FSS indicated a greater model fit for the work enjoyment factor compared to the absorption and intrinsic work motivation factors. This may be explained by the large quantity of significant relative weights for work enjoyment.

To supplement the relative weights analysis, dominance matrices were computed to further investigate the importance of the FSS factors across the WOLF. A dominance matrix provides a logical order of the predictors (i.e., FSS factors) by comparing the relative contribution to the criterion variable (i.e., WOLF factors). The results of the dominance analysis (Table 4) indicated that autotelic experience completely dominated other FSS factors for each of the three WOLF factors. The only exception to this was found for absorption where autotelic experience was only slightly more dominant than transformation of time. In addition to autotelic experience, the most dominant factors for absorption included transformation of time, sense of control, and concentration. Autotelic experience, loss of self-consciousness, and challenge-skill balance dominated the other factors for work enjoyment. Lastly, loss of self-consciousness, transformation of time, and autotelic experience were the most dominant factors of intrinsic work motivation. All of the dominant FSS factors mirrored the greatest relative weights for the respective WOLF factors, yet not all were significant relative weights. These results provide further support for identification of overlap between scales and use of relative weights analysis.

Table 4. Dominance Matrix of the Flow State Scale for the Factors of the Work-Realted Flow Inventory

DV: Absorption	1	2	3	4	5	6	7	8	9
1. Challenge-skill	---	.289	.406	.563	.000	.000	.320	.000	.000
2. Action-awareness	.711	---	.703	.859	.031	.125	.633	.000	.000
3. Clear goals	.594	.297	---	.711	.000	.016	.523	.000	.000
4. Feedback	.438	.141	.289	---	.000	.000	.297	.000	.000
5. Concentration	1.00	.969	1.00	1.00	---	.500	1.00	.000	.000
6. Sense of control	1.00	.875	.984	1.00	.500	---	1.00	.000	.000
7. Self-consciousness	.680	.367	.477	.703	.000	.000	---	.000	.000
8. Transformation*	1.00	1.00	1.00	1.00	1.00	1.00	1.00	---	.359
9. Autotelic*	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.641	---
DV: Work Enjoyment	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Challenge-skill*	---	.508	1.00	.992	.750	.906	.031	.977	.000
2. Action-awareness	.492	---	.742	.797	.609	.586	.477	.500	.000
3. Clear goals*	.000	.258	---	.625	.063	.094	.000	.281	.000
4. Feedback*	.008	.203	.375	---	.070	.117	.000	.242	.000
5. Concentration*	.250	.391	.938	.930	---	.578	.000	.617	.000
6. Sense of control*	.094	.414	.906	.883	.422	---	.000	.430	.000
7. Self-consciousness*	.969	.523	1.00	1.00	1.00	1.00	---	1.00	.000
8. Transformation	.023	.500	.719	.758	.383	.570	.000	---	.000
9. Autotelic*	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	---
DV: Work Motivation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Challenge-skill	---	.398	.328	.773	.461	.297	.078	.031	.000
2. Action-awareness	.602	---	.672	.836	.609	.563	.469	.500	.000
3. Clear goals	.672	.328	---	.844	.672	.539	.328	.273	.000
4. Feedback	.227	.164	.156	---	.234	.164	.086	.047	.000
5. Concentration	.539	.391	.328	.766	---	.320	.000	.063	.000
6. Sense of control*	.703	.438	.461	.836	.680	---	.031	.000	.000
7. Self-consciousness*	.922	.531	.672	.914	1.00	.969	---	.203	.000
8. Transformation*	.969	.500	.727	.953	.938	1.00	.797	---	.000
9. Autotelic*	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	---

Note. * denotes significant relative weight. Values are the dominance estimates to be read from right to left; a score of 1.00 indicates complete dominance, a score of .50 indicates that two factors are completely even, and a score of .00 indicates that this factor was completely dominated.

Furthermore, analyses were conducted to understand differences between the FSS and WOLF in relation to how frequently individuals were identified as experiencing flow. For the purpose of this exploratory analysis, two different approaches were taken. First, a multiple hurdles-like approach, where a flow state was defined as achieving a high score (i.e., above 3.0) on all individual facets of each scale, was utilized. This produced a dichotomy (i.e., achieved or not achieved) for both scales.

For the WOLF, although a high score on the scale may be assumed to be above the scale center (i.e., 3.5), when looking at the response options, it is logical that anything above a 3 (i.e., *sometimes*) can be treated as an achieved score. Specifically, a score of 4 indicates that the statement is experienced often and therefore would indicate a flow state occurring. Through this multiple hurdles-like approach, 144 (46%) individuals achieved a flow state for the WOLF. Moreover, on the FSS a score greater than 3 (i.e., *neither agree nor disagree*) logically indicated tendency toward experience of the statement. Accordingly, 93 (30%) individuals scored high on all nine factors and therefore experienced flow. As such, the WOLF identified 51 (16%) more individuals as experiencing a flow state. The second approach can be considered as a compensatory categorization. Specifically, this technique assumes that if the average score across all factors is greater than 3.0, a flow state has been achieved. Interestingly, the frequency of flow dramatically increased for both the WOLF (n = 231; 74.5%) and the FSS (n = 265; 85.5%). This is an increase of 28.5% for the WOLF and 55.5% for the FSS.

The differences between the two approaches my differ due to differing frequencies of certain facets of the scales. In investigating which factors most likely inhibited achievement of flow in the multiple hurdles approach, we found a higher frequency of respondents failed to surpass a score of 3.0 for the transformation of time (42.0%) and autotelic experience (35.0%) factors of the FSS and the intrinsic work motivation (40.6%) and absorption (37.7%) factors of the WOLF. Taken together, these exploratory analyses indicate how variability in flow detection may be a function of classification criteria. This is particularly troublesome as many studies utilize a compensatory categorization (i.e., aggregate score) in their variable-centered analyses (i.e., regression) for flow studies.

Further supplemental analyses examined the frequency of flow between demographic groups (e.g., age, gender, hours worked). The purpose of this analysis was to examine flow detection between the scales and demographic groups to highlight similarities or differences between the FSS and the WOLF. For age and number of hours worked, correlations between the factors, as well as the overall scale averages, were computed (Table 5).

Table 5. Demographic correlations among factors of scales

Scale	Factor	Age	Hours/week
FSS		.20***	.12*
	Challenge-skill balance	.23**	.12*
	Action-awareness	.12*	.06
	Clear goals	.24**	.13*
	Unambiguous feedback	.21**	.13*
	Concentration	.24**	.05
	Sense of control	.13*	.09
	Loss of self-consciousness	.18*	.03
	Transformation of time	-.05	.07
	Autotelic experience	.07	.11*
WOLF		.05	.10
	Absorption	.03	.12*
	Work enjoyment	.07	.06
	Intrinsic work motivation	.18	.08

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, $n = 310$; FSS is the flow state scale and WOLF is the work-related flow inventory.

The results indicated age was significantly related to average scores on the FSS, but not the WOLF. In addition, the number of hours worked was significantly related to average scores on the FSS, but not the WOLF. However, correlations at the factor level reveal how the individual components of flow experiences tell a different story in relation to demographic information. Specifically, transformation of time and autotelic experience were not significantly related to age, yet the other seven factors indicated significant weak correlations. For the number of hours worked per week, the challenge-skill balance, clear goals, unambiguous feedback, and autotelic experience were significant but weak correlations. In contrast, only absorption for the WOLF was significantly related to the number of hours worked per week. In light of these results, it appears that by measuring the ability to achieve flow using the FSS, the flow experience may be accounting for more contextual information such as the age of the individual or the antecedents of the situation than when measuring the frequency of flow using the WOLF.

Table 6. Demographic group breakdown of flow experiences

	Multiple Hurdles		Compensatory	
Demographics	WOLF	FSS	WOLF	FSS
Gender				
Male	78 (47.0)	50 (30.5)	125 (75.3)	141 (87.6)
Female	66 (46.2)	43 (30.3)	105 (73.4)	124 (88.6)
Marital Status				
Single	68 (42.8)	46 (28.9)	118 (74.2)	129 (83.2)
Married	63 (51.2)	40 (33.1)	95 (77.2)	109 (90.8)
Divorced	11 (45.8)	6 (26.1)	16 (66.7)	23 (100.0)
Other	2 (50.0)	1 (25.0)	2 (50.0)	4 (100.0)
Ethnicity				
White	89 (42.0)	60 (28.4)	153 (72.2)	186 (89.4)
Black	22 (59.5)	12 (32.4)	30 (81.1)	28 (75.7)
Asian	17 (60.7)	10 (37.0)	20 (71.4)	22 (84.6)
Hispanic	11 (55.0)	9 (45.0)	17 (85.0)	18 (94.7)
Other	5 (62.5)	2 (20.0)	11 (91.7)	11 (91.7)
Edu. Level				
Some high school	2 (40.0)	2 (40.0)	4 (80.0)	5 (100.0)
High school/GED	18 (54.5)	11 (33.3)	26 (78.8)	28 (84.8)
Some college	26 (41.9)	22 (35.5)	44 (71.0)	52 (85.2)
Associate’s	20 (50.0)	16 (40.0)	35 (87.5)	38 (100.0)
Bachelor’s	51 (41.1)	29 (24.0)	84 (67.7)	101 (84.2)
Some graduate	3 (42.9)	1 (14.3)	5 (71.4)	6 (85.7)
Master’s	19 (55.9)	10 (29.4)	28 (82.4)	31 (91.2)
PhD	5 (100.0)	2 (40.0)	5 (100.0)	4 (100.0)
Employment Status				
Full-time	123 (47.9)	77 (30.3)	196 (76.3)	222 (89.2)
Part-time	21 (39.6)	16 (30.2)	35 (66.0)	43 (81.1)
Jobs worked				
1 Full-time	89 $(41.4)_a$	65 (30.5)	150 $(69.8)_a$	183 (87.1)
2 Full-time	17 $(81.0)_b$	9 (42.9)	20 $(95.2)_b$	19 (90.5)
1 FT, 1 PT	33 $(56.9)_{bc}$	16 (28.1)	48 $(82.8)_b$	50 (90.9)
2 Part-time	5 $(31.3)_{ac}$	3 (18.8)	13 $(81.3)_{ab}$	13 (81.3)

Note. Values represent number of observations of flow; within group percentages of flow experiences are in parentheses; letters denote significant difference between groups using LSD post hoc analysis; “Multiple hurdles,” flow was dichotomously coded based scoring above 3.0 on each of the individual factors; “Compensatory,” flow was dichotomously coded based on scoring above 3.0 on the average across factors.

Next, the frequency of flow experiences was investigated based on demographic groups for each scale and method of classification (i.e., multiple hurdles, compensatory). The results detail the number of cases of flow as well as the proportion of flow experiences within the respective demographic category (Table 6). Examination of the frequency of cases across all demographic groups indicated that the compensatory scores generally detected more cases of flow compared to the multiple hurdles scores, yet the frequency between scales was similar. Additionally, an examination of the percentages within each demographic category revealed that both scales appeared to have a relatively consistent proportion of flow state identification. The only primary deviation from this pattern was a high proportion of flow for PhD individuals compared to other levels of education when using the WOLF and multiple hurdles method. Lastly, it appears both scales using the multiple hurdles method detected a higher proportion of flow for individuals working two full-time jobs but working more did not necessarily mean a higher proportion of flow.

To quantify these differences, one-way analysis of variance (ANOVA) results indicated that there was not a significant difference between demographic characteristics except for the number of jobs worked. For instance, the WOLF was more sensitive than the FSS to the number of jobs worked for detection of flow. Specifically, there was a significant difference in flow identification between working one full-time job and two full-time or one full-time and one part-time, but not two part-time jobs. Although this pattern was reflected across both flow scoring methods, the multiple hurdles scoring method also indicated a significant difference in the frequency of flow experiences between an individual working one full-time and one part-time and an individual working two part-time jobs. In other words, it appears working more jobs beyond a full-time job carries a higher frequency of flow experiences than working only part-time jobs. In sum, the analysis of demographics indicate that there are relatively minor differences in frequency of flow between groups, but identified discrepancies appear to be a function of the selected scale and method of classification.

Discussion

With the increase of popularity of the concept of flow over the course of the past few decades (Csikszentmihalyi, 1975), researchers have become better equipped to understand the function of periodic, optimal experiences of intense concentration and absorption in a certain task. Moreover, flow has been identified as a multidimensional construct across a variety of factors such as concertation and an autotelic experience (Csikszentmihalyi, 1975; 1990). However, the ability to differentiate flow experiences from other experiences has received a lot of criticism, especially in regard to a lack of agreed upon operationalization as well as the inability to quantitatively assess flow using the ESM (Quinn, 2005; Jackson & Marsh, 1996). More recently, the development of quantitative scales, such as the FFS (Jackson & Marsh, 1996) and the WOLF inventory (Bakker, 2008), has enabled researchers to empirically investigate flow. Nevertheless, the nine-factor structure of the FSS and the three-factor structure of the WOLF have only received mixed support (e.g., Staurou et al., 1996; Happell et al., 2015) and the extent of overlap between the context-specific scales has remained unexplored.

The current research sought to explore the concept of flow through an inductive approach by comparing the FSS and WOLF in a sample of working adults. As aforementioned, the structure of both the scales required further support and as such, CFA was utilized. Although support was found for the FSS, the transformation of time factor still appeared to be less salient than the other factors for the overall fit for our data. This is in line with assumptions of transformation of time being less central to the construct of flow (Tenenbaum et al., 1999), but other researchers have still found the factor to be significant (e.g., Jackson & Marsh, 1996, Staurou et al., 1996). Additionally, CFA supported the three-factor structure of the WOLF. Interestingly, CFA showed that acceptable factor structure levels are reached when these two scales are in the same model. Specifically, this suggests that although the FSS and WOLF both measure flow experience, the fact that the FSS assesses ability to reach flow and the WOLF assesses frequency of flow experiences creates different forms of responses by participants. In other words, although flow is measured by both scales, CFA supports that these two scales measure slightly different constructs. Future research should therefore try to test similarities and differences between the WOLF and the FSS in multiple samples of diverse participants. In sum, these results provide more clarity on the structure of the individual scales and support the multidimensionality nature of flow. Even so, the support for both a nine-factor as well as a three-factor scale in only one sample may complicate the ability to gain an agreed upon operationalization of flow.

To understand the relationship between the FSS and the WOLF, we investigated the extent to which the nine factors of the FSS influenced the three factors of the WOLF. Because of the unique differences between the purpose of the FSS to detect the ability to be in flow compared to the WOLF's intent to measure frequency of flow experiences, the relative weights analysis (RWA) indicated varying overlap between the FSS and the WOLF. For example, seven of the nine FSS factors were significant predictors of work enjoyment but only two were significant for absorption. With further support from the dominance analysis, the RWA identified the most influential factors when measuring flow using quantitate scales. In examining the quantity of significant relative weights as well as the overall fit of the model, work enjoyment better resembled the nine-factor structure of theory compared to the absorption and intrinsic work motivation. Although researchers once acknowledged absorption, work enjoyment, and intrinsic work motivation as the common characteristics of flow experiences, these results indicate unequal distribution of the nine flow characteristics across the three dimensions.

The prominence of certain FSS factors for the WOLF shed light on the importance of flow characteristics for work-specific experiences. Across all three WOLF factors, the autotelic experience was a common characteristic, and sense of control, loss of self-consciousness, and transformation of time were important for at least two WOLF factors. Yet, past research has questioned the importance of FSS factors, specifically autotelic experience, loss of self-consciousness, and transformation of time (e.g., Tenenbaum et al., 1999). The prominence of these three FSS factors across the WOLF suggest conflict with the assumption that they are less central to the flow experience. Therefore, this assumption may be incorrect or misguided in a work setting as these factors remain significant predictors to work-related characteristics.

Originally, we drew theoretical assumptions of similarities between the factors of the FSS and the WOLF based on researchers' definitions of the facets. Given the RWA results, a clearer understanding of flow at the factor level revealed which flow characteristics, as measured by the FSS, contribute to each of the WOLF factors. Although our original understanding of work enjoyment and intrinsic work motivation aligned with the results of the RWA, absorption deviated from the expected pattern. Absorption was defined as the complete immersion and concentration on the task at hand, when comparing to the FSS neither action awareness nor concentration were significant weights. The lack of contribution of these factors to absorption questions the ability to connect perceptions of ability to achieve flow to the frequency in which they are experienced. Taken together, the definition of absorption, work enjoyment, and intrinsic work motivation may be conceptually misaligned with the original, nine dimensions of flow.

Moreover, the RWA revealed action awareness did not significantly relate to any of the three WOLF factors. Consequently, we suspect three conclusions may be possible. First, the WOLF fails to incorporate the merging of actions and awareness into flow identification. If the action awareness aspect is a key component to flow identification as suggested at the inception of the construct, then the WOLF is flawed. Conversely, if absorption measures the true merging of action and awareness, then the FSS erroneously measures the merging of action and awareness. The second conclusion follows the idea of contextual flow experiences in that the cognitive nature of work does not require physical movements or requires very little physical movement. As such, the merging of actions and awareness would not necessarily characterize flow experiences because physical actions never or rarely occurred. Lastly, past research (e.g., Tenenbaum et al., 1999) has suggested that the merging of action awareness only occurs during deeper, more intensive flow experiences. This suggests that individuals in this sample may have never reached this level of flow and therefore could not identify this characteristic. It is also possible that, while at work, individuals do not have the time and available resources to fully tap into a completely immersive flow state as varying demands may continuously remove individuals from flow. Depending on the accepted conclusion and adding to the ambiguity of flow operationalization, flow theory may either be supported or challenged.

The comparison between the FSS and WOLF on flow identification also emphasized differences between the ability of each scale to categorize flow experiences. One challenge of this exploratory analysis was the lack of instruction on how the responses on the scales should be used to identify flow. For instance, both the FSS and WOLF note that scores should be high on each individual factor for flow to occur (Bakker, 2005; Jackson & Marsh, 1996). This guideline led to the use of a multiple-hurdles-like approach where flow was only identified if each individual factor was above a certain point. However, many other researchers compile a total, or aggregate, score across factor (e.g., Engeser & Rheinberg, 2008; Gaggioli, Mazzoni, Milani, Riva, 2015), despite the lack of support for a global measure of flow (Bakker, 2008; Jackson & Marsh, 1996). Using either method on either scale produced extremely different results, yet this specific dialogue of flow categorization remains undiscussed in current literature. Presumably, the use of quantitative scales such as the WOLF and the FSS has primarily been used as a continuous variable rather than a tool to identify flow which brings into question many findings of flow research. As such, useful information recorded at the factor level becomes diluted and could lead to false conclusions.

The danger of using a composite score was highlighted in our investigation of the FSS and the WOLF's relationship with demographic groups. For instance, when using average scores across factors, average flow scores on the FSS, but not the WOLF, were significantly related to the number of hours worked. However, a different pattern emerged at the factor level; the number of hours work was only weakly related to autotelic experience as well as some FSS factors that are antecedents of flow (i.e., challenge-skill balance, clear goals, unambiguous feedback). The only significant difference between groups was the sensitivity of the WOLF to the number of jobs worked. Specifically, the exploratory analysis revealed that the frequency of flow experiences was greater when working beyond a single full-time job or two part-time jobs. Interestingly, this pattern was relatively consistent across categorization methods of the WOLF, but no differences were found when using the FSS. At this point, it remains unclear which scale and categorization method allows for best identification of flow at work. As such, the use of compensatory flow scores versus the individual factor scores to examine flow posits an issue of not only the definition of flow but the conclusions drawn from previous analyses.

When moving to apply the results of flow research to organizational settings, two primary avenues may arise: a) reinventing existing programs to foster flow or b) helping direct individuals towards the experience. By reinventing existing programs in organizations, organizations can shape the context of work to become more conducive to flow experiences. For instance, current trends in training and development literature have been criticized for being oversimplified and lacking the ability to deeply engage learners (Kraiger, 2014). However, when taking into account the challenge-skill balance dimension as a precursor to the flow experience, a learner with high perception of ability can more easily reach flow when the challenge of the training is proportionately high. Therefore, learner self-efficacy may play a deeper role in engaging learners and setting them up for success, as long as the training is adequately challenging. Yet, as suggested by the current research, examination of the ratio between challenge and skill remains insufficient in capturing the flow experience suggesting that programs aimed at increasing flow experiences should target every dimension of flow. The second avenue occurs at a more individual level; organizations may provide assistance in direct employees towards a flow experience which in turn can lead to higher motivation (Kanfer & Heggestad, 1997), performance (Engeser & Rheinberg, 2008), and interpersonal connections between employees (Csikszentmihalyi, 1990). As quantitative, self-assessments, the FSS and WOLF offer an easy means to gauge an individual's own level of flow, although the use of the scales as a feedback tool was not explored in the current research. Nonetheless, the alignment between the factors of the scales suggests how one may consider the extent that perceived ability to achieve the nine dimensions of flow contribute to frequency of absorption, work enjoyment, and intrinsic work motivation in work contexts. The self-reflective knowledge may allow for a deeper understanding of how one can reach optimal experiences and the potential characteristics that constitute the experience.

Although the current study provides novel insight on the relationship between the FSS and the WOLF, some limitations should be considered for future directions. First, as the WOLF and the FSS are both self-report (i.e., single-source) and single-method techniques, there is a chance that common-method bias (Spector, 2006) has influenced our results. Additionally, although our sample was sizeable, Mturk samples are considered to be a convenience sample. Without random selection, there is potential for a biased sampled that may influence results and our interpretations, but this can be mitigated through replication in a cross-cultural design. Beyond this, we relied solely on CFA to test factor structure without the combination of exploratory factor analysis with a multiple sample technique. In terms of our conclusions, we cannot determine which scale operationalization of flow best fits flow theory. It is possible that, since we relied on a work sample, results may be different in a non-working, leisure sample. Lastly, we are not able to give direction on how to determine whether or not flow occurred using the FSS and WOLF. We, however, offer the ability to use a compensatory or a multiple hurdles approach as a method to identify flow experiences.

Future research should investigate which identification method is most appropriate and determine the theoretical and practical implications of using multidimensional, quantitative scales (e.g., FSS, WOLF) to categorize flow experiences. Another avenue of research may be directed more specifically towards the factors of the flow scales. Because action awareness was not represented by any of the three WOLF factors, particularity absorption, the importance of this factor remains in question. Yet, the prominence of autotelic experience in the WOLF suggests that the satisfaction of the experience itself resonates in all aspects of work-related flow experiences. This would indicate that autotelic experience is central to work-related flow. Both of these results provide more evidence to the centrality of the flow characteristics, yet more evidence is needed. Lastly, research should delve deeper into potential explanations for why the FSS and majority of the factors were significantly related to participant age, whereas this pattern was not observed for the WOLF. Accordingly, as the FSS appears biased towards age and the WOLF seems to be particularly sensitive to those working a greater number of jobs. In line with this avenue, the current literature lacks clarity on the operationalization of flow which potentially leads to contextual bias of the scales.

In conclusion, the development of quantitative scales such as the FSS and the WOLF has allowed researchers to confirm the multidimensional nature of flow and helped develop our understanding of this complex construct. In light of the evidence, we can better define how original flow characteristics align with the proposed characteristics of flow at work. Differences at the foundation of the WOLF and the FSS may have contributed to gaining a more comprehensive view of flow experiences, yet categorization of the experiences remains ill-defined. Nevertheless, we gained insight on how each piece of flow impacts the work-realted facets to aid in changing organizational programs or guiding employees towards more frequent flow experiences. Additionally, this study provides a base for future research that may add to the critical investigation of tools and methods to accurately identify flow.

APPENDIX A

Flow State Scale items and factor structure

Instructions: "Please answer the following questions in relation to your experience in the event you have just completed. These questions relate to the thoughts and feelings you may have experienced during the event. There are no right or wrong answers. Think about how you felt during the event and answer the questions using the rating scale below. Circle the number that best matches your experience from the options to the right of each question."

Original items score on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree)

<u>Challenge-skill</u>

1. I was challenged, but I believed my skills would allow me to meet the challenge.
2. My abilities matched the high challenge of the situation.
3. I felt I was competent enough to meet the high demands of the situation.
4. The challenge and my skills were at an equally high level.

<u>Action-awareness</u>

5. I made the correct movements without thinking about trying to do so.
6. Things just seemed to be happening automatically.
7. I performed automatically.
8. I did things spontaneously and automatically without having to think.

<u>Clear goals</u>

9. I knew clearly what I wanted to do.
10. I had a strong sense of what I wanted to do.
11. I knew what I wanted to achieve.
12. My goals were clearly defined.

<u>Feedback</u>

13. It was really clear to me that I was doing well.
14. I was aware of how well I was performing.
15. I had a good idea while I was performing about how well I was doing.
16. I could tell by the way I was performing how well I was doing.

<u>Concentration</u>

17. My attention was focused entirely on what I was doing.
18. It was no effort to keep my mind on what was happening.
19. I had total concentration.
20. I was completely focused on the task at hand.

<u>Sense of control</u>

21. I felt in total control of what I was doing.
22. I felt like I could control what I was doing.
23. I had a feeling of total control.
24. I felt in total control of my body.

<u>Loss of self-consciousness</u>

25. I was not concerned with what others may have been thinking of me.
26. I was not worried about my performance during the event.
27. I was not concerned with how I was presenting myself.
28. I was not worried about what others may have been thinking of me.

<u>Transformation of time</u>

29. Time seemed to alter (either slowed down or speed up).
30. The way time passed seemed to be different than normal.
31. It felt like time stopped while I was preforming.
32. At times, it almost seemed like things were happening in slow motion.

<u>Autotelic experience</u>

33. I really enjoyed the experience.
34. I loved the feeling of that performance and want to capture it again.
35. The experience left me feeling great.
36. I found the experience extremely rewarding.

APPENDIX B

Work-related Flow Inventory items and factor structure

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 statements."

Original items score on a 7-point Likert scale (1 = never, 2 = almost never, 3 = sometimes, 4 = regularly, 5 = often, 6 = very often, 7 = always)

Absorption

1. When I am working, I think about nothing else
2. I get carried away by my work
3. When I am working, I forget everything else around me
4. I am totally immersed in my work

Work Enjoyment

5. My work gives me a good feeling
6. I do my work with a lot of enjoyment
7. I feel happy during my work
8. I feel cheerful when I am working.

Intrinsic Work Motivation

9. I would still do this work, even if I received less pay
10. I find that I also want to work in my free time
11. I work because I enjoy it
12. When I am working on something, I am doing it for myself
13. I get my motivation from the work itself, and not from the reward for it

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