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Challenging the Challenge-Skill Balance: A Comparison of the Experience of Flow Antecedents in Amateur Leisure Activities, and Meditative Movement Arts

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Challenging the Challenge-Skill Balance: A Comparison of the Experience of Flow Antecedents in Amateur Leisure Activities, and Meditative Movement Arts

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EDUC 5839: MSc Psychological Studies

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Abstract

Objectives: A focus on traditional Flow State pre-conditions, has been evaluated as limiting investigation into novel eliciting factors. Furthermore, reliably inducing flow remains an elusive outcome, across contexts and settings. However, meditative-movement interventions are suggested to successfully elicit flow across domains. Therefore, key features within these activities may serve as novel antecedents of flow. The objective of this study, was to investigate whether flow states are elicited differently in meditative movement compared to other amateur activities.

Methods: A mixed methods multidisciplinary approach was adopted for this research. Quantitative and qualitative data were collected from meditative movement backgrounds (N=57) and other amateur activity types (N=124) via a modified version of the Flow State Scale. Quantitative data were tested via multifactorial Analysis of Variances, to detect differences in the extent of flow-dimensions experienced between the groups. Qualitative data were examined via inductive thematic analysis to determine whether the meditative arts presented novel flow antecedents.

Results: Quantitative results indicated no significant differences in the experience of flow antecedents between activity groups ($F(1, 179) = 1.42$, $p = 0.23$). However, qualitative results suggested a relaxed-experiential approach and somatic awareness as novel flow antecedents across activities.

Conclusions: Findings suggest that features of meditative movement arts may elicit flow states in a variety of contexts. The results were discussed in relation to traditional flow frameworks and current research in the field. Possible directions for future areas of study are identified for researchers.

Keywords: Flow State, Leisure, Meditative Movement, Interdisciplinary Study

Introduction

The Field of Positive Psychology, Quality Leisure and Flow State

Definitions of Positive Psychology posit that the area of study revolves around subjective experiences that give life value and meaning (Seligman &Csikszentmihalyi, 2000). Given this central focal point, experiences of well-being, contentment, and satisfaction, are key areas of interest in the field (Alex Linley, et al., 2006). Engagement with quality leisure is a driving force for such experiences (Driver, 2003). Furthermore, meaning is found during leisure via the promotion of joyfulness, connection, discovery, and empowerment (Schmalz & Pury, 2018).

When regarding such manifold benefits, it is surprising that, the unique and interdisciplinary nature of leisure activity, and its component states of mind have been evaluated as a key (Schmalz & Pury, 2018), yet overall undervalued area of study in positive psychology (Stebbins, 2015). However, one outcome of leisure has elicited considerable amounts of attention, a psychological condition known as Flow State (flow). In their seminal work resulting in the *Theory of Leisure Experience*, Tinsley and Tinsley (1986) assert, that the highest *leisure state* can only be truly experienced via flow. The condition has become possibly the most widely studied, intrinsically rewarding, psychological experience in the field of leisure activity (Stebbins, 2018). Furthermore, flow is commonly evaluated as a leisure related theory (Elkington, 2011). Indeed, the theory was conceived during pioneering studies in the realm of leisure, in multi-disciplinary research on activities such as; rock climbing, dance, chess and basketball (Csikszentmihalyi, 1975).

Scholars including the originator of Flow Theory, Mihaly Csikszentmihalyi have since expanded the examination of flow across diverse domains and contexts (Singh & Malik, 2017). Subsequently, flow has been examined in relation to marketing (Richard & Chandra, 2005), social cohesion (Mugford & Tennant, 2005), mental health (Litwiller, et al., 2017), creativity (Krichman,

2014) and feminist ethics (Fox & Walker, 2002). Such a sweeping and prevalent academic interest is a testament to the theory's importance. There has been a recent upsurge in the study of flow experienced during leisure (Mackenzie, et al., 2013; Løvoll & Vittersø, 2014; Singh & Malik, 2017), as research continues to note manifold subjective benefits across life domains, relating to the experience of flow in this realm (Brajša-Žganec, et al., 2011). The current high level of academic interest in flow during leisure may also be due to evaluation of the realm as highly conducive to eliciting the state (Elkington, 2011). Furthermore, flow results in numerous beneficial outcomes during engagement with leisure. Exceptional performance (Jackson, et al., 2001), focussed engagement (Hodge, et al., 2009), enjoyment (Csikszentmihalyi, 2008), motivation and absorption (Valenzuela, & Codina, 2014) have all been noted during leisure activity whilst engaging with flow states.

Current trends have resulted in leisure experiences being negatively impacted by external demands on an individual's time, resources, and attention (Zuzanek, 2004). In counterbalance, the general public has become increasingly more aware of the importance of mindful self-care, and a healthy work-leisure balance (Johnston & Yeung, 2019). It is imperative, therefore, that research continues to examine flow to promote focussed and meaningful engagement with leisure, for the well-being of individuals and wider communities. Such research could have profound implications on participation in leisure, subsequently improving quality of life for the general public. Furthermore, generalisability to professional realms associated to leisure, exercise and sport, may drive achievement and excellence across these domains.

Flow State: Theoretical Framework

Flow state was first introduced by Csikszentmihalyi (1975), as an optimal psychological experience due to focussed engagement with meaningful activity. In his original study Csikszentmihalyi's objective was to reveal why individuals commit to activities, that have no obvious extrinsic rewards (Engeser & Rheinberg, 2008). Results suggested an underlying psychological condition that encouraged *a sense of exhilaration, a deep sense of enjoyment that is long cherished*

(and) that does not come through passive, receptive, relaxing times (Csikszentmihalyi, 2008). Csikszentmihalyi named the condition flow state, suggesting a link between an individual's skill being *stretched to its limits* in pursuit of a worthwhile goal and the aforementioned positive outcomes of flow (Csikszentmihalyi, 2008). Thereafter, flow has primarily been evaluated as an experience that both drives full absorption and optimal performance within an activity; whilst also providing meaning during engagement (Wong &. Liem, 2021).

Traditional frameworks divide flow into nine component parts. These include three conditions which elicit the state; and six characteristics, which are experienced during the phenomenon (Nakamura & Csikszentmihalyi, 2014). The presence of such dimensions have been confirmed in a variety of studies over the past three decades (Boniface, 2000; Ellis, et al., 1994; Jackson & Marsh, 1996). Chen, et al. (1999) further demarked component dimensions of flow into three distinct stages; ***antecedents, experiences and effects***. Csikszentmihalyi's flow dimensions (highlighted in bold), grouped into Chen et al.'s stages are presented below.

Antecedents: Can be summarised as the perquisite conditions required between individual and activity, to elicit flow state. These include **challenge-skill balance;** when an optimal level of challenge is met by sufficiently high levels of skill. Csikszentmihalyi (1988) argues that one cannot become fully engaged to meet such challenges without **clear goals**. Furthermore, **immediate feedback** helps to achieve/maintain balance between challenge and skill and assess current status in relation to specified goals. (Chen, et al., 1999)

Experiences: Are reported during entry into the state and comprised of an individual's perceptual feedback in relation to an activity. **Merging of action and awareness** is noted as a result of deep focus on the task at hand. High levels of **concentration** are reported during activities to maintain an individual's attention, exclusively upon the activity and the present moment. Finally, a sense of **control** is elicited as flow promotes instinctive and effective responses to any situation that may arise during an activity (Doganis, et al., 2000).

Effects: Are the final highlighted stage which can be noted as outcomes of experiencing the phenomenon. A **loss of reflective self-consciousness** and evaluations of oneself as a social actor has been noted across domains. Other dimensions include **distortion of temporal experience** (typically a perception of time speeding up), and evaluation of the activity as intrinsically rewarding or an **autotelic experience**.

Framing the Current Research

Traditional flow theory, and its dimensional conceptualisations, have been evaluated as being culturally universal, and remarkably robust over time across disciplines (Stavrou, & Zervas, 2004) and throughout various diverse contexts (Singh & Malik, 2017). However, the state is still considered elusive (Aherne, et al., 2011) and unpredictable (Chavez, 2008). Evaluations of elusive-universality may seem paradoxical; yet they astutely sum up the current state of the field. Furthermore, they provide sound reasoning for continued research into the phenomenon, and a re-evaluation of its proposed conceptual uniformity and durability.

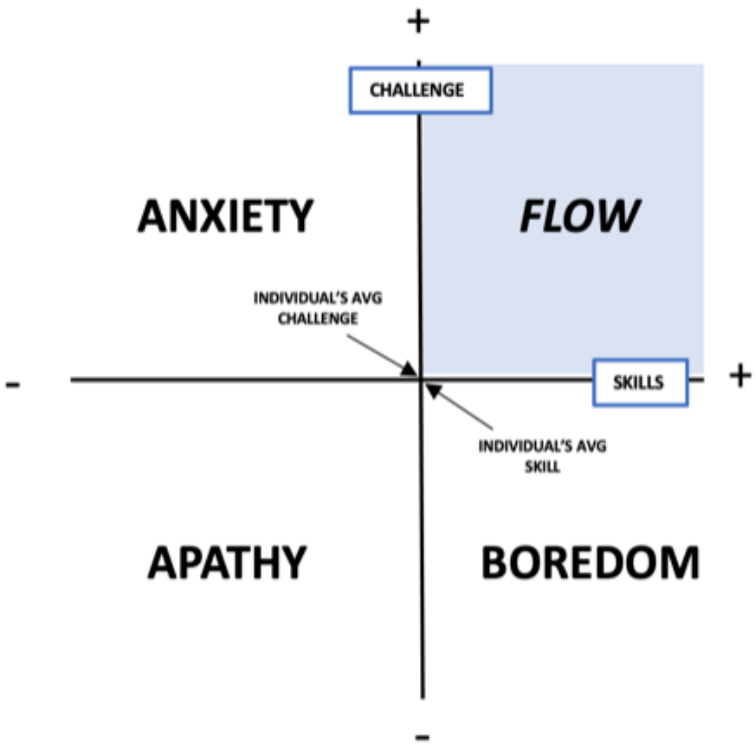
Studies suggest that most individuals have an intuitive understanding of flow, experiencing it at varying levels across personal domains (Hoffman & Novak, 2009). However, a consistent operational definition is an area of contention amongst many scholars. Critical evaluations of traditional flow theory surmise the construct to be unwieldy due to conceptual, dimensional and methodological issues (Choi, et al., 2007). This scrutiny is driven by the fact that consistently inducing flow; via interventions based on Csikszentmihalyi's conceptualization, are still out of reach after almost 40 years of research in the field (Goddard, et al., 2021). Such critiques can be considered investigative waypoints. Following them leads to a continued inspection of the efficacy of traditional flow frameworks in eliciting and maintaining the state. During an extensive literature review, problematic factors relating to flow antecedents, clear goals and challenge skill balance, were noted as central areas of interest, across an array of both classic and contemporary studies. Critical evaluation of these dimensions is a crucial means of furthering understanding into how to reliably induce flow, and fundamental in revealing the true nature of the state.

Definitional Incongruence Across Contexts and Disciplines: Effortful Goal Orientation vs Relaxed Exploration

Traditional conceptualisations of flow pivot on the condition being experienced during challenging situations related to clearly defined goals, and absent in relaxed, passive and receptive states (Csikszentmihalyi, 2008). Finding an optimal level of difficulty, comparative to an individual's skill level; or a groove, which lies between anxiety and boredom is suggested, to be critical to eliciting flow (see fig 1.).

Figure 1.

Flowing from apathy to optimal performance



Note: Modified version of Kimiecik & Stein's (1992) diagram.

Assessment of the prime importance of the challenge-skill balance dimension, will be highlighted later in this paper. It is important to first consider, the importance of goal orientation as a way of finding and maintaining this balance. Relating to this Harris, et al. (2017), found that incremental increases in difficult and specific goals, induced dimensions of flow in basketball/netball

players, via the maintenance of a challenge-skill balance. Furthermore, in their study on structured amateur circuit training exercise, Grove and Lewis (1996) suggested that the condition was linked to duration of engagement, and cumulative prior experience in relation to an activity. More recently, Yanar, et al.'s (2017) research found repetitive goal-oriented training, provided significant increases to the levels of flow experienced by amateur football players. Repetitive practise is linked to setting/systematically working through predefined outcome goals; that push an individual to effortfully surpass previous limitations. This is a cornerstone of both amateur and professional disciplines. Traditional frameworks posit such approaches, are critical to the elicitation and maintenance of flow (Kimiecik & Stein, 1992). However, these concepts do not explain the difficulty in reliably inducing the state across such realms in practical ways.

In theoretical terms, adhering to clearly defined outcome goals to encourage flow is based in sound and logical reasoning. Pragmatically this approach could be evaluated as a reductionistic; somewhat lacking in precision and nuance. Firstly, under such preconditions, the state becomes a mere outcome of repetitive and effortful engagement; a product as opposed to a unique and intricate subjective experience. Secondly, the dimensional label of clear goals is in itself unclear. As Kowal and Fortier (1999) state, such dimensional labels promote ambiguity, broad definitions and overlap; which may explain contradictory findings across various studies.

In line with such notions, classic research on recreational sport failed to find a significant relationship between flow and adherence to task-oriented goals (Stein, et al., 1995). The study suggested dispositional, not externally focussed goal orientation, may affect individuals' experience of flow. Correspondingly, other research has found it useful to distinguish between quantifiable, target oriented, process focused, open and "do your best" goals when examining flow. For example, Schweickle et al.'s (2017), study suggested focussed adherence to specific outcome goals is detrimental to the elicitation of flow. Such goal orientation induced a connected but more pressure related *all or nothing* psychological condition known as Clutch State (Schweickle et al.,2017).

Subsequently, confirmatory research has highlighted performance related pressure may indeed restrict the elicitation of flow (Lakicevic, et al., 2020). Highlighted above is a conceptual and contextual fissure in the field, that propels further examination of the component dimensions of flow. After decades of inconclusive findings, there is a clear necessity to identify whether equivocal terminology, related to traditional dimensions, can be used to define and measure the state reliably.

This study aims to continue the work of scholars who have adopted expansionist approaches whilst examining flow; and detect eliciting factors which may have been discounted by traditional conceptualisations. Exemplar studies across leisure contexts include those such as Samdahl's (1988) research, which reported activities associated with self-expression, and free from role-related constraints, had the highest positive affect relating to flow. Similarly, Mannell and Bradley (1986), demonstrated perceived freedom during activity, leading to more engaging experiences of flow in individuals. Furthermore, contemporary research on artistic creativity by Krichman (2014), suggested that there is a substantial overlap between openness to new experience and the state. Such counterarguments to traditional theory suggest relaxation; novelty, exploration, variation, and open goals are important factors relating to eliciting the phenomenon. These factors have been highlighted as significantly related to flow in the amateur leisure realm (Lakicevic, et al., 2020), yet arguably unrepresented in traditional frameworks, warranting continued investigation in current research.

Corresponding to the above, recent research has recommended divergence from traditional flow conceptualisations; due to the possibility of a multi-model framework (Mackenzie, et al., 2013). Furthermore, prominent scholars in the field have endorsed contextual examinations of flow; to explain how the condition may differ across activities, promoting refined definitions of the state (Swann, 2016). Questioning the utility of dimensional umbrella terms such as clear goals, to adequately address factors such as context and subjective goal orientations; could lead to an expansion of the flow model. Furthermore, such re-evaluations under an interdisciplinary lens, with

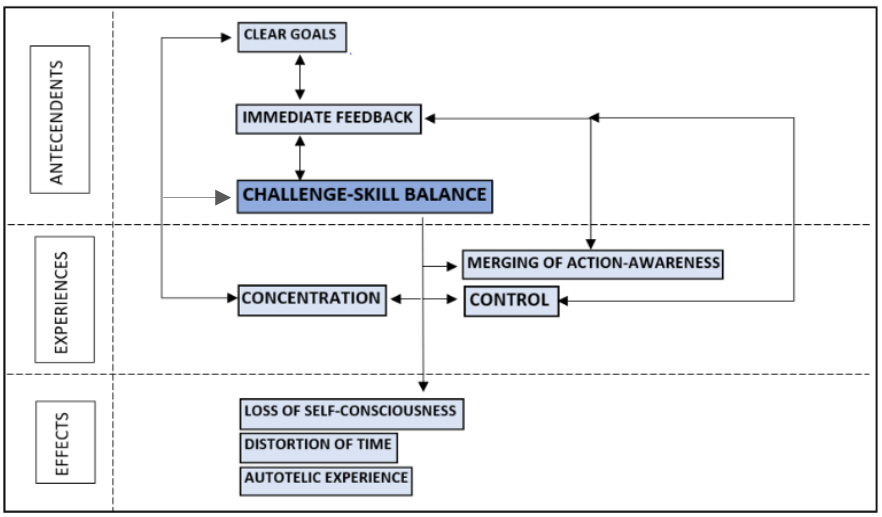
findings being discussed alongside the traditional flow lexicon can be deemed as appropriate; considering the theory was formulated under such conditions. Assessments could be made thereafter, on whether traditional theory can accurately measure and explain flow across a diverse range of settings. This approach would also allow a concurrent examination of the challenge skill antecedent, which is inextricably linked to the clear goals dimension.

Challenging the Predominance of Challenge-Skill Balance: Mindfulness and Meditative Movement as a Possible Gateway to Flow

For decades an empirical focus on the challenge-skill balance antecedent, has led to the dimension often being assessed as the most salient feature in flow theory (Moneta & Csikszentmihalyi, 1996; Keller, et al., 2011; Lovoll, & Vitterso, 2014). As a result, a balance between challenge and skill, is a central tenet in much current research (Hart & Di Blasi, 2015) and is predominantly evaluated as a cornerstone of subjective experiences of flow (Voelkl & Ellis, 1998). Such claims reverberate with Csikszentmihalyi's traditional conceptualisations, with many of his other conditions/characteristics either feeding into, or linking back to a challenge skill balance. This is particularly true of the clear goals dimension, as cognitive control is maintained via executive level brain functions that focus on effortful target objectives. The result has been described as a balancing act, as cognitive processes address ever changing task demands (Chevalier, 2015). Suggested executive functions related to the experience of flow are presented in Figure 2., a contextual example of such processes is highlighted in Figure 3.

Figure 2.

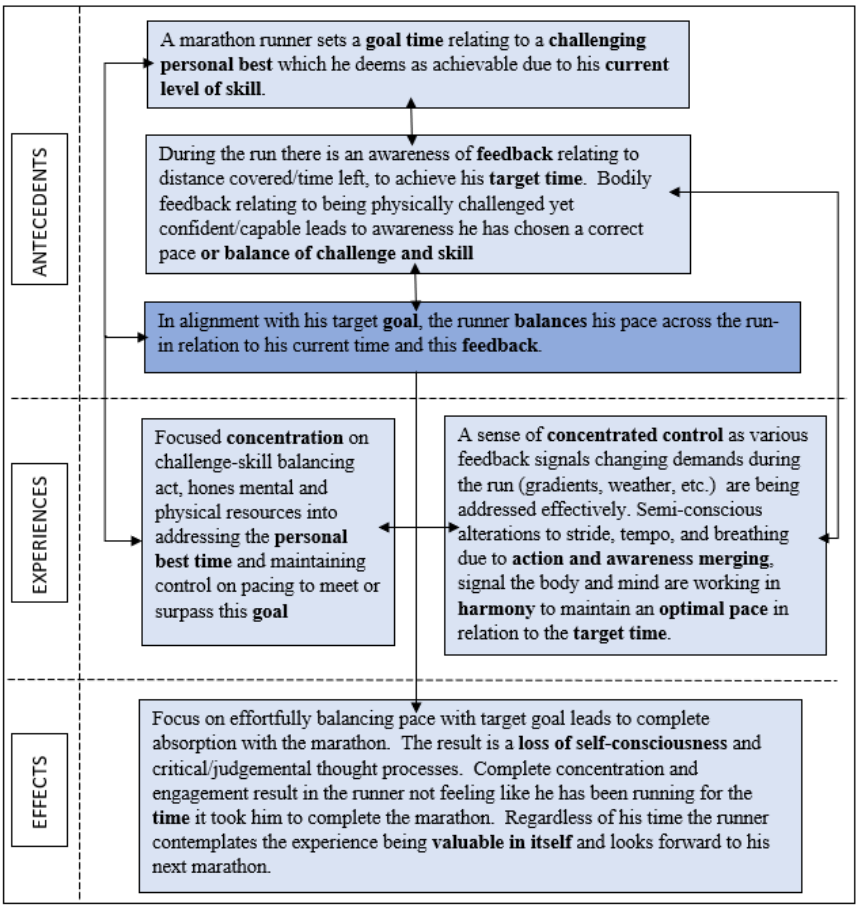
Executive Processes Relating to the Experience of Flow



Note: Arrows represent the executive processes relating to the experience of Flow based on traditional conceptualisations. Challenge-Skill balance acts as a prime antecedent, or dimensional 'gatekeeper' to flow experiences and effects

Figure. 3.

A Marathon Runner Finds Flow Whilst Engaging with a Pre-set Outcome Goal.



Note: The experience is mediated by his ability to remain in a groove between anxiety and boredom (see Fig. 1) by correctly modulating his pace to maintain a balance between challenge and skill.

According to the reasoning presented in the figures above, scholars such as Shin (2006) and Pearce, et al. (2005), have gone as far as to distil the concept of flow to a measure of difference between skill and challenge. Considering the problematic definitional issues highlighted in relation to the clear goals dimension, this technique could be described as rudimentary. Studies highlighted below promote continued research into the suggested primacy of the challenge and skill balance dimension.

A recent study on amateur skiers found that adherence to a challenge-skill balance may result in boredom not flow, with imbalance being a better predictor of the state (Løvoll & Vittersø, 2014). Additionally, Rheinberg and Vollmeye (2003) assert a focus on challenge-skill balance may have limited research on other proposed dimensional factors. Although Csikszentmihalyi has emphasized the embodied and holistic nature of flow (Csikszentmihalyi & LeFevre, 1989), somatic factors are notably secondary to cognitive factors in his traditional framework. The flow dimensions immediate feedback and action-awareness merging, arguably only give an academic nod to physiological elements of the condition. Chavez's (2008) research on golfers, compared entering flow to a feeling of heightened physical relaxation and environmental awareness, noting perceptions such as the club being an extension of the athlete's hand. Such physiological factors could be encapsulated within dimensions such as a sense of immediate feedback/action and awareness merging. However, other factors relating to physiological arousal are harder to reconcile under current dimensions. For example, in Bernier, et al.'s (2009) study, swimmers reported a 'tingling' sensation, a feeling of boiling inside and a strong heartbeat during flow.

A lack of physiological emphasis in the flow dimensions may be due to the majority of the research on flow being based on self-report questionnaires (Engeser, et al., 2021). The utility of such methods has been notable in a variety of settings, allowing for quantifiable measurements of both

total and dimensional experiences of flow (Stavrou, et al., 2007; Yoshida, et al., 2013). However, ethereal somatic factors, such as those noted in Bernier's study, may have gone undetected in studies adopting purely quantitative approaches; especially in those that adopt a univariate focus on challenge skill balance. As Heo et al. (2010) state, such a focus might only elucidate a limited portion of flow. With this in mind, this research follows recommendations regarding mixed methods study approaches to gain a deeper understanding of flow states (Jackson & Marsh, 1996). Evaluating qualitative data has been assessed as an effective way of exploring complex human experiences (Flick, 2014), such as flow, across diverse settings (Queirós et al., 2017). Assessing experiential data alongside quantitative results across a variety of contexts, has multiple benefits. It will allow for the detection of possible novel factors related to the state. Incongruence between quantitative and qualitative data may highlight problematic factors relating to current measures. Furthermore, the approach will test whether the promotion of challenge skill balance as the prime antecedent dimension of flow is valid; or if a more holistic approach to eliciting the state would be beneficial.

In mindfulness/meditative practices, a heightened *holistic consciousness* is encouraged using the body as a portal to elicit optimal states (Eddy, 2016). This is done via a focus on bodily sensation and increased somatic awareness (Rigg, 2018). Mindfulness and flow have features in common; both conditions emphasize the importance of concentration on the present moment, and evaluate focused engagement with activities as intrinsically rewarding (Wright et al. 2006). However, differences between the two phenomena must be noted. Where traditional flow conceptualisations promote using outcome goals to walk a challenge-skill tightrope; mindful practices use concentrated awareness of breathing and bodily sensation; with target outcomes often being a distance from such defined processes (Ospina, et al., 2007).

Interestingly, research suggests that when individuals adhere to a somatosensory-cognitive sequence of mindful awareness; localized attention to the body results in significant gains in emotional and cognitive regulation (Kerr, et al., 2013). This has profound implications for flow

theory such as; regulating stress/anxiety and promoting confidence increase optimal performance (Scott-Hamilton, et al., 2016). A resulting clear and sustained focus of attentional resources, noted during mindfulness interventions had positive correlations with enhanced flow experiences in professional athletes (Harris, et al., 2017). In the realm of amateur leisure, there has been an explosive uptake in worldwide engagement with ancient disciplines, now classified as meditative-movement activities, such as; Yoga, Taichi, and Qigong (Johnston & Yeung, 2019).

Scholars Larkey et al. (2009), categorise meditative movement activities as those that include; some form of bodily positioning or movement, and goals of a clear calm state of mind achieved via a focus on breathing. Recently several studies have highlighted suggested links between meditative movement activities and flow. Whilst measuring for flow during a sixty-minute Qigong breathwork session, Pölönen et al. (2019), found flow to be present after twenty minutes; intensifying both at forty and sixty minutes into the practise. Recently an intervention based around breath-work and a combination of mindful yoga was used to increase performance and flow in professional baseball players (Chen, et al., 2019). A study by Ying and Chiat (2013) applied a theoretical and practical Tai Chi intervention to research flow in piano players. This research highlighted increased somatic awareness, similar to that found in Bernier, et al.'s (2009) study, with participants noting sensations of numbness, heat and tingling as conditions of flow. Furthermore, work by Tyagi, et al. (2016), suggests that focus on the breath may be a factor in inducing flow in Yoga practitioners. Their study found increased experiences of flow and enhanced mood, whilst linking controlled breathing to autonomic nervous system/heart rate variability; which are linked to positive internal states, such as flow.

The studies highlighted above are far from making claims of causality. Associations between flow and mindfulness however, are clear; as is the justification for continued research into how these psychological conditions relate to and/or complement each other. After an exhaustive literature review, no interdisciplinary studies, such as the one this research proposed, could be

found investigating how meditative/mindful practices relate to flow across activity types. Furthermore, a comprehensive meta-analysis has recommended studies address the effects of meditation practices on psychological processes, such as flow, that result in enhanced performance and wellness (Ospina, et al., 2007). Csikszentmihalyi (2008) has posited that oriental meditative-movement arts were designed to produce flow. Recognition of links between techniques related to meditative movement and flow state are a valuable starting point. However, such recognition does not explain the absence of unique factors connected to these arts from the current framework; which arguably clash with traditional criteria on multiple levels.

Current Study Aims

A recent systematic review has evaluated flow theory approaching a crisis point (Swann, et al., 2018). It is the objective of this study to examine flow antecedents present in Csikszentmihalyi's traditional framework, through a level of criticality corresponding to such evaluations of theoretical crisis. Taking the above into account this study will address the following research question:

Will flow states be elicited differently when comparing experience of the phenomenon in meditative-movement disciplines and other activities?

The study will test the following hypotheses to address the research question:

- **Hypothesis 1:** There will be significant differences in the extent of flow experienced in the clear goals and challenge skill dimensions, when comparing meditative-movement disciplines to other activities.
- **Hypothesis 2:** Examination of subjective experiences relating to meditative movement activities, will reveal novel flow antecedents which are not acknowledged in traditional theory.

Materials and Methods

Design

In order to evaluate both quantitative and qualitative data to address the research question this research adopted an interdisciplinary mixed-methods design. A between-subjects approach was implemented to address Hypothesis 1. Meditative movement and other activity types were assigned as the independent variables. Dependent variables were flow state antecedents clear goals and challenge skill balance. Participants were classified by activity type and allocated into meditative movement activity and other activity groups. Group classification was based on Larkey et al.'s (2009) definition of meditative movement activities. Thematic analysis was applied to address Hypothesis 2 as an exploratory method of detecting possible novel eliciting factors relating to flow state.

Participants

Chain referral (snowball) sampling was employed to recruit participants from a variety of amateur clubs (both within and without of the University of Glasgow) involved with activities such as; swimming, running, dancing, qigong and yoga (see Appendix E. for sample distribution across activity type). The sample was bolstered by links to the survey posted on amateur Facebook groups, and by inviting individual students from University of Glasgow, Psychological Studies 2021, cohort to participate. A sample of 186 participants was recruited in the study. Across disciplines 111 were female, 74 were male, and one participant identified as non-binary. The mean age of the sample was 50 years old with a standard deviation of 17 years.

Materials

The *Flow State Scale (FSS)* was used as an instrument to evaluate levels of flow state experienced (Jackson & Marsh, 1996). The FSS utilises a self-report questionnaire with an objective of understanding if, and to what extent, individuals experience flow in its different dimensions during a range of activities. Flow is measured using a subset of the nine dimensions, there are 36

questions in the survey, 4 for each dimension of flow. The questionnaire can be used to evaluate total flow state scores by calculating the mean of the sum of item scores, or measure experience of individual items singularly (Aherne, et al., 2011). Items are formulated as statements relating to a participant's subjective experience relating to a recent activity such as, *I know clearly what I want to do* (clear goal dimension), in response to which participants could either agree or disagree. A Likert scale was used to evaluate the extent of flow experienced via levels of agreement using 5 anchor points from 1 (strongly disagree) to 5 (strongly agree). The FSS was selected as it was developed as a means of measuring levels of flow in physical activity settings (Jackson & Marsh, 1996). The scale has been evaluated as having good psychometric properties/validity (Chen, et al., 2010), both in the domain of sports (Stavrou, et al., 2007) and variety of other settings (Yoshida, et al., 2013). Furthermore, Marsh and Jackson (1999) confirmed the validity of the FSS in interdisciplinary research on professional swimmers, triathletes and cyclists.

Whilst the validity of the FSS has been confirmed as a quantitative instrument; this study adhered to recommendations for research to use qualitative methods/mixed-modalities to gain further insight into the condition (Jackson & Marsh, 1996). Accordingly, a qualitative section was appended to the FSS to detect novel dimensions of flow which may have been overlooked in previous studies. Taking Chen, et al.'s (1999) classification of flow antecedents into account, open-ended questions were presented to participants, such as:

> *Is there anything you do before* (antecedent) *an activity to help you achieve optimal performance? If so, could you please describe it?*

Recommendations to neutralise social desirability effects via indirect questioning (absence of the term flow state), and the option for participants to respond in the negative, were considered during the formulation of such questions (Fisher, 1993; Bäckström, et al., 2014).

Procedure

Clearance from the University of Glasgow's School of Education ethics committee (see Appendix A.), was obtained before participant recruitment and data collection was enacted. After providing digital consent and demographic information, participants were required to answer all 41 questions on the modified FSS. Questions were presented with the quantitative section first, followed by the open-ended qualitative section. After accessing the modified FSS, participants were given an unlimited amount of time to finish the survey. It was necessary to answer all 41 questions on the survey to finish and submit answers.

Participants were made aware that they were being asked to participate in research on flow states. However, to decrease the possibility of subject bias/social desirability effects, they were not given any information on flow, or its antecedents. In addition, the study adhered to recommendations such as, online data collection with an emphasis on encouraging the greatest degree of anonymity for participants possible, to further limit subject bias (Larson, 2019). Participants were requested to complete the survey within 2hrs of completing their respective activity. This measure was taken in line with recommendations of time-sensitive 'event based' data collection, to reduce bias recall (Swann, et al., 2019). The study was administered and conducted via JISC; a widely used platform that enables data collection via online surveys.

Reflexivity

Prior to and during the study, researchers have experienced flow states in both meditative movement and other activities. Researchers acknowledged that this may have had an impact on data classification, collection and analysis during the study and have taken appropriate measures to address this.

Ethical Considerations

During the registration process club secretaries were made aware that; the survey was for those over the age of 18 only, no personal data would be collected during the study, and data would be held in accordance with GDPR regulation on secure storage devices. To further ensure participant anonymity/confidentiality, club secretaries acted as the only point of contact between researchers and participants throughout the research. To ensure they were fully informed subjects were required to read and acknowledge understanding of a Plain Language Statement (see Appendix B). Digital consent (see Appendix C) was required before being allowed access to the modified online FSS survey (see Appendix D). This research recognised that asking subjects to participate in the study, after completing their respective activities, may impact the way they engaged with their disciplines. To mitigate any risk of harm or injury, participants were asked to take part in their activity exactly as they would were they not participating in the research. Furthermore, participants were requested to contact the researchers, study supervisor or outside support agencies, should they feel any distress either during or after the research.

Data Analysis

Quantitative Data Analysis of Hypothesis 1

Hypothesis 1 was tested using a between-subjects design, with mean scores of dimensions calculated from the totals for participants in both meditative movement and other activity types. Inferential statistical analysis was conducted using a 2x2 ANOVA, to detect whether flow antecedents were experienced to different extents, in meditative movement and other activity types. Recommendations made by Kimiecik and Stein (1992), to use statistical procedures such as analysis of variance, when evaluating the presence of flow state in activity, were taken into account whilst selecting this method.

Qualitative Data Analysis of Hypothesis 2

Hypothesis 2 was tested using inductive thematic analysis on qualitative data, for both meditative movement activity and other activity types. Inductive thematic analysis was chosen as an evaluative approach, based on its exploratory strength in revealing themes related to causal factors underlying psychological phenomena (Guest, et al., 2012). Furthermore, thematic analysis has been assessed as being well suited to working with medium-large sample sizes and brief text data (Robinson, 2021), such as that collected in the qualitative section of the survery. Inductive thematic analysis was conducted on qualitative data according to recommendations made by Braun and Clark (2006), utilizing the following steps;

a) Familiarization with the data to form initial impressions,
b) Generate initial codes,
c) Search for themes,
d) Review themes,
e) Refine/define and name themes, and
f) Produce the final report.

Thematic analysis was conducted under the framework of prior studies examined during the literature review, which informed and guided the generation of initial codes. To reduce the possibility of cognitive bias during each stage of analysis, emerging themes were cross checked to ensure credibility (Lincoln & Guba, 1985). Researchers also followed recommendations to keep a short journal during each step of the research, to encourage reflexivity by noting any preconceptions/presumptions, that could influence analysis of the data (Langdridge, 2007).

Results

The aim of this research was to assess if flow states are elicited differently, when comparing experience of the phenomenon in meditative-movement disciplines, and other activities. Data was collected online via an online survey; quantitatively by the FSS, and qualitatively via a free form section appended to the survey. The data was used to address this study's two hypotheses, with results presented below.

Hypothesis 1: Quantitative Results

Hypothesis 1. stated there would be a significant difference in the extent of flow experienced by participants, in antecedent dimensions, when comparing meditative movement with other activity groups. Participant responses in independent variable groupings (meditative movement activity vs other activity) were evaluated alongside dependent variable dimensions (clear goals vs challenge skill). Data was processed for evaluation and tested for normality and homogeneity of variance. Descriptive and inferential statistical testing was then conducted on the variables. A detailed explanation of these processes is presented below.

Data Cleaning and Preparation

A total of 186 participants took part in the online FSS survey. However, participants were excluded from the dataset for 'straight-lining' on the questionnaire (N =1); referring to the use of drugs or alcohol to elicit flow, as this was considered a possible confounding factor (N = 3), and for not being of a suitable age to engage with the study (N =1). After removing these data points, the full sample consisted of 181 participants, with the meditative movement activity group consisting of 57 participants and the other activity group consisting of 124 participants. The FSS survey in its entirety, was used during data collection as this was a joint research project with the data collected being used to address different hypotheses. Thereafter to prepare the data, participant responses relevant to the flow dimensions clear goals, and challenge skill balance were extracted from the full dataset, and transferred to the coding platform 'R' for analysis (see Appendix F. for code).

Descriptive Statistic

Mean scores and other descriptive statistics, of total flow, and selected dimensional flow were calculated for the meditative movement and other activity groupings (refer to Table 1. For details).

Table 1.

Descriptive Statistics for Meditative Movement (Med-Mov) and Other Activity (Oth-Act) Groupings

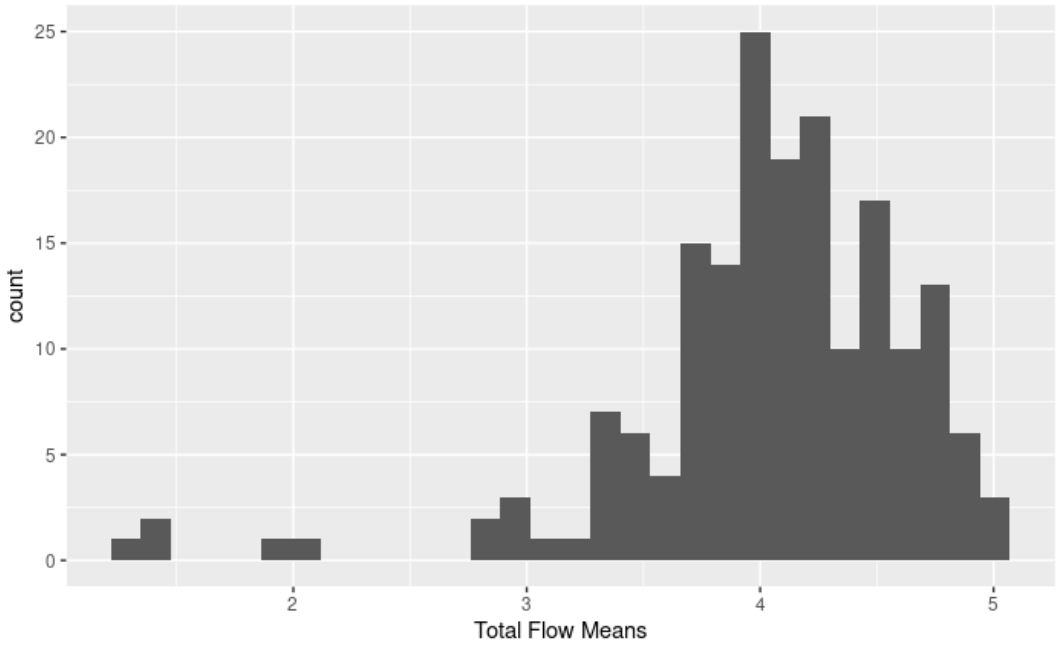
Activity Type	N (181)	Dimensional Flow Clear Goals				Dimensional Flow Challenge Skill				Total Flow			
		Mean	Min	Max	SD	Mean	Min	Max	SD	Mean	Min	Max	SD
Med - Mov	57	4.10	4.00	4.20	0.75	4.04	3.95	4.14	0.74	4.09	4.01	4.17	0.59
Oth-Act	124	4.14	4.06	4.21	0.83	3.96	3.89	4.03	0.77	4.03	3.98	4.09	0.62

Inferential Statistics

Quantitative data was examined to test for possible differences in the levels of flow in antecedent dimensions, clear goals and challenge skill balance, in meditative movement activities when compared to other activities. A two-way ANOVA was conducted to examine the effects of meditative movement, and other activity types on experience of flow in the clear goals and challenge skill balance dimensions. A histogram was evaluated to assess normality, (refer to Fig. 4 for details).

Figure 4.

Total Flow Experienced by Participants Across Activity Groups.

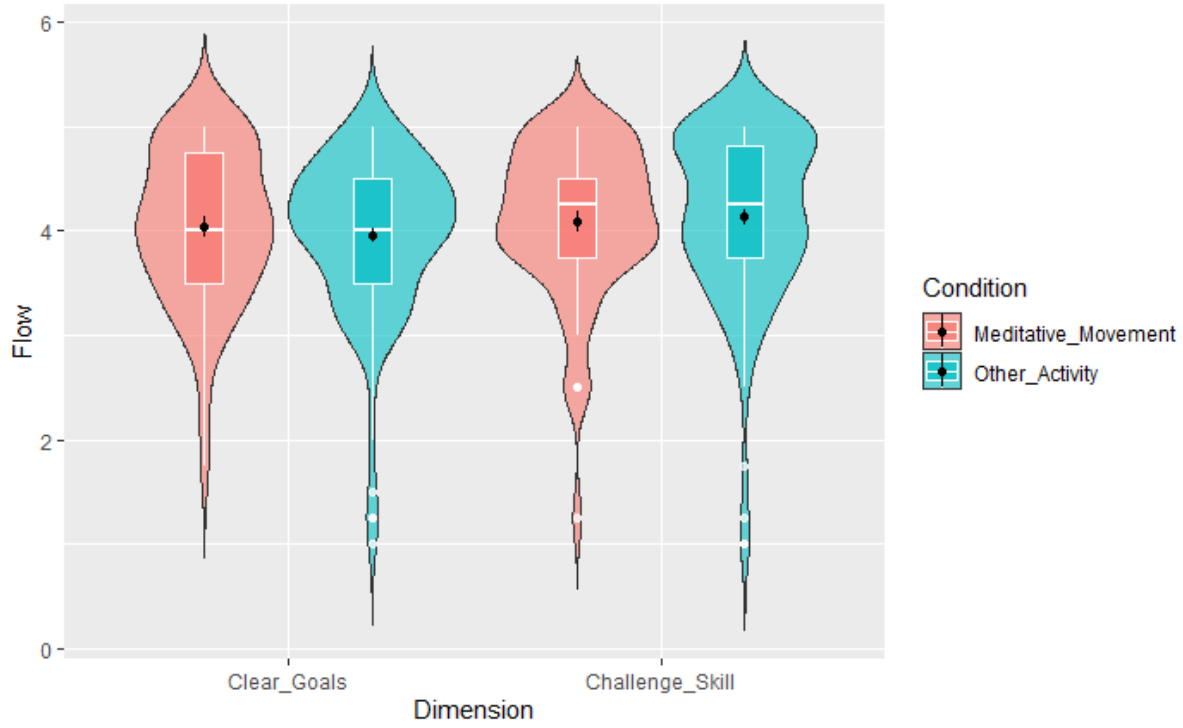


Whilst the visualisation suggested a negative skew, the beginnings of a normally distributed dataset were assessed as being present. A Shapiro-Wilk's test was conducted, revealing a lack of normality ($p < .05$), however a subsequent Levene's test suggested that the variances of the groups were equal ($p > .05$). Therefore, the data were evaluated as suitable for inferential analysis under the ANOVA.

The 2X2 ANOVA revealed no significant interaction effect between activity group conditions and flow dimension variables, $F(1, 179) = 1.42$, $p = 0.23$, partial $\eta^2_g > 0.01$. Therefore, an analysis of the main effect for flow dimensions was performed. A significant main effect was found, in the antecedent dimensions, $F(1, 179) = =4.91$, $p = 0.03$, $\eta^2_g = 0.01$. Pairwise comparisons were subsequently run at 95% confidence intervals, with Bonferroni-adjusted p-values. Participants in the other activity condition experienced flow in the clear goals dimension (M= 4.14, SD = 0.83), at significantly lower levels ($p < 0.05$) than the challenge skill balance (M = 3.89, SD = 0.77) dimensions.

Figure 5.

Mean flow Scores in the Dimensions of Clear Goals and Challenge Skill Balance.



Hypothesis 2: Qualitative Results

Thematic Analysis

Inductive thematic analysis led this research to recognise two overarching themes interwoven, and interlinked, throughout the data, relating to the elicitation and maintenance of flow.

These were:

1. ***Relaxed-Experiential Approach***
2. ***Body Before Mind***

A large number of participants across amateur activity types, noted the experience of flow was easier to elicit whilst adopting a ***Relaxed Experiential Approach*** when engaging with their discipline. This approach was often conducted by limiting critical evaluation of performance, relating to pre-set goals during engagement with activity. A focus on breathing and increased bodily awareness, or putting the ***Body Before Mind,*** was present across activity types. This focussed somatic awareness, was found to facilitate relaxation, focus, calmness and deeper levels of optimal engagement within activities, also resulting in flow.

Relaxed Experiential Approach

Goal orientation was noted as a factor that positively affected access to flow state. One weightlifter found that before starting their practise, setting goals in relation to previous performances resulted in more frequent experiences of flow. A yogi talked of incremental goals describing how they were *always trying to stretch that little bit more* in each class they attended. However, a focus on goal-orientation was predominantly noted as a factor that positively influenced access to flow before, not during an activity. For example, a swimmer stated goal-oriented focus prior to engagement helped them reach flow and optimal performance. The swimmer stated, *I find my swimming goals occupy my mind as I fall asleep*, later acknowledging that this led to experiencing flow as a *form of meditation because my mind is utterly relaxed* during the activity.

Other participants noted a focus on outcome goals and performance limited the accessibility of flow. A chess player stated *being over-concerned with the result of the game* limited the occurrence of the state whilst, *try(ing) to be calm and relaxed* positively affected the ability to experience the condition. One runner stated that using a *body scan to relax muscles - especially face muscles* led to *enjoying the physical sensation of running* and feeling the *elation* of flow. Present here is a somatic technique to encourage enjoyment and relaxation, not a concentrated/continual assessment of performance in relation to a target goal. Such attitudes were mirrored in meditative movement activities. A Qigong practitioner noticed being *open minded, [and] observant rather than*

critical facilitated entry to flow. Another subject who practised Tai Chi stated that the condition was more accessible whilst; i*gnoring critical thinking, therefore relaxing mentally and physically, while remaining mentally totally focussed.* Both a yogi and meditator wrote of managing expectations. The Yogi stated; *I often perform better when I have no expectations.* The meditator talked of; *not being greedy for the experience [of flow]*, stating *trying to "make it happen", as in force it* was a definite way of decreasing their chance of fostering the condition. Suggested here was that a focus on target outcomes, even if they were flow itself, limited accessibility of the state. The implications of fostering a relaxed outlook, as opposed to a critical goal-oriented focus, was revealed as profound in eliciting flow across the sample.

Relaxation techniques were utilized across the sample to increase performance. Participants from a variety of disciplines including; dancing, musical performance, running, rock climbing, triathlon, and wild swimming, used visualisation and mantras to promote *calm(ness), relaxation, focus and confidence*. Statements made by the swimmer mentioned above, who used such techniques to elicit flow, connected: *repeated practice and visualisation* to promoting such positive outcomes; *once I'm in the water…my mind is utterly relaxed and focused…my body is doing its thing*. Additionally, the participant revealed compartmentalising goal-oriented visualisations before engagement, helped them to automatically *count strokes and distances* during the activity. The result was full engagement with the experience of their activity, resulting in flow which they described as *peace*. In the words of another participant *if I need relaxation, I use imagery… to switch off the brain*. They and several others noted *limiting conscious control*, to relax into their respective disciplines, greatly improved their chances of inducing flow.

Such automaticity appeared consistently as not only an outcome of flow, but also a requirement to elicit the state across the sample. This was notably apparent in the meditative movement arts. As one rock climber described; *my body just knows exactly how to do it and my brain is just along for the ride and observing*. Qigong practitioners also noted *automatic* and *smooth*

movements without thought connected to entering the state. In Tai Chi *trying to do things consciously rather than automatically* inhibited flow. To get in the zone one runner *avoid(ed) thinking about the specific task at hand*, and the *specifics of what bodily actions I am doing*. Allowing the body to automatically perform was highlighted to increase participants' abilities to become fully immersed in their respective activities, and subsequently experience optimal performance. One rock climber described the importance of becoming fully engaged, to activate and experience flow; *you become the task, you become the climb*. They went on to mention *surrendering to the experience and not being judgemental* were major factors in achieving flow state.

A full focus on the experiential factors within an activity greatly increased the chance of fostering flow across disciplines. A wild swimmer revealed that observing and connecting to nature allowed them to become fully immersed in the swim, resulting in flow state;

> *Sometimes I see birds or animals that I believe to be symbolic in the moment… A connection to nature that is rare and special…If the water is particularly cold, I enjoy the shock, the reset to the brain.*

This focus on a variety of rich experiential natural elements appeared to anchor the participant's focus on the activity in the present nurturing flow. This is evident as they go on to state they elicit the condition via a *singular focus on an object* or physiological arousal, connected to a shock of the cold water that *reset the brain*. Such sentiments were comparative to those made by a rock climber;

> *A little gust of wind helps to focus me and keeps me present I think it's a small change to my environment that opens me up to feeling like I'm part of something, joined with the rock in harmony.*

Apparent here is the notion that focussing on becoming *harmoniously* attuned to an environment and aware of subtle changes within it, had profound impacts on focus and the

subsequent accessibility of flow. Another climber succinctly summarised this concept by revealing; *there's no separation between me and the outside world*, whilst a swimmer connected the experience of flow with a *one-ness with the water*. A participant who practised both Qigong and Tai Chi stated flow was a, *strong sense of connection to my environment, almost as if the air around me is alive and conscious and I have dissolved into it*.

Environments that facilitated calm and focus were also noted as being important to prepare for/engage with an activity at a level where flow could be experienced fully. One yogi stated *(I) shut out all outside noise and activity….as I relax in my yoga room in silence to chill out before my class* as a method of encouraging flow states. Social environments were noted to encourage the state, as another yogi achieved flow more frequently, *at my regular studio with the same teacher and familiar faces.* Familiarity with other participants in group activities was also noted to increase collaboration and performance; which increased enjoyment and ultimately the chance of experiencing flow. Dancers explained that *like-minded* partners who; refrained from turning the activity *into a competition, had similar experience levels* and who were focussed on fostering a *group experience* eased accessibility of flow state . Similarly, one subject who practised Tai Chi in a group setting, noted; *feeling totally comfortable with…the rest of the people in the group* helping to elicit flow through feeling *part of the collective energy of the group*. The aforementioned quotes suggest calmness and familiarity in both solitary and group environments, affected participants ability to relax and enter flow state. This too was noted via group interactions, with participants explaining social factors such as dedication on a group level to garnering positive experiences and energy, having a major impact on their performance.

Body Before Mind

As highlighted above, a recurrent theme across the sample was that of participants restricting continual performance appraisals to induce relaxation, focus and flow. One principal method used by participants to achieve this aim, was a focus on increasing bodily awareness. A yogi

revealed *I concentrate solely on how the experience feels in my body to get out of my thinking mind* to increase the chance of experiencing flow. Bodily awareness both during the opening phase of activities and in high stress situations, was a means of reducing anxiety and reaching flow state. A chess player elaborated on this notion;

> *I use mindfulness techniques during games to keep calm and focused. This involves taking deep breaths and doing a quick body scan to reduce stress, particularly when the opponent has the initiative.*

A focus on breathing was the primary bodily awareness method noted to transition participants from normal engagement with their activity to optimal engagement through flow. A weightlifter explained that achieving flow, and attaining personal records was easier via *a focus on controlling my breathing.* As controlled breathing is an inherent part of many physical activities it was foreseeable that one swimmer stated; *swimming enforces a level of breath control that seems to allow access to the flow state*. A roller skater expanded on this idea, stating flow was elicited by *breath (that) brings attention to the moment*. A runner explained *I focus on my breathing to help me focus and 'zone out'* as a strategy to engage with flow. A wild swimmer noted *I do Wim Hoff's breathing techniques sometimes before I go open water swimming. This helps to prime my body for the cold water and to get in the zone.* A dancer revealed, *I do breathing exercises to centre myself, connect to breath and the ground under my feet.* This quote succinctly reveals how breathing can bridge the gap between body and mind. The breath was used across these experiential accounts to elicit focus; draw attention to bodily awareness and *centre* or prepare for optimal engagement with an activity. Respectively, a karate practitioner explained achieving flow was particularly difficult without; a *focus on my breathing and coordinating such with my movements*. Apparent above is that a variety of participants placed attention on their breathing to retain presence, increase focus and to coordinate movement within an activity.

Alongside breathing techniques, becoming acutely aware of bodily sensation was also noted as a possible novel antecedent of flow. Body scans were mentioned as a way of doing this, in a variety of activities from chess to running, as a way of maintaining flow throughout. One swimmer mentioned constant evaluations of their bodily movements *focussing on hand position… my mind will wander to head position, then to body position, then to kick technique,* as crucial in fostering flow state. Another swimmer disclosed that eliciting flow in this manner could be likened to *a positive feedback loop*. Generally, the sample presented a remarkable physical awareness, both before and especially during engaging with an activity.

A musician revealed preparing for flow via a *focus on the bodily sensations (that) bring things away from mental chatter.* Somatic awareness was discussed to a greater extent in the meditative arts. A Qigong practitioner explained their experience of flow below;

> *I feel tingling sensations in the palm of my hands, with the slightest shift of warm air between my palms. Additionally, I may feel weighted movements within my body as it dissipates. For example, at the start of the session, just completed, there was a weighted feeling in my shoulders and I continued it lifted and at the end it was gone.*

Focussed awareness and recognition of bodily sensations may be conducive to flow via meditative movement techniques, by anchoring one's focus on the experiential intricacies found within activities. Such sensational detail seemed to be the difference between success and failure, or flow and injury. For example, a rock climber used painstaking awareness to ensure a successful climb focusing on *the texture of the holds and the pressure I was using to stick to the wall.* In another domain, a swimmer paid attention to the fact that during flow, *each micro-movement of my body feels purposeful and in sync. I hesitate to call it 'control', but rather 'harmony'*. Comparing the above statements suggests putting the body before mind produced focus/addressed bodily tension which could result in flow. It was also a technique of engaging in a meaningful way with activities, through purposeful movement – and the exhilaration of harmonious action.

Both these, and outcomes related to relaxed experiential focus on activities were inextricably interlinked throughout the qualitative dataset, weaving complex patterns throughout activity types. A relaxed experiential approach and a focus on bodily awareness was noted as a predominant factor, relating to flow, in meditative movement activities. These themes also presented themselves consistently throughout most other activity types. One outstanding feature presented across activities was the positive impacts the experience of flow had on increasing meaning and quality of engagement. This was evident as one dancer stated experiencing flow was; *like I'm dancing on clouds and no step can go wrong, like my chest is filled with fireworks and I'm alive*.

Discussion

Hypothesis 1

This study hypothesized that: there would be significant differences in the extent of flow experienced in the clear goals and challenge skill balance dimensions, when comparing meditative-movement disciplines to other activities. Analysis revealed there was no significant difference between the activity groupings relating to the clear goals and challenge skill balance antecedents ($F(1, 179) = 1.42$, $p = 0.23$, $\eta 2g > 0.01$). The mean score of flow experienced in the clear goals dimension ($M = 4.10$, $SD = 0.75$) in the meditative movement category was similar to flow experienced in this dimension ($M = 4.14$, $SD = 0.83$) in the other activity category. These findings may be evaluated as unusual, whilst considering that one of the key features of meditative activities is adopting a non-judgmental outlook on goal-oriented performance (Schlieter, 2017). However, qualitative results confirmed that orientation towards specific goals was an inherent factor across a range of activities in this category. Yogis were determined to increase their levels of flexibility; tai chi practitioners engaged with their discipline to learn complex sets, and meditators resolved to reach heightened levels of awareness and relaxation. Such targets have been described as task-oriented goals which have been contrasted to ego-oriented goals.

Task-Oriented vs Ego-Oriented Goals

Task oriented goals promote a focus on intrinsic motivations and evaluations of performance. Ego oriented goals are typically defined competitively, with performance measured externally and in relation to others (Murcia, et al., 2008). Arguably therefore, task-orientation relates more to processes and ego-orientation more to outcomes. Studies have found that athletes adopting a task over ego-oriented approach, increase levels of concentration, evaluations of control and appraisals of an activity being intrinsically enjoyable (Stavrou, et al., 2015). These outcomes have been suggested to positively affect the occurrence of flow, due to increased levels of

confidence and decreased levels of anxiety. Moreover, such factors feed into the flow dimensions concentration, control and autotelic experience.

It has been argued that mindful practices are inherently more task-oriented than other activities (McCarthy, 2011). Other activity types may also encourage such a task-oriented outlook. More likely is the presence of both task and ego-orientations, dependent on subjective dispositions and characteristic demands of a specific activity. Whilst quantitative findings elucidated the importance of clear goals, qualitative findings offered deeper insights regarding the nature of the clear goals dimension, expanding traditional definitions and conceptualisations. A predominant task-orientated approach to targets across the sample, was found in relation to the clear goals antecedent of flow, with participants noting intrinsic motivations regarding engagement with their respective activities. Notably, the meditative movement grouping experienced a slightly higher mean level of total flow (M = 4.09, SD = 0.59) than the other activity grouping (M = 4.03, SD = 0.62). This may have been due to a greater degree of task-orientation to goals in the meditative arts category.

Challenging the Challenge Skill Balance: Measuring Flow or Clutch States?

As with the clear goals dimension, no significant difference was present in relation to the mean score of flow experienced in the challenge skill balance dimension in the meditative movement category (M = 4.04, SD = 0.74), and mean score of dimensional flow in the other activity grouping (M =3.96, SD = 0.77). However, a significant difference was noted on a dimensional level ($F(1, 179) = 4.91$, $p = 0.03$, $\eta^2_g = 0.01$). Flow in the clear goals dimension was experienced at a significantly higher level than in the challenge skill balance dimension, in the other activity grouping. These findings do not support original operational definitions of flow, as primarily being the result of a balance between skill and challenge (Csikszentmihalyi & Nakamura, 2010). However, considering the high scores of the challenge-skill balance dimension in the current research, its importance must be acknowledged. Results are in line with literature that describes challenge skill balance and clear

goals as equally powerful antecedents to flow; supporting multidimensional evaluations of the state (Fong, et al., 2015).

Flow theory was developed via qualitative studies on amateur leisure activities (Csikszentmihalyi, 1975). The theory, and its predominant measure the FSS, have subsequently been refined, during studies mainly focussing on the professional sporting realm (Jackson & Marsh, 1996). A focus on the challenge skill dimension, may be related to the fact that effortful maintenance of such a balance is an inherent feature of a professional athlete's daily experience. In the professional realm, specific outcome goals are systematically addressed during training on the basis that they match, or at times slightly exceed, an athlete's skill levels (Ericsson, et al., 2003). Subsequently, control, automaticity, and an implicit knowledge of one's discipline are fostered in the training arena. These have been related to athletes' perceptions of their level of skill, allowing them to confidently elicit optimal performance, whilst addressing difficult and pressure related extrinsic outcomes in competitive settings (Otten, 2009).

Qualitative data, in the current research, revealed that preparation, a reliance on automation and implicit knowledge were also important factors relating to flow, in the amateur realm. Prior performance leading up to engagement with activity, as well as an understanding of the impacts of hydration, nutrition and adequate amounts of rest were revealed by the sample; as important factors relating to the elicitation of flow. In addition, practice which enabled automatic performance positively affected the accessibility of the state. However, a more relaxed approach differentiated the current amateur sample, from more effortful approaches adopted in comparative professional realms.

Relating to the above, contemporary research suggests past studies may have conflated flow states with a similar yet distinctive condition; known as clutch state. The comparative condition has astutely been described as an outcome of *making it happen,* in comparison to flow which is a result of *letting it happen* (Swann, et al., 2017). Clutch states have been noted, as an outcome of a

deliberate decision to increase effort and intensity to address challenging situations, resulting in a sense of achievement and a drain on mental and physical resources. Contemporary research contends that flow states are linked to open goals, being elicited by drawing attention away from critical evaluations of a challenge-skill balance; resulting in intrinsic rewards and energizing effects (Swann, et al., 2017). Certain scholars stipulate therefore, that research based on the maintenance of a challenge skill balance could have been measuring clutch instead of flow states (Schweickle, et al., 2017). A mixed methods approach, allowed this study to measure flow dimensionally, and cross check findings qualitatively during measurement of the state. Experiential accounts related the importance of limiting critical evaluation, and the energizing effects of optimal performance. Therefore, the data suggests this study was indeed measuring flow and not clutch states.

These findings confirm the utility of the FSS, which was designed based on traditional conceptualisations. Although statistical analysis revealed a non-normal distribution of quantitative data collected by the scale (see Fig. 4), the beginnings of normality were suggested. Increasing the number of anchor points for items on the scale may increase the likelihood of normal distribution, and allow for more precise measurement of dimensional flow. Furthermore, qualitative data suggests that participants recognised certain current dimensions as present during the run up to activity to elicit flow. Expanding the scale to include items related to the preparation phases of activity, may elicit a greater understanding of how flow is elicited.

Hypothesis 2

The second hypothesis of this study stipulated: examination of subjective experiences relating to meditative movement activities, would reveal novel flow antecedents which are not acknowledged in traditional theory. Qualitative accounts evaluated in the current research support the study's second hypothesis. The subjective data revealed that relaxation, an experiential approach towards activity and increasing bodily awareness were prime antecedents to flow.

Original conceptualisations of flow postulate that relaxation during an activity is a result of a lack of alignment between skill and challenge. This results in boredom, restricting the accessibility of flow (Csikszentmihalyi, 1975). Recent research has contested such claims, recognising the existence of relaxed flow states (Chang et al., 2020). The study found that relaxed flow was linked to goal orientation; with participants implementing an imbalance between challenge and skill –encouraging greater feelings of control in relation to achievable tasks, to initiate the state. This study's results corroborate such findings; which may explain the current quantitative results indicating higher levels of flow in the clear goals dimension than the challenge skill balance dimension across groups. However, in the aforementioned study relaxation was evaluated as an outcome as opposed to an eliciting factor of flow.

Of considerable interest in the current study, was that participants highlighted the importance of reducing goal orientation and increasing relaxation, ***whilst*** engaging with their discipline, to elicit flow. Goal orientation was found across this study's sample as a factor that provided focus predominantly ***before*** engagement with activity; used as a means to plan and prepare for optimal engagement. Such approaches were exemplified by the chess player, who spent time leading up to matches painstakingly evaluating their game in relation to strategies used by their opponent. However, once they were involved with a match, critical evaluations were limited, and a relaxed approach, facilitated via mindfulness techniques, increased the accessibility to flow. Accounts such as this suggest specific goal orientation shifted toward a more relaxed experiential approach during different stages of activity.

The findings presented above suggest flow could be a multi-model condition. Such divergence from uniform traditional models has been noted in research on amateur adventure activities, that dichotomises the state into telic and paratelic flow conditions (Mackenzie, et al., 2011). In the study, telic flow was characterised as a *serious* condition dependent on specific important outcome goals. Paratelic flow was described as a *playful* condition; more accessible, less

dependent on target outcomes; and linked to novelty, variation and relaxation. The distinction between telic and paratelic flow may explain the novel antecedents presented in the current research. Arguably, participants in this research were primarily engaged with paratelic flow. Subjects described relaxed and embodied approaches, that may have attuned them to detecting and engaging with novel situations; unrelated to pre-set goals or the maintenance of a balance between skill and challenge. Research has evaluated this as an exploratory approach which facilitates flow via discovering natural environments, testing new skills and an uncertainty inherent to adopting open goals (Boudreau, et al., 2020). Exploration was noted across the sample, as wild swimmers and climbers paid close attention to natural elements; tai chi, and qigong practitioners were highly attuned to air quality, and dancers refined their skills in relation to new partners. This mindfulness was anchored via focus on the breath and increased awareness of bodily sensations. Such findings validate research which has noted a proximity between recognition of physiological sensation, and limiting cognitive control to facilitate flow (Chavez, 2008).

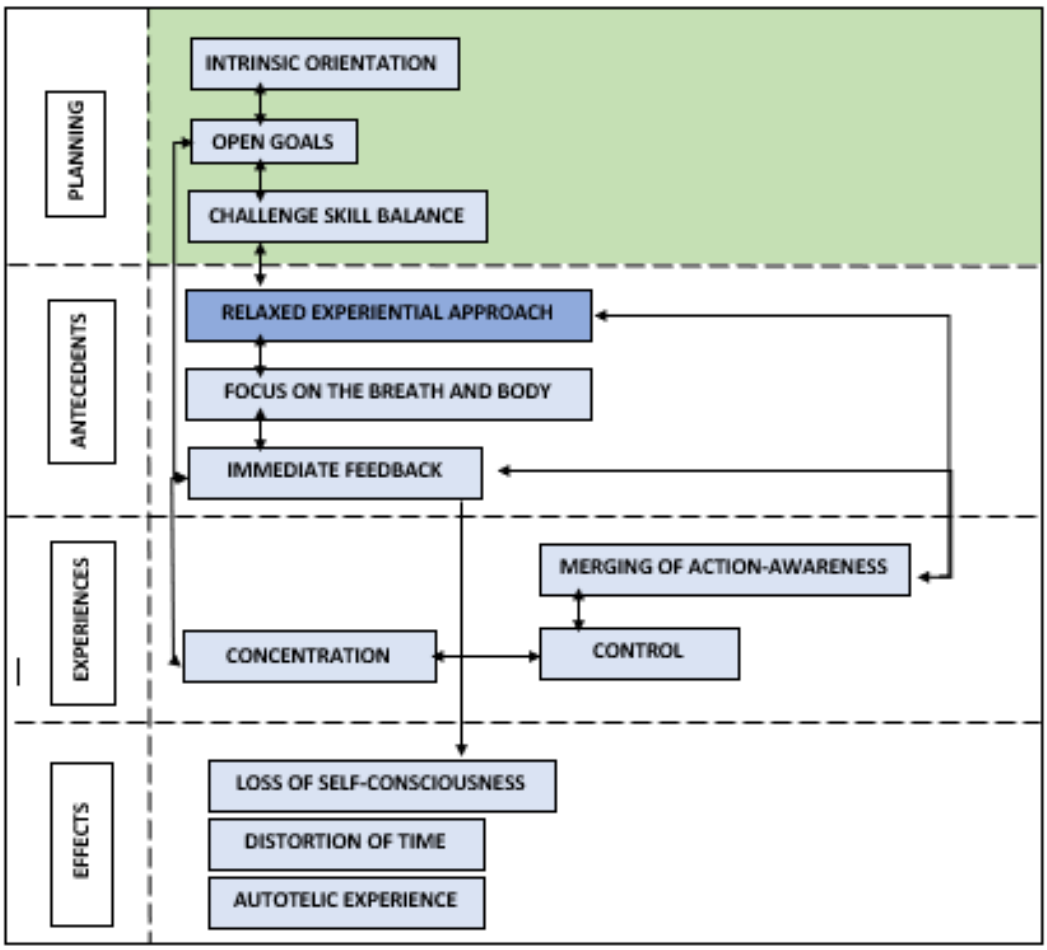
General Discussion

Quantitative results highlighted that contrary to traditional frameworks, the clear goals and challenge skill balance antecedents were of equal importance when eliciting flow in both activity groupings. Qualitative findings further revealed that participants used specific, task-oriented goals during the planning stage of activity. In addition, there was a distinctive relaxed approach and lack of criticality across the sample. This suggests that aforementioned targets may been placed alongside various other open goals during engagement; with flow being experienced in line with para telic conceptualisations of the condition. As some of the sample described characteristics of both telic and para telic flow, it may have been that participants transitioned between the two types of flow during activity. Such accounts are in line with studies, that contend that flow is a multi-model and multiphasic condition (Mackenzie, et al., 2011). Suggested processes based on the research discussed above are presented in Figure 6 and Figure 7. These diagrams utilize the same

design as Figure 2 and Figure 3, to enable a comparison with traditional frameworks. It would be presumptuous of this research to totally refute traditional frameworks, whilst promoting a new model based on dimensional interactions suggested hereafter. However, it is the hope of this study that such conceptualisations will promote a continued discussion in the field, and an expansion of the traditional framework – based on recommendations presented in current literature.

Figure 6.

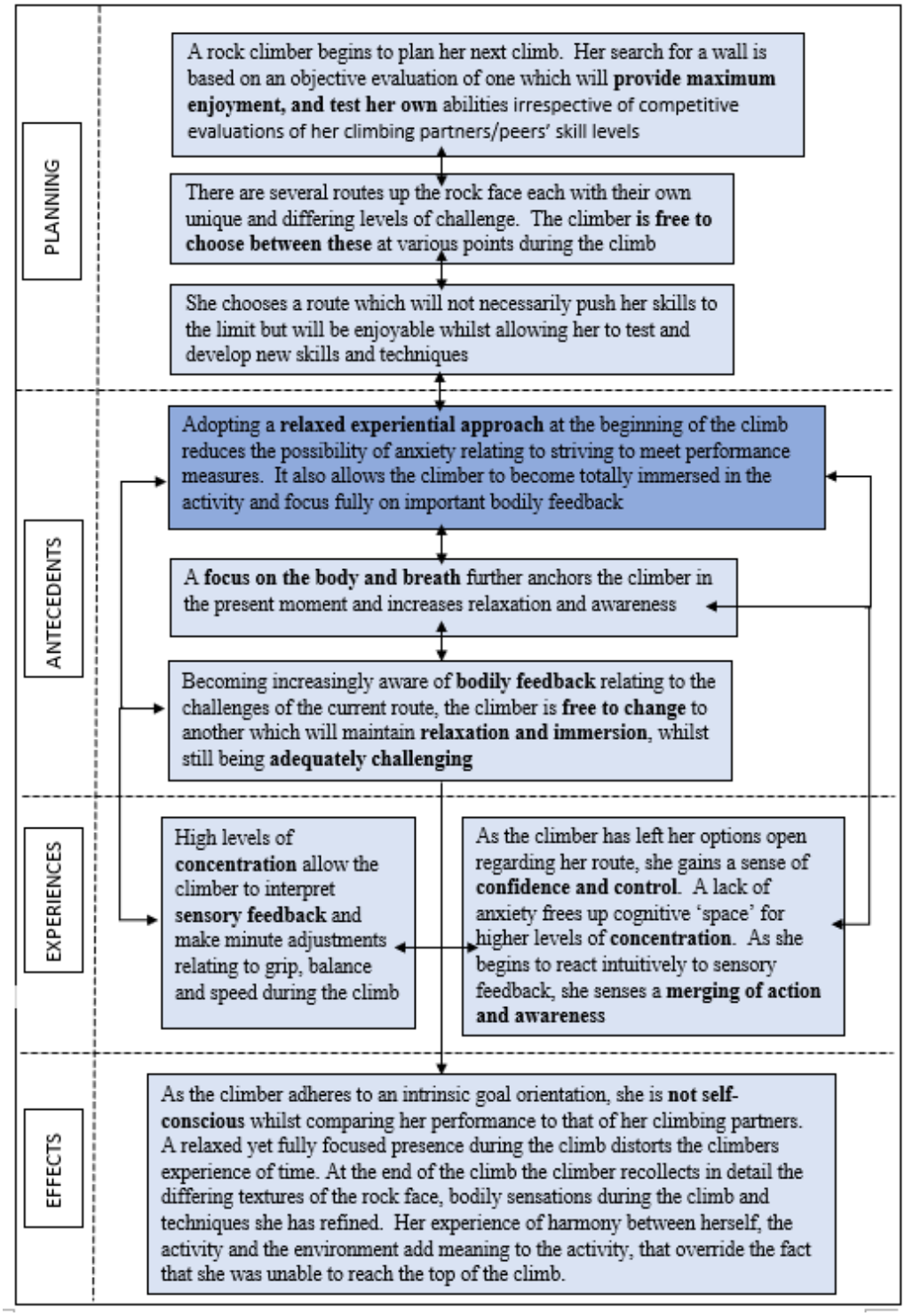
Executive Processes Relating to Relaxed Para Telic Flow



Note: Arrows represent the executive processes relating to the experience of flow based on current conceptualisations. Highlighted in green is a planning phase which affects the accessibility of the condition. A relaxed experiential approach acts as a prime antecedent, to para telic flow

Figure 7.

A Climber Finds Flow Whilst Engaging with Open Intrinsic-Oriented Goals



Note: The experience is mediated by her ability to adopt a relaxed experiential approach which is anchored in awareness of both the breath and bodily sensation.

Strengths, Limitations and Future Directions

One main strength of this study was its mixed methods research design. Analysing quantitative data alongside qualitative experiential accounts, allowed this research to gain deeper perceptions into how flow was experienced dimensionally. Furthermore, it allowed the study to examine detailed current findings alongside the traditional framework. This in turn, enabled evaluations as to whether the subjective data collected, was adequately represented under traditional definitions and conceptualisations. In the qualitative section of the survey, this study made efforts to limit subject bias by not referencing flow or meditative/mindful activities as a means of accessing the state. Several participants however, seemed to have experience in the meditative arts and integrated these into their primary activity types to elicit flow. Considering an increasing awareness and proliferation of mindfulness techniques, across the general public (Simonsson & Martin, 2020), it may have been useful to assess whether participants had any prior experience in meditative movement arts in the demographic section of the survey. This would have allowed the study to make a more accurate comparison of how flow is experienced, in meditative and non-meditative activities.

Relating to the above, future studies focussing on the amateur realm, may find it useful to base their designs on past research focussing on how meditative interventions affect the occurrence of flow in professional sports. The experience sampling method would be a useful tool to enact such study designs. The method is used to gain a snapshot of a participant's experience during activity, by using randomly timed electronic prompts, to answer a brief Likert scale self-report form to assess flow in a variety of objective situations (Csikszentmihalyi, 2014). This strategy would be inadvisable during meditative movement activities themselves. However, it would allow for precise measurement of how meditative techniques impact the accessibility of flow, at various points during other activities. It would also align with current recommendations, regarding time sensitive 'event based' data collection, enacted during or directly after activity (Swann, et al., 2019).

The current research was limited in adopting these approaches due to the current Covid-19 pandemic, with lockdown and social distancing measure restricting the ability to interact with participants. This in turn had an impact on procedural elements during the study, such as acquiring a sample for the research. Several of the clubs this study's researchers contacted were either closed, or at limited capacity due to restrictions related the pandemic. Engagement with activity was also limited, with many participants having to alter their usual practices to work around lockdown restrictions. This study recognises, that it may have been advisable to limit the selection of activity types evaluated in the research. Honing in on activities that could be conducted without the support of clubs, groups or specialised requirements (such as gym equipment, that may have not been available at the time), may have given a clearer understanding on how flow is truly experienced during normal engagement across these activity types. To offset these pandemic related confounding factors, contemporary studies could compare flow in meditative movement activity and other solitary and home-based activities.

Regardless of the widespread effects of the pandemic, this study's interdisciplinary approach added validity to the findings of the research. The sample was comprised of a diverse range of activities with a variety of contrasting integral characteristics. Studying flow across differing disciplines, added credence to findings regarding novel flow antecedents detected across the sample; which were present regardless of the fundamental demands of specific activity type. The study engaged with a medium number of participants, however, budgetary constraints restricted the sample size, as the FSS is a pay for use measure. Future studies could adopt a similar comparative approach, with a larger sample. This would be beneficial as statistical testing revealed, the current study may have been underpowered to find a small effect size, when comparing the impact of activity category on dimensional experiences of flow. A more equally distributed sample would also be beneficial in future studies, as the current study had a participant ratio of 2:1 in other activity: meditative movement activity groupings.

Conclusions

In conclusion, the current study found that flow was experienced in similar ways in both meditative movement and other activity groups. Whilst there were high scores in both the clear goals, and challenge skill balance dimensions of flow across activity types, a balance of challenge and skill was not the prime eliciting factor of flow, for the majority of participants. Additionally, novel flow antecedents highlighting a relaxed experiential approach towards/increasing bodily awareness during engagement with leisure activities, were found to increase flow in a diverse range of activities and settings. Features relating to meditative movement, were found to elicit flow in other activity types; suggesting these could be used during preparation and opening phases of leisure activities to increase the likelihood experiencing flow.

Such findings suggest that traditional flow frameworks that posit a goal-oriented focus on effortful maintenance of challenge skill balance, should be placed under continued scrutiny. As discussed above, the findings contest the primacy of the challenge skill balance dimension; revealing a suggested presence of a variety of other differing ways to elicit the state. The current study concludes that a divergence from an overarching traditional model of flow, would be of continued and considerable interest in the field. Multi-model conceptualisations which take into account differing types of the state, such as telic and para-telic flow, whilst identifying and separating conditions such as clutch states, are therefore recommended for future study.

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APPENDICES

Appendix A: Ethical Clearance

University of Glasgow | School of Education

18/06/2021

Dear Eoin Ryan and Nicholas Mackenzie

School of Education Research Ethics Committee

Project Title: 402200157

Application No: Multi-Disciplinary Examination of Perceived Conditions and Characteristics of Flow State

The School of Education Research Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study. It is happy therefore to approve the project, subject to the following conditions:

- Start date of ethical approval: 18/06/2021
- Project end date: 19/11/2021
- Any outstanding permissions needed from third parties in order to recruit research participants or to access facilities or venues for research purposes must be obtained in writing and submitted to the School of Education Research Ethics Administrator before research commences. Permissions you must provide are shown in the reviewer feedback form, titled *Notification of Ethics Application Outcome*, that has been sent to you.
- Data collected should be held securely for the period you indicated in the application and any personal data collected should be appropriately managed in accordance with the General Data Protection Regulation.
- The research should be carried out only on the sites, and/or with the groups and using the methods defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment as an amendment to the original application. The *Request for Amendments to an Approved Application* form should be used: https://www.gla.ac.uk/schools/education/research/ethics/forms/

Yours sincerely,

Barbara Read.

Dr Barbara Read
School of Education Ethics Officer

Appendix B: Plain Language Statement

Title of project and researcher details

Multidisciplinary Perceptions of Conditions and Characteristics of Flow State

Researchers: Nicholas MacKenzie, Eoin Ryan

Supervisor: Christina Soderberg

Course: Msc Psychological Studies (Conversion)

You are being invited to take part in a research project into how people experience flow state (or being in the zone) whilst being active in sports, music or art. Before you decide if you want to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the information on this page carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

I hope that this sheet will answer any questions you have about the study.

1. What is the purpose of the study?
The purpose of this study is to find out how individuals experience flow state in their discipline. We wish to study whether people do certain things that help them get into and stay in the zone.

2. Why have I been chosen?
You are being asked to take part because we believe that you may have experienced flow state in your field and that your experiences will provide valuable insights how flow is experienced by people in different fields such as sports, music and the arts.

3. Do I have to take part?
The head/administrator of your club or society has likely asked you whether you want to be a participant in this research. You do not have to take part in this study. Even after agreeing to take part or at any point during you make choose to opt-out of the study and not complete questionnaire without giving any reason or justification for doing so. We will not be in contact with you directly so will put no pressure on you to complete the study, however if you have any question relating to taking part in the research you can contact us via the email addresses provided below.

4. What will happen to me if I take part?
If you take part, you will be asked to complete a brief questionnaire about a recent experience relating to your discipline. We recommend that you fill out the questionnaire within 1hr of finishing a session relating to your discipline.
The questionnaire is made up of a demographic section, a multiple-choice section composed of 36 questions and a written section with 4 questions relating to flow state experiences that we ask you to answer in your own words.

You do not have to answer any questions that you do not want to. Participation will take about 20 minutes of your time. Your answers to the questionnaire will be stored digitally however we will not ask you any personal questions that may breach confidentiality. As there will be no way of identifying your personal responses to the questionnaire after you have submitted your answers there will be no way of retracting them from the study.

5. Will the information that I give you in this study be kept confidential?
Your answers to the questionnaire will be stored digitally however we will not ask you any personal questions that may breach confidentiality or make you identifiable at any point in the study. I will keep all the data I collect about flow states will be kept on secure and GDPR compliant University of Glasgow servers or in a locked file on my computer. If during the questionnaire you write anything which makes me worried that you might be in danger of harm, I might have to inform relevant agencies of this.

6. What will happen to the results of this study
I will analyse the data I collect from participants, and present this in the dissertation which I am writing for my qualification, Msc in Psychological Studies. All clubs and societies will receive a written summary of the findings and I will also present the information to colleagues. The study may be

7. Who has reviewed the study?
This study has been reviewed and agreed by the School of Education Ethics Forum, University of Glasgow

8. Who can I contact for further Information?
If you have any questions about this study, you can ask the research team - Nik or Eoin by sending an email to flowstatepsychology@protonmail.com or my supervisor, Christina Soderberg (Christina.Soderberg@glasgow.ac.uk) or the Ethics officer for the School of Education, education-ethics@glasgow.ac.uk

If at any time you feel distressed during the study, and wish to seek outside support, you can reach out to The Samaritans for free help and advice, by telephone: 116-123, or by email: jo@samaritans.org (response time 24hrs).

Thank you for reading this.

End _____

Appendix C: Consent Form

Please read and confirm the following information prior to taking part in the study

You will not be able to participate in the survey without giving full consent.

- ***I confirm that I have read and understood the Plain Language Statement and have had the opportunity to ask questions.***

- ***I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.***

- ***I acknowledge that participants will not be identified at any time during the study, nor will any personal or secure information be collected.***

- ***I understand that all data that is collected will not be linked to individual participants and will be held securely, according to GDPR for the purposes of this research***

- ***I acknowledge that material collected may be used in future publications, both print and online, and I agree to waive my copyright to any data collected as part of this project.***

- ***I confirm I am over 18 years old.***

Please tick to confirm;

I agree to take part in this research study according to the terms outlined above ☐

Appendix D: Flow State Online Survey

P.1 - Welcome to Flow State Research 2021

What you can expect to find in the survey:

- An Introduction to the Survey
- Digital Consent Form
- Flow State Survey

1. Instructions
2. Demographics Section
3. Multiple Choice Section (36 Questions)
4. Written Section (5 Questions)

- End of Survey

Thank you, results and support information

(This survey should take you approximately 15-20 minutes to complete)

P.2 - Introduction to the Study: Plain Language Statement

Please download and read the following statement to ensure your full understanding of this research prior to taking part.

Link to Plain Language Statement

https://www.dropbox.com/scl/fi/92ymmk7q7xc95pl1b0tj4/Flow-States-PLS.docx?dl=0&rlkey=6h5pdp7sm8nh99x835xxt209v

(The PLS – As detailed in Appendix 1. – was also made available to participants online below the link for download)

P.3 - Consent Form

(As detailed in Appendix B)

P.4 - Flow State Survey

Instructions

Thank you for taking part in the flow state survey

Please read the instructions below carefully before beginning.

- We advise that you take part in your activity ***exactly*** as you would if you ***weren't*** taking part in this study and aim to complete the questionnaire within 2 hrs of finishing. For instance- if you are a runner, run as you usually would and take the survey afterwards.

- Please answer the following questions in relation to your experience in the activity you have recently completed. There are no right or wrong answers.

- Think about how you felt during the activity and answer the questions using the rating scale provided. Select the number that best matches your experience from the options in the drop-down boxes under each question.

- Once you have completed the tick questions there are sections for you to write about your personal experiences relating to your activity.

P.5 - Flow State Survey

Demographic Section

1. Age:

2. Sex: (male/femal/non-binary/prefer not to say)

3. English Language Level: (native/fluent/IELTS lvl. 6-7/second language/other)
   If you selected Other, please specify:

4. Activity Type:
   a. (Archery/Boxing/Chess/Cycling/Dancing/Golf/Gymnastics/Judo/Karate/Kendo/ Kungfu/MMA/Meditation/Muay Thai/Music/Painting/Pottery/Qigong/Road Running/RockClimbing/Rowing/Sailing/Shorinji/Skateboarding/Surfing/Swimming/ Taekwondo/Tai Chi/Trail Running/Triathlon/Ultramarathon/Video Games/Weightlifting/Wild Swimming/Yoga/Other)

   b. If you selected Other, please specify:

5. How many hours per week do you spend engaging in your activity?
   (0-2 hours/3-5 hours/6-8 hours/ 7-9 hours/10-12 hours/13-15 hours/ 16-18 hours/19-20 hours/20+ hours)

6. Have you ever experienced the feeling of being 'in the zone'? (yes/no)

Multiple Choice Section

Please read the statements below and answer according on how strongly you agree/disagree with them. For example, if you strongly disagree with a statement, you would select 1; if you neither agree or disagree you would select 3, or if you strongly agree you would select 5.

Answer Key

1: Strongly Disagree

2: Disagree

3: Neither Agree or Disagree

4: Agree

5: Strongly Agree

1. I know clearly what I want to do
2. My attention is focused entirely on what I am doing
3. I was not concerned with what others may have been thinking of me
4. Things just seemed to be happening automatically
5. I found the experience extremely rewarding
6. Select the answer 'Correct Answer': Wrong/Not Right/Correct Answer/Incorrect (attentional check to detect ‘straight-liner’ participants)

Written Section

Please write answers to the questions below in your own words based on your own experiences relating to an activity you have recently completed.

Responses only need to be a sentence or two.

1. Is there anything you do before an activity to help you achieve optimal performance? If so, could you please describe it?

2. Is there anything you do during an activity to help you maintain optimal performance? If so, could you please describe it?

3. Can you describe what you experience if you are performing at your best?

4. Are there any factors that positively impact your performance?

5. Are there any factors that negatively impact your performance?

P.6 - End of Survey

Thank you taking the time to participate in this research. If you would like a summary of the results of this study, please send a request by email to

flowstatepsychology@protonmail.com

If at any time you felt distressed during the study, and wish to seek outside support, you can reach out to The Samaritans for free help and advice, by telephone: 116-123, or by email: jo@samaritans.org (response time 24hrs).

Appendix E: Sample Distribution According to Activity Category/Type

CATEGORY	ACTIVITY TYPE	PARTICIPANTS
Meditative Movement Activity	Meditation	6
	Qigong	17
	Tai Chi	22
	Yoga	14
Other Activity	Painting	3
	Sewing	5
	Textile Art	3
	Badminton	1
	Chess	5
	Rock Climbing	4
	Cycling	5
	Scottish Country Dancing	21
	Brazilian Jiu Jitsu	1
	Judo	1
	Karate	2
	Kung Fu	1
	Ninjitsu	1
	Musicianship	14
	In-line Skating	1
	Roller Skating	1
	Skateboarding	1
	Road Running	8
	Trail Running	3
	Ultramarathon	1
	Triathlon	1
	Indoor Swimming	23
	Sailing	2
	Surfing	2
	Wild Swimming	8
	Weightlifting	7
	Football	1
	Computer Programming	1
	TOTAL	**186**

Appendix F: Coding

Loading the Data

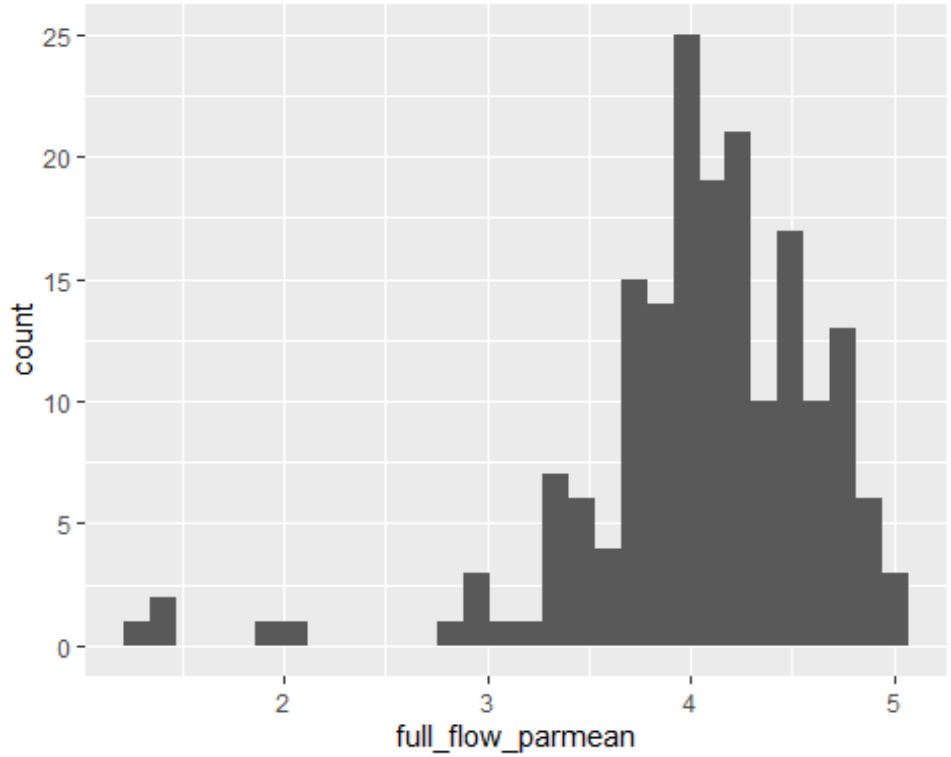
```
oa_fullflow <- read_csv("C:/Users/User/Desktop/Final/oa_fullflow.csv")

## Rows: 124 Columns: 38

## -- Column specification --------------------------------------------
---------
## Delimiter: ","
## chr  (1): URN
## dbl (37): Activity, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q1
8, Q19...

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet thi
s message.

MedMov_Act_Full <- read_csv("C:/Users/User/Desktop/Final/MedMov Act Full.c
sv")

## Rows: 57 Columns: 39

## -- Column specification --------------------------------------------
---------
## Delimiter: ","
## chr  (2): Activity Category, URN
## dbl (37): Activity, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q1
8, Q19...

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet thi
s message.

FullFlow_Dataset <- read_csv("C:/Users/User/Desktop/Final/FullFlow_Datase
t.csv")

## Rows: 181 Columns: 45

## -- Column specification --------------------------------------------
---------
## Delimiter: ","
## chr  (2): URN, Q5_a
## dbl (42): Age, Sex, English, Activity, TimeSpent, FlowXp, Q8, Q9, Q10,
Q11, ...
## lgl  (1): Q4_a

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet thi
s message.

parscores_factorial <- read_csv("C:/Users/User/Desktop/Final/parscores_fac
torial.csv")
```

```
## Rows: 362 Columns: 4

## -- Column specification --------------------------------------------
---------
## Delimiter: ","
## chr (2): Condition, Dimension
## dbl (2): Subject, Flow

##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet thi
s message.
```

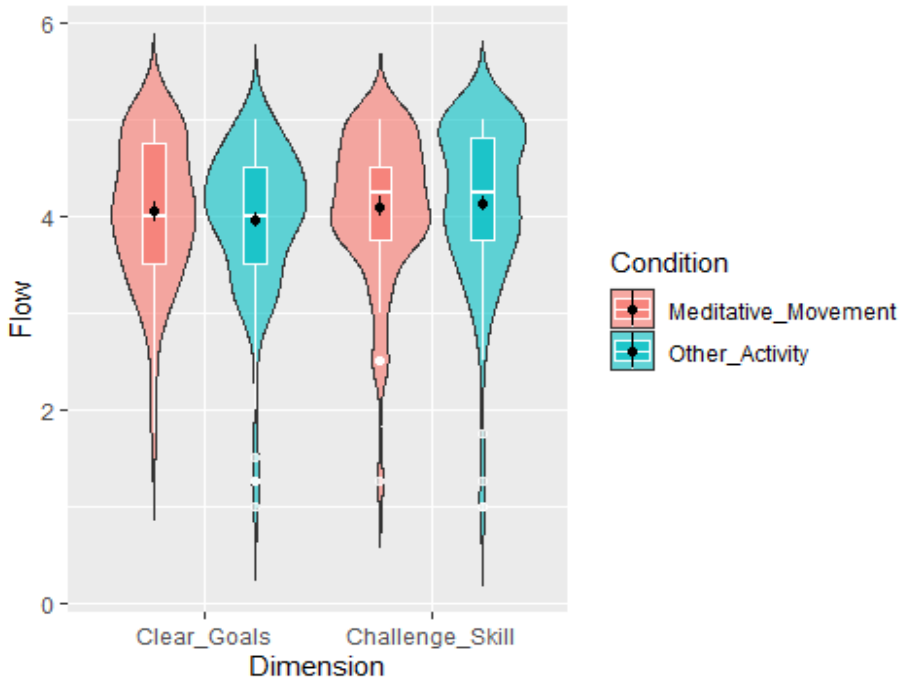
Descriptives

```
Fullflow <- select(FullFlow_Dataset, URN,Q8:Q44) %>%
mutate(full_flow_parmean = (Q8 + Q9 + Q10 + Q11 + Q12 + Q13 + Q14 + Q15 +
Q16 + Q17 + Q18 + Q19 + Q20 + Q21 + Q22 +Q23 +Q24 +Q25 +Q26 + Q27 +Q29 +Q3
0 +Q31 +Q32 +Q33 +Q34 +Q35 +Q36 +Q37 +Q38 +Q39 +Q40 +Q41 +Q42 +Q43 +Q44)/3
6)

oa_fullflow <- select(oa_fullflow, URN,Q8:Q27, Q29:Q44) %>%
mutate(full_flow_parmean = (Q8 + Q9 + Q10 + Q11 + Q12 + Q13 + Q14 + Q15 +
Q16 + Q17 + Q18 + Q19 + Q20 + Q21 + Q22 +Q23 +Q24 +Q25 +Q26 + Q27 +Q29 +Q3
0 +Q31 +Q32 +Q33 +Q34 +Q35 +Q36 +Q37 +Q38 +Q39 +Q40 +Q41 +Q42 +Q43 +Q44)/3
6)


descriptives_othact_flow <- select(oa_fullflow, full_flow_parmean) %>%
  summarise(mean = mean(full_flow_parmean, na.rm = TRUE),
            min = mean(full_flow_parmean) - sd(full_flow_parmean)/sqrt(n
()),
            max = mean(full_flow_parmean) + sd(full_flow_parmean)/sqrt(n
()),
            sd = sd(full_flow_parmean))

othact_CS_scores <- select(oa_fullflow, URN,Q8,Q17,Q26,Q36) %>%
  mutate(CS_Par_mean = (Q8+Q17+Q26+Q36)/4) %>%
  select(CS_Par_mean)

 othact_CS_descriptives <- othact_CS_scores %>%
   summarise(mean = mean(CS_Par_mean, na.rm = TRUE),
             min = mean(CS_Par_mean) - sd(CS_Par_mean)/sqrt(n()),
             max = mean(CS_Par_mean) + sd(CS_Par_mean)/sqrt(n()),
             sd = sd(CS_Par_mean))

othact_CG_scores <- select(oa_fullflow, URN,Q8,Q17,Q26,Q36) %>%
  mutate(CG_Par_mean = (Q8+Q17+Q26+Q36)/4) %>%
  select(CG_Par_mean)

 othact_CG_descriptives <- othact_CG_scores %>%
   summarise(mean = mean(CG_Par_mean, na.rm = TRUE),
             min = mean(CG_Par_mean) - sd(CG_Par_mean)/sqrt(n()),
             max = mean(CG_Par_mean) + sd(CG_Par_mean)/sqrt(n()),
             sd = sd(CG_Par_mean))
```

```
MedMov_Act_Full <- select(MedMov_Act_Full, URN,Q8:Q27, Q29:Q44) %>%
mutate(full_flow_parmean = (Q8 + Q9 + Q10 + Q11 + Q12 + Q13 + Q14 + Q15 +
Q16 + Q17 + Q18 + Q19 + Q20 + Q21 + Q22 +Q23 +Q24 +Q25 +Q26 + Q27 +Q29 +Q3
0 +Q31 +Q32 +Q33 +Q34 +Q35 +Q36 +Q37 +Q38 +Q39 +Q40 +Q41 +Q42 +Q43 +Q44)/3
6)


descriptives_medmov_flow <- select(MedMov_Act_Full, full_flow_parmean) %>%

    summarise(mean = mean(full_flow_parmean, na.rm = TRUE),
              min = mean(full_flow_parmean) - sd(full_flow_parmean)/sqrt(n
()),
              max = mean(full_flow_parmean) + sd(full_flow_parmean)/sqrt(n
()),
              sd = sd(full_flow_parmean))

medmov_CS_scores <- select(MedMov_Act_Full, URN,Q8,Q17,Q26,Q36) %>%
  mutate(CS_Par_mean = (Q8+Q17+Q26+Q36)/4) %>%
  select(CS_Par_mean)

 medmov_CS_descriptives <- medmov_CS_scores %>%
   summarise(mean = mean(CS_Par_mean, na.rm = TRUE),
             min = mean(CS_Par_mean) - sd(CS_Par_mean)/sqrt(n()),
             max = mean(CS_Par_mean) + sd(CS_Par_mean)/sqrt(n()),
             sd = sd(CS_Par_mean))

medmov_CG_scores <- select(MedMov_Act_Full, URN,Q10, Q19, Q29, Q38) %>%
  mutate(CG_Par_mean = (Q10+Q19+Q29+Q38)/4) %>%
  select(CG_Par_mean)

 medmov_CG_descriptives <- medmov_CG_scores %>%
  summarise(mean = mean(CG_Par_mean, na.rm = TRUE),
             min = mean(CG_Par_mean) - sd(CG_Par_mean)/sqrt(n()),
             max = mean(CG_Par_mean) + sd(CG_Par_mean)/sqrt(n()),
             sd = sd(CG_Par_mean))

 flow_vis <- parscores_factorial %>%
  group_by(Condition, Dimension) %>%
  summarise(mean = mean(Flow, na.rm = TRUE),
             min = mean(Flow) - sd(Flow)/sqrt(n()),
             max = mean(Flow) + sd(Flow)/sqrt(n()),
             sd = sd(Flow))

## `summarise()` has grouped output by 'Condition'. You can override using
 the `.groups` argument.

ggplot(Fullflow, aes(full_flow_parmean))+
  geom_histogram()

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```




```
ggplot(parscores_factorial, aes(x = Dimension , y = Flow, fill = Conditio
n))+
  geom_violin(trim = FALSE, alpha = .6)+
  geom_boxplot(position = position_dodge(.9), width = .2, colour = "white
", alpha = .7)+
  scale_x_discrete(labels = c("Clear_Goals", "Challenge_Skill"))+
    geom_pointrange(data = flow_vis,
                    aes(Dimension, mean, ymin=min, ymax=max),
                    shape = 20,
                    position = position_dodge(width = 0.9))
```

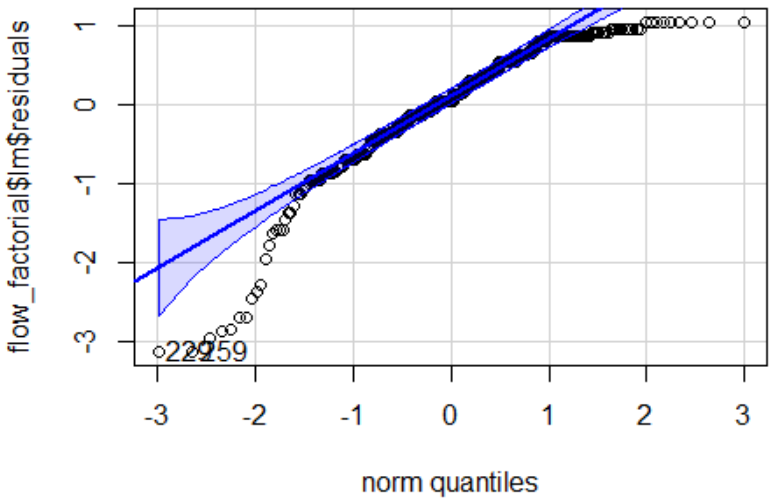


`

```
flow_factorial <- aov_ez(id = "Subject",
                data = parscores_factorial,
                between = "Condition",
                within = "Dimension",
                dv = "Flow",
                type = 3,
                es = "pes")

## Converting to factor: Condition

## Contrasts set to contr.sum for the following variables: Condition

factorial_output <- anova(flow_factorial) %>% tidy()

## Warning in tidy.anova(.): The following column names in ANOVA output we
re not
## recognized or transformed: num.Df, den.Df, MSE, ges
```

Assumption Tests

```
qqPlot(flow_factorial$lm$residuals)
```




```
## [1] 229 259

shapiro.test(flow_factorial$lm$residuals)

##
##  Shapiro-Wilk normality test
##
## data:  flow_factorial$lm$residuals
## W = 0.9019, p-value = 1.536e-14

test_levene(flow_factorial)

## Warning: Functionality has moved to the 'performance' package.
## Calling 'performance::check_homogeneity()'.

## OK: Variances in each of the groups are the same (Levene's Test, p = 0.
773).
```

Post Hoc Tests

```
posthoc_factorial <- emmeans(flow_factorial,
                             pairwise ~ Dimension| Condition,
                             adjust = "bonferroni")


contrasts_factorial <- posthoc_factorial$contrasts %>%
  tidy()

posthoc_factorial2 <- emmeans(flow_factorial,
                             pairwise ~ Condition| Dimension,
                             adjust = "bonferroni")

contrasts_factorial2 <- posthoc_factorial2$contrasts %>%
  tidy()
```

Appendix G: Excerpt of Qualitative Analysis

Codes:

Relaxed Experiential Focus

1. Goal Orientation
2. Limiting Conscious Evaluation
3. Presence
4. Performance Techniques
5. Conducive Environments

Body Before Mind

6. Focus on Breathing
7. Somatic Awareness
8. Automaticity
9. Harmony
10. Relaxation and Calm

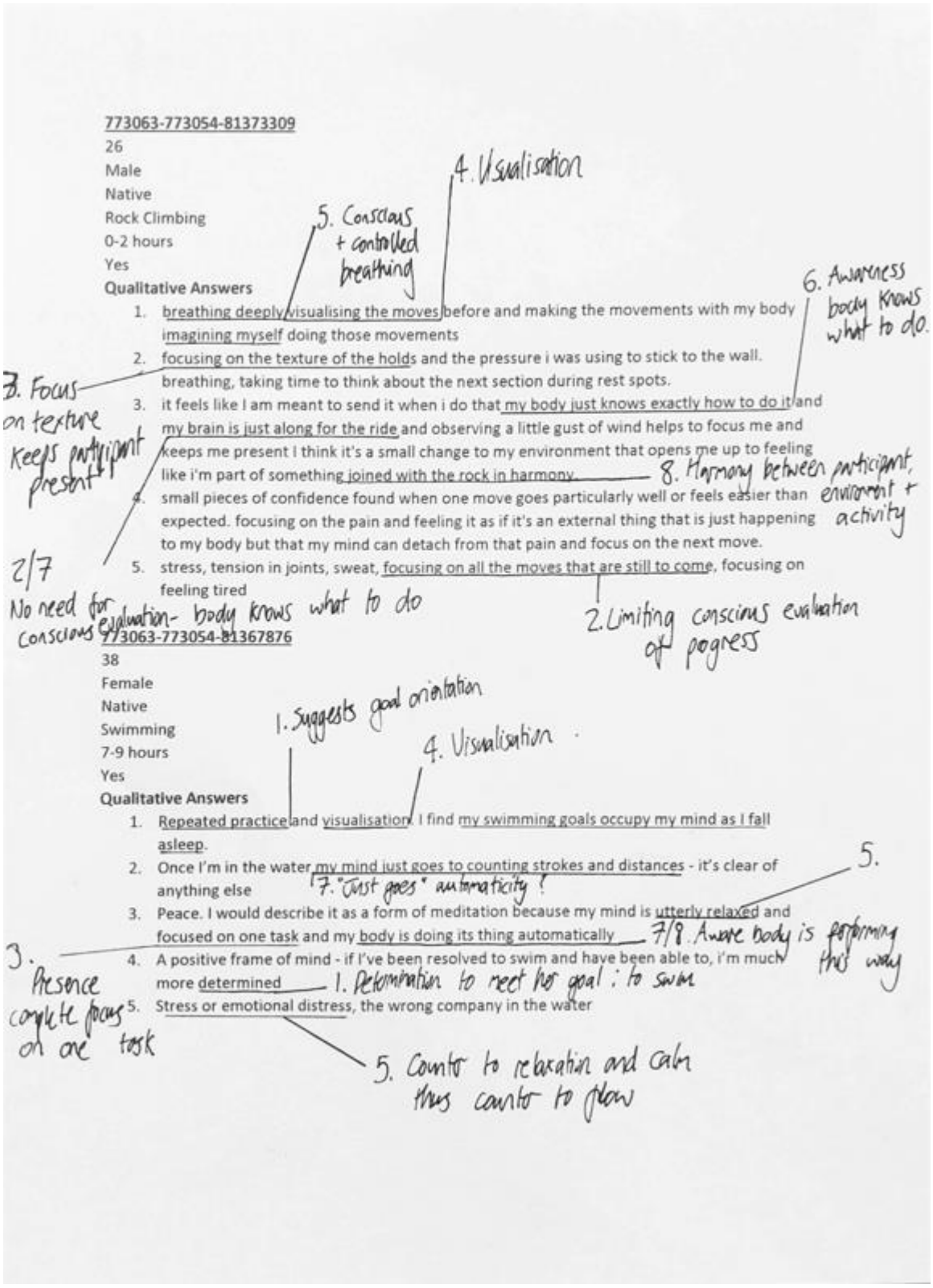
Key:

Participant ID No.

Age
Sex
English Language Proficiency
Activity
Engagement with activity (hrs per week)
Have you ever experienced flow states before?

Qualitative Answers (to following questions)

1. Is there anything you do before an activity to help you achieve optimal performance? If so, could you please describe it?
2. Is there anything you do during an activity to help you maintain optimal performance? If so, could you please describe it?
3. Can you describe what you experience if you are performing at your best?
4. Are there any factors that positively impact your performance?
5. Are there any factors that negatively impact your performance?



773063-773054-81373309
26
Male
Native
Rock Climbing
0-2 hours
Yes
Qualitative Answers

1. breathing deeply visualising the moves before and making the movements with my body imagining myself doing those movements
2. focusing on the texture of the holds and the pressure i was using to stick to the wall. breathing, taking time to think about the next section during rest spots.
3. it feels like I am meant to send it when i do that my body just knows exactly how to do it and my brain is just along for the ride and observing a little gust of wind helps to focus me and keeps me present I think it's a small change to my environment that opens me up to feeling like i'm part of something joined with the rock in harmony.
4. small pieces of confidence found when one move goes particularly well or feels easier than expected. focusing on the pain and feeling it as if it's an external thing that is just happening to my body but that my mind can detach from that pain and focus on the next move.
5. stress, tension in joints, sweat, focusing on all the moves that are still to come, focusing on feeling tired

4. Visualisation
5. Conscious + controlled breathing
6. Awareness body knows what to do.
3. Focus on texture Keeps participant present
8. Harmony between participant, environment + activity
2/7 No need for conscious evaluation - body knows what to do
2. Limiting conscious evaluation of progress

773063-773054-81367876
38
Female
Native
Swimming
7-9 hours
Yes
Qualitative Answers

1. Repeated practice and visualisation I find my swimming goals occupy my mind as I fall asleep.
2. Once I'm in the water my mind just goes to counting strokes and distances - it's clear of anything else
3. Peace. I would describe it as a form of meditation because my mind is utterly relaxed and focused on one task and my body is doing its thing automatically
4. A positive frame of mind - if I've been resolved to swim and have been able to, i'm much more determined
5. Stress or emotional distress, the wrong company in the water

1. Suggests goal orientation
4. Visualisation
7. "Just goes" automaticity ?
5.
3. Presence complete focus on one task
7/8. Aware body is performing this way
1. Determination to meet her goal : to swim
5. Counter to relaxation and calm thus counter to flow

Appendix H: Evidence for Themes

Superordinate Themes	Codes	Selective Illustrative Quotations (Regarding the elicitation of Flow)
1. Relaxed Experiential Approach	1.1 Goal Orientation	Several of the questions suggested that the activity is one that would be very challenging and that emphasizes a high level of performance. I am a good swimmer and totally involved when swimming but I don't push myself to compete, either with myself or others. I just swim. Not being judgemental about the outcome Not being able to settle to myself, being over-concerned with the result of the game (detracts from flow)
	1.2 Limiting Conscious Evaluation	I repeat “don’t think of anything” multiple times and it helps clear my mind I try to focus on breathing. Be quiet to gain focus, try to be calm and relaxed I lose all awareness except for the climbing, I don't hear anything, and time stops having meaning. I lose conscious thought.
	1.3 Presence	Focusing in on the moment, deepening awareness of what I want to do. surrendering to the experience Focusing on the texture of the holds and the pressure I was using to stick to the wall.
	1.4 Performance Techniques	I visualize my performance going well. Sometimes, before the concert, I also visualize an innumerable number of people (family, teachers, classmates, audience, too many to count and too many to fit) standing behind me and alongside me on the stage while I perform. When I'm really working hard, I will use mantras (normally in 3s to link in to my breathing)
	1.5 Conducive Environments	Set the space in such a way as to avoid external distractions, music / candles, noise

		cancelling headphones and have any props, water etc that I may need to hand so as not to disturb my flow. Definitely doing my flow at my regular studio with the same teacher and familiar faces. Feeling totally comfortable with the space I'm in and the rest of the people in the group.
2. Body Before Mind	2.1 Focus on Breathing	I do breathing exercises to centre myself, connect to breath and ground in my feet. Close my eyes. Stay focused on my breath & only have awareness of the instruction from my yoga teacher Focus on my breathing and coordinate such with my movements. Control my breathing. Sometimes when practicing the forms, parts of my body may feel weighted. I focus on my breathing and it helps to achieve optimal performance.
	2.2 Somatic Awareness	I'll do a bit of focussing on hand position, then my mind will wander to head position, then to body position, then to kick technique. I think part of what makes it easy to gain flow in swimming is that there are enough parts that make up the whole of good swimming that you can float through lots of topics in a swim, but them all contribute towards you swimming better. Focus on the bodily sensations and bring things away from mental chatter.
	2.3 Automaticity	My mind is utterly relaxed and focused on one task and my body is doing its thing automatically Strong sense of muscle memory or things happening automatically, sometimes anxiety when the body realises that there's very little conscious control.
	2.4 Harmony	A little gust of wind helps to focus me and keeps me present I think it's a small change to my environment that opens me up to

		feeling like I'm part of something joined with the rock in harmony.
	2.5 Relaxation and Calm	If I feel calm, relaxed and confident, I perform well. If my instrument is well maintained, it prevents me from feeling nervous that my instrument will have an issue that affects my playing. Keep relaxing any nervousness that might come up. Keep being calm. Try to stay calm and focused. Use imagery as to the outcome. If I need relaxation, I use imagery during my swimming to switch off the brain Relaxed, open minded, observant rather than critical, immersed in the experience Keeping very calm and enjoying myself!