PERSPECTIVES ON FLOW:

USING THE FLOW STATE SCALE -2 TO COMPARE CLIMBERS WITH AND WITHOUT DISABILITIES

By

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Major Department: Recreation Sciences

Participation in adventure as a recreational therapy intervention is well-recognized for its physical, psychological, and social benefits for people with disabilities. Advances in technology and adaptive equipment have increased accessibility to outdoor and adventure-based activities for those with physical disabilities. Notably, adaptive climbing has drastically increased in popularity in the past decade. Climbing, as an adventure activity, has long been established to facilitate the psychological state of flow; however, there is a lack of research on the experience and effects of flow in individuals with physical disabilities and specifically, adaptive climbing and flow. The purpose of this study was to investigate if flow is experienced differently between individuals with and without physical disabilities who participate in climbing programs and to determine if there is a relationship between the flow state and intention in future participation for individuals with physical disabilities. The Flow State Scale-2 was used to assess flow and additional questions measured participation. Results showed that climbers without disabilities (M=4.3, SD=0.5) reported a statistically significant higher level of a sense of control than

climbers with disabilities (M=3.8, SD=0.8), t(43)=2.24, p=.045, d=0.65. Results also showed a statistically significant positive, linear relationship between the global flow score and participation score for all climbers (R^2=0.14, F(1,43)=6.74, p=.013). Implications of findings and suggestions for future research in adventure as a recreational therapy intervention are discussed.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SECTION I: MANUSCRIPT[1]

Introduction

Recreational therapy (RT) is a systematic process that involves the purposeful use of recreational and leisure activities to promote physical, social, psychological, cognitive, and spiritual health and well-being (American Therapeutic Recreation Association [ATRA], 2019). The benefits of leisure participation have long been established (Stumbo & Peterson, 2009) with connections to well-being (Kuykendall et al., 2018) and quality of life (Iwasaki, 2007). RT adopts a holistic approach to treatment, incorporating the strengths and needs of individuals with disabilities (McKenney et al., 2012). Research also demonstrates that RT has positive benefits specifically for people with physical disabilities (Long, 2002). With 18% of the United States population having impairments with physical functioning (Centers for Disease Control and Prevention [CDC], 2022), such as amputation (Ziegler-Graham et al., 2008), cerebral palsy (Oskoui et al., 2013), spina bifida (CDC, 2020, September 3), and spinal cord injury (Jain et al., 2015), RT can be a viable treatment option (ATRA, 2019). Additional disabilities that affect mobility and physical function can also include multiple sclerosis, stroke, traumatic brain injury, muscular dystrophy, and Parkinson's disease (Georges & Das, n.d.; Khaku & Tadi, n.d.; LaPelusa & Kentris, n.d.; Shrimanker et al., n.d.; Tafti et al., n.d.). People with physical disabilities face a diversity of constraints in almost all aspects of life (World Health Organization [WHO], 2011). These barriers act as limitations to functioning and can include social, structural, and technological features of day-to-day life (WHO, 2001) and extend into leisure activities, which are an integral part of health and well-being (Caldwell & Gilbert, 1990). Participation in leisure offers social, psychological, and physical benefits for people with disabilities (Madsen et

[1] Manuscript adheres to the style and headings of the *Therapeutic Recreation Journal*

al., 2021), with the potential to experience flow (Ellis et al., 1983). Flow has long been an important conceptual framework to support the process and outcomes of using recreational therapy interventions (Stumbo & Peterson, 2009). Therefore, flow is the focus of this study.

Flow, outlined by Csikszentmihalyi and Nakamura (2012), is the total immersion in the present moment. This optimal experience is characterized by nine factors: balance of challenge and skill, well-defined goals, clear feedback, total concentration on the task, time distortion, combination of action and awareness, sense of self-control, loss of self-consciousness, and intrinsic motivation (Csikszentmihalyi, 1990). Challenge-skill balance, goals, and feedback act as precursors to the flow state, and must be present for flow to occur. Once these conditions are met, flow occurs and is characterized by the remaining six factors (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). Recreational therapists have an important role in facilitating flow since RT can be used to enable individuals with disabilities to experience flow (Ellis et al., 1983; Stumbo & Peterson, 2009). Interventions specifically designed to promote flow can help reduce barriers to leisure participation (Ellis et al., 1983) and serve as motivation for continued participation (Boudreau et al., 2020; Delle Fave et al., 2003). Furthermore, outcomes from experiencing a flow state also include an increase in well-being, life satisfaction, and positive mood (Boudreau et al., 2020).

Adventure-based activities have long been used to facilitate a flow state (Boudreau et al., 2020), but there is a lack of research in the study of flow for individuals with physical disabilities participating in adventure-based activities, and specifically on adaptive climbing. With today's technology and adaptive equipment, adventure-based activities are becoming more accessible to this population (Denq & Delasobera, 2017). Benefits of adventure-based recreation include increased self-efficacy, building a community, and an increased quality of life (Dorsch et al.,

2016). Nevertheless, individuals with physical disabilities tend not to choose such activities based on constraints, such as lack of awareness of accessibility and adaptations, skills, knowledge, and perceptions of danger (Williams et al., 2004). Despite the aforementioned challenges, Burns et al. (2013) found that participation in adventure activities can help this population find their sense of self and find joy in new experience or continue enjoying activities they had previously.

For those without disabilities, climbing is a popular indoor and outdoor activity for all ages (Outdoor Foundation, 2022). In fact, in a national survey the Outdoor Foundation found that around 10 million Americans engaged in rock climbing as an adventure-based activity in 2021 including 5 million climbing indoors. When forming his flow theory, Csikszentmihalyi (1975) initially studied the experience of rock climbers. This data greatly contributed to the development of the dimensions of flow. With the historical relationship of flow to climbing, it is past time that adaptive climbing be included in the research. While often associated with climbing outdoors, the flow state can also be achieved with indoor rock climbing (Schattke et al., 2014). Indoor climbing for people with disabilities can be beneficial in multiple functional domains (Bibro & Żarów, 2021; Christensen et al., 2017; DelGrande et al., 2020; Oriel et al., 2018) and help ease the transition from constraints experienced outdoors (Paradox Sports, 2015; Williams et al., 2004).

Background

Recreational Therapy Adventure-Based Interventions

Leisure has been recognized as an important part of daily life (Caldwell & Gilbert, 1990), with participation in outdoor recreational activities on the rise for the past decade (Outdoor Foundation, 2022). People with disabilities have lower participation rates in leisure activities (Blauwet et al., 2017; Lape et al., 2018; Madsen et al., 2021; Yazicioglu et al., 2012), and much of their leisure time is spent indoors (Labbé et al., 2019). Participation in physical activity has long been established to improve quality of life and life satisfaction (Blauwet et al., 2017; Carless et al., 2014). Additionally, participation in outdoor recreation has shown to have a positive influence on physical health, well-being, and social involvement among other positive outcomes (Dorsch et al., 2016; Madsen et al., 2017; Menzies et al., 2021).

RT is a unique field positioned to facilitate the use of adventure-based interventions in people with disabilities (Groff, 2016; Hatala, 2016) by providing satisfaction through recreational activities and enabling individuals to apply skills learned to everyday life (Caldwell & Gilbert, 1990; Groff, 2016). These types of interventions, commonly called adventure therapy, use adventure or outdoor activities to achieve treatment goals (Groff, 2016; Hatala, 2016). Adventure therapy is most used as an intervention in behavioral and mental health settings (Groff, 2016; Hatala, 2016), but adapted outdoor activities can benefit people with physical disabilities (Dorsch et al., 2016; Lundberg, Bennett, & Smith 2011). Programs dedicated to facilitating adventure therapy and adventure-based activities and interventions exist across the United States (e.g., Catalyst Sports, National Ability Center, Adaptive Sports Center, Common Ground Outdoor Adventures), and provide a wide range of interventions like rock climbing, high ropes courses, paddling, skiing, and hiking. These interventions offer benefits to physical,

psychological, and social functioning for individuals with disabilities (Labbé et al., 2019; Madsen et al., 2021).

Adaptive Climbing

Rock climbing is currently used as a therapeutic intervention, primarily for its mental health benefits (Austin, 2018; Frühauf et al., 2021) In individuals without physical disabilities, climbing has shown to improve upper body and core strength, overall fitness, and emotional health (DelGrande et al., 2020; Frühauf et al., 2021). Adaptations to outdoor activities are becoming increasingly common, making climbing accessible to various populations (Denq & Delasobera, 2017). Equipment like adaptive harnesses, pulley systems, and special made climbing prostheses can be used to break down barriers to participation for climbers with disabilities, among many other adaptations and considerations (De Luigi & Cooper, 2014; Denq & Delasobera, 2017; Lundberg, Taniguchi et al., 2011; Outdoors For All, 2019; Paradox Sports, 2015).

Research regarding adaptive climbing is limited, but participation in adaptive rock climbing was linked to physical fitness benefits in people with intellectual disabilities (Bibro & Żarów, 2021) and increase social participation in children with autism spectrum disorder (Oriel et al., 2018) and cerebral palsy, as well as improve motor skills in children with cerebral palsy (Christensen at al., 2017). Adaptive climbing was also found to improve physical being, psychological being, physical belonging, community belonging, practical becoming, and leisure becoming aspects quality of life in an individual with spinal cord injury (DelGrande et al., 2020). In these studies on adaptive climbing, the interventions all took place in an indoor climbing gym. With constraints for people with physical disabilities, this approach can aptly instruct individuals on accessibility through adaptive climbing gear and familiarize them with climbing in general,

techniques, and safety measures in a more controlled environment before transitioning outdoors (Paradox Sports, 2015). Adaptive climbing outside can have an intense effect on body awareness and identity in climbers with multiple sclerosis, evident by a renewed sense of self (Calsius et al., 2015). In fact, leisure participation in general is in important part of identity formation for people with disabilities (Kleiber, 1999) and individuals with disabilities are likely to transition from an external locus of control to an internal locus of control after adaptive sport participation (Hutzter & Bar-Eli, 1993).

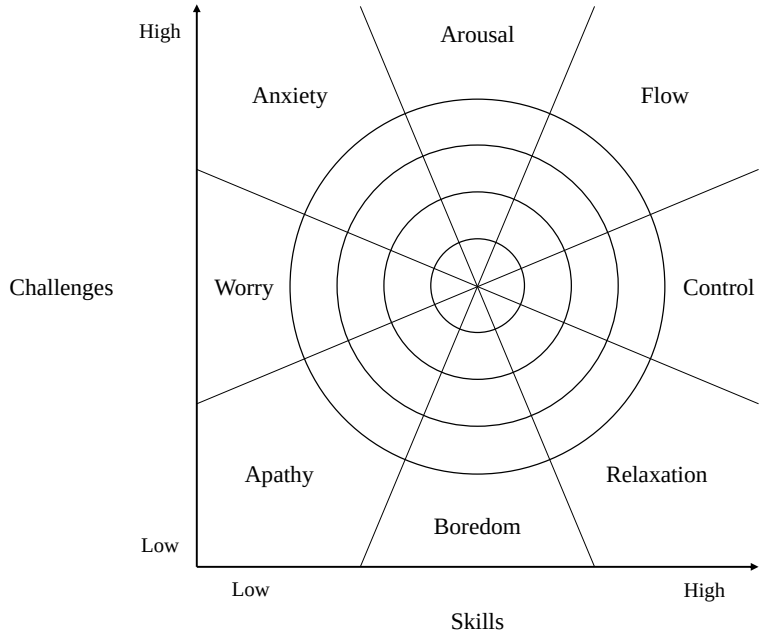
Flow

Csikszentmihalyi (1990) defines flow as "the state in which people are so involved in an activity that nothing else seems to matter" (p. 4). Flow is experienced similarly by everyone, regardless of gender, age, culture, or activity (Nakamura & Csikszentmihalyi, 2012). The flow state is marked by nine different dimensions, three antecedents and six characteristics that define the experience (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). These dimensions are the balance of challenge and skill, well-defined goals, clear feedback, total concentration on the task, time distortion, combination of action and awareness, sense of self-control, loss of self-consciousness, and intrinsic motivation (Csikszentmihalyi, 1975, 1990; Nakamura & Csikszentmihalyi, 2012). Flow, as a construct, is commonly analyzed through two separate lenses: a multidimensional model and unidimensional model (Jackson & Eklund, 2002; Jackson et al., 2010). The multidimensional approach to flow takes each of the nine factors into account individually and provides more detail into the experience of flow. On the other hand, the unidimensional model provides a global concept of flow that is gathered from the nine factors necessary for flow to occur (Jackson et al., 2010).

For flow to occur, there must first be a balance between challenge of the activity and an individual's perceived skill level (Csikszentmihalyi, 1990). At the most basic level, when the challenge at hand is too high for someone's skill level, anxiety is experienced. When the challenge is too low for the skill level, boredom is experienced (Nakamura & Csikszentmihalyi, 2012). People also report feeling more energetic, blissful, and creative when both challenge and skill are high (Csikszentmihalyi & LeFevre, 1989). The original model included only anxiety and boredom but has been expanded to include more states, such as worry, apathy, relaxation, and control as the understanding of flow theory has become more comprehensive over time (see Figure 1) (Nakamura & Csikszentmihalyi, 2012). Well-defined goals and clear, immediate feedback must also be present to bring about flow (Nakamura & Csikszentmihalyi, 2012). These two factors work together to create a feedback loop that allows an individual to adjust their current actions or continue to move closer to achieving flow (Csikszentmihalyi, 1975).

Figure 1

Model of the Flow State



Note. Emotions experienced depending on the balance between an individual's perceived skill level and the perceived level of challenge. Adapted from Nakamura, J. & Csikszentmihalyi, M. (2012). Flow theory and research. In Snyder, C. R., & Lopez, S. J. (Eds.), *The Oxford Handbook of Positive Psychology* (2nd ed., pp. 195-206). Oxford University Press. https://doi.org/10.1093.oxfordhb/9780185187243.013.0018. Copyright 2012 by Oxford University Press. Adapted with permission.

Once the challenge-skill balance is met, coupled with distinct goals and direct feedback, an individual enters the flow state and experiences total concentration on the task, combination of action and awareness, time distortion, sense of self-control, loss of self-consciousness, and intrinsic motivation (Csikszentmihalyi, 1975, 1990; Nakamura & Csikszentmihalyi, 2012). When in flow, an individual is focused solely on the current activity and is not concerned with

normal, day-to-day life, including any unpleasant thoughts or feelings (Csikszentmihalyi, 1990). With absorption in the task, an individual's action and awareness combine into one and there is no longer a distinction between themselves and the movements they are making (Csikszentmihalyi, 1990). With this characteristic, Csikszentmihalyi (1975, 1990) describes that actions become almost instinctive. Closely linked with the blending of action and awareness, time distortion is also experienced in the flow state (Csikszentmihalyi, 1975). Time may either seem to speed up or slow down, depending on circumstances of the activity (Csikszentmihalyi, 1975; 1990). The sense of self-control that occurs within flow involves a lack of concern about losing control (Csikszentmihalyi, 1990) and the belief that the individual will know how to respond to whatever happens next in the task at hand (Nakamura & Csikszentmihalyi, 2012). Loss of self-consciousness includes the loss of "the concept of self" (Csikszentmihalyi, 1990, p. 64), the key details of how people identify themselves, and often the sense of merging with the environment (Csikszentmihalyi, 1990). Last, intrinsic motivation, or the autotelic experience, is a key factor that occurs with the experience of a flow state (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). The activity is rewarding in and of itself and any extrinsic benefits do not matter (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012).

Flow and Individuals with Disabilities

Since disability may influence some of the dimensions of flow, namely the balance between challenge and skill (Loy et al., 2023), individuals with disabilities may experience a flow state differently than people without disabilities (Sutton, 2009). Sutton (2009) also suggests that different factors, such as constraints to participation and increased self-consciousness, may contribute to a different experience of the flow state. In people with disabilities, flow has been facilitated in people with intellectual disabilities through a music intervention (Soltani et al,

2011), in individuals with neurological disorders in a variety of interventions (Ottiger et al., 2021), and in people with physical disabilities through adaptive sports (Sutton, 2009) and dance (Swaine et al., 2020). In individuals with intellectual and neurological disorders, the importance of matching challenge and skill was concluded to be one of the most important predictors of the flow state (Ottiger et al., 2021; Soltani et al., 2021), echoing the significance established by Csikszentmihalyi (1990). Recreational therapists should also purposefully design interventions tailored to appropriately challenge people with disabilities (Ellis et al., 1983; Stumbo & Peterson, 2009). Therapeutic use of flow includes two approaches, either specifically creating an environment to promote the experience of flow or assist individuals in discovering activities that can facilitate flow for the individual (Nakamura & Csikszentmihalyi, 2012). Fostering flow in people with disabilities can create more meaningful leisure experiences (Ellis et al., 1983; Stumbo & Peterson, 2009)

Study Objectives

Little research exists on people with disabilities' experiences of flow, especially in physical activity contexts, and very little research exists on outcomes of adaptive climbing. Despite this, adaptive climbing and other adventure-based activities are used to promote quality of life in people with physical disabilities (e.g., DelGrande et al., 2020; Dorsch et al., 2016). Climbing has also been shown to facilitate a flow state as famously studied by Csikszentmihalyi (1975; 1990). As a result, there is a wealth of published literature on the investigation of flow and climbing without disabilities (e.g., Boudreau et al., 2022; Csikszentmihalyi, 1975; 1990; Kiewa, 2001; Schattke et al., 2014). However, no research related to flow and climbing with disabilities exists to date. This discrepancy in research is surprising, especially with the long history (almost 50 years) of research on flow and climbing and the growing popularity of

adaptive climbing in the past decade (Denq & Delasobera, 2018). Flow also has a long history of being a conceptual foundation to RT practice (Peterson & Stumbo, 2009); however, little research on flow and disabilities exists for theoretical support. Filling these gaps in the literature can help recreational therapists discover how their clients may experience flow and how a flow state can be facilitated with understudied interventions like adaptive climbing. To begin to address these gaps, the purpose of this study was to use survey design to determine if climbers with and without physical disabilities experienced flow differently and if flow had the potential to act as a motivating factor for future leisure participation. With these goals in mind, this study addressed the following research questions:

RQ1: Do people with physical disabilities experience flow differently than people without physical disabilities while climbing?

RQ2: Do higher scores on the Flow State Scale-2 predict intentions to continue participation in rock climbing for people with disabilities?

Methods

Study Design

The primary purpose of this study was to empirically evaluate whether people with disabilities experience flow differently than people without disabilities in a sample of climbers. The Flow State Scale-2 (FSS-2, Jackson & Eklund, 2002), a self-report Likert scale questionnaire, was used to assess flow and additional items were added to measure intentions for continued participation. The use of a self-report questionnaire, administered after participation, allowed participants to fully engage in and focus on climbing and did not disrupt performance (Jackson & Eklund, 2002). Likert scales are a useful way to measure concepts that cannot be directly observed (Jebb et al., 2021), like those experienced in flow. Questionnaires also ensure that each participant answered the exact same prompts, but there may have been bias in responses, such as participants either choosing only or avoiding choosing the extreme options, strongly disagree and strongly agree (Babbie, 2021).

This study was cross-sectional since data were collected at one point in time (Babbie, 2021; Creswell & Creswell, 2018), after participation in climbing. The questionnaires were administered in-person to aid participants in responding, if needed, and mitigate the potential for low response rates often found in electronic questionnaires (Babbie, 2021; Jones et al., 2013). In addition, administering the questionnaire in person allowed the researcher to ensure that responses are collected immediately after the experience to prevent forgetting key details of their experience through memory decay (Brown, 1958). This type of administration also has some weaknesses, mainly monetary and time-related costs (Jones et al., 2013); printing out each questionnaire is potentially more costly than electronic administration and time expensive. Time and financial costs also included researcher travel to facilitate the questionnaire in person.

Setting

The study took place at indoor climbing gyms across the Southeastern United States. The researcher partnered with a non-profit organization that was started and is directed by a recreational therapist. The organization facilitates adaptive indoor and outdoor climbing, cycling and mountain biking, kayaking, and skiing for people with physical disabilities. Its primary mission is to make adventure activities more accessible for people with physical disabilities and encourage positive change through participation and inclusion. Indoor adaptive climbing programs are offered at ten different locations in North Carolina, Georgia, Alabama, Tennessee, Kentucky, and Virginia. Each location hosts an adaptive climbing workshop at least once a month, open to all ability and skill levels. The director of the organization provided written support for this study (see Appendix A). The researcher also had access to the same climbing gyms and the climbing wall of a university located in the Southeastern U.S. to sample climbers without disabilities.

Population and Sample

This study sought to recruit climbers with and without disabilities to analyze the experience of flow. To evaluate the differences between these two groups, the researcher aimed to collect a minimum of 30 responses from each group to reach a target sample size of at least 60 total. The target sample size (N=60), 30 responses from each group, was selected since this number is generally enough to represent normal distribution for most populations (Memon et al., 2020). A criterion purposeful sampling method was used in this study to ensure that participants met a set condition required by the study (Babbie, 2021; Palinkas et al., 2015): (a) adult climbers with physical disabilities, (b) able to read and write in English, and (c) individuals who had climbed at least once on the day of sampling. In addition, convenience sampling, a type of

nonprobability sampling that relies on who is available (Babbie, 2021), was used to recruit (a) adult climbers without disabilities, who can (b) read and write in English, and (c) who had climbed at least once on the day of sampling.

Protection of Use of Human Subjects

This study was approved as certified exempt by the University and Medical Center Institutional Review Board (IRB) in January 2023 (see Appendix B). An informed consent letter was provided to participants in the study with the instrument (see Appendix C).

Instrumentation

The questionnaire, administered by the researcher and adaptive sports organization volunteers, included sections on demographics, flow, and participation (see Appendix D). A description of each section follows.

Demographics

In addition to gathering data on flow and motivation, participant demographics were collected in this study. Demographic information included an event identification number, location, event (e.g., adaptive or non-adaptive climbing), minutes elapsed from end the of event to completion of questionnaire, age, gender, race, years participating in adaptive sports and recreation, total number of climbing sessions, times climbed that day, type of disability, and years with disability. The event identification number was used in place of the participant's name to ensure confidentiality. Time elapsed was recorded to make sure the questionnaire appropriately reflected the participant's state after climbing, a similar practice to previous studies (Jackson & Eklund, 2002; Jackson & Marsh, 1996; Sutton, 2009). The years participating and climbing-related questions were included to give insight into the participant's skill level. Age,

gender, and race was included to provide descriptive statistics of the study population. Type of disability was used to determine differences between the study groups.

Flow State Scale-2

Flow was measured using the physical version of the Long FSS-2, a 36-item scale aimed at assessing flow within a sports or performance context (Jackson & Eklund, 2002; Jackson et al., 2010). The FSS-2 is an update of the original Flow State Scale (FSS; Jackson & Marsh, 1996) with improved psychometric measurement of the flow state (Jackson & Eklund, 2002). The FSS-2 is designed as a self-report instrument to avoid disrupting participation in an activity (Jackson & Eklund, 2002), an important factor in measuring flow; Csikszentmihalyi (1975, 1990) describes the importance of total concentration in the flow state. After completion of an event, participants were prompted to reflect on their experience and rate their agreement, from strongly disagree to strongly agree, with the given statements on a five-point Likert scale.

Items and Dimensions. The FSS-2 was devised to assess flow as a global dimension and each of the nine factors of flow independently with four items dedicated to each dimension (Jackson & Eklund, 2002). See Appendix D for the nine dimensions of the FSS-2 and five sample items copyright approved by the publisher to exhibit for a thesis (Jackson et al., 2010).

Using a scale that can measure both uni- and multidimensional aspects of flow allows the researcher to ascertain a more comprehensive understanding of how flow is experienced (Jackson & Eklund, 2002). Jackson and Eklund determined that both the higher-order, unidimensional model and first-order, multidimensional model are supported, with the first-order model fitting marginally better, and recommend using the multidimensional model, noting that the unidimensional model can be used when useful to the study (e.g., examining both global flow

and the nine factors in one study). This study utilized both the uni- and multidimensional model for analyses.

Scoring and Interpretation. Responses from the FSS-2 are scored by averaging all nine of the item responses individually to obtain scores for each flow dimension (Jackson et al., 2010). The global flow score is calculated by adding all the dimensional scores together and dividing by nine, the number of dimensions. FSS-2 does not have a cut-off score to definitively conclude whether a participant experienced flow, but

> lower item average values indicate a stronger degree of disagreement with statements proposed and higher item average values indicate a stronger degree of agreement with statements proposed. Low agreement with statements indicative of a flow characteristic is suggestive that the person's experience was not substantively "flow-like" in nature. Conversely, strong endorsement of item statements indicates that the individual was undergoing a substantively "flow-like" experience.…
>
> The mid-range score of "3" on the state scales represents a "neither agree nor disagree" option. This moderate score may indicate some degree of endorsement of the item. It could, however, also indicate some ambiguity regarding relevance of the item to the person's experience of the activity under consideration. (Jackson et al., pp. 17-18)

Reliability. The internal consistency of the FSS-2 has been thoroughly tested in athletes with acceptable results (Jackson et al., 2010). Internal consistency, represented by Cronbach's alpha (α) is a measure of the reliability of an instrument that reflects how well the items relate and measure the same construct (American Psychological Association [APA], n.d.-c). Scores between .70 and .80 are generally considered acceptable (Bland & Altman, 1997), with a good score generally regarded as .80 or above (Taber, 2018). In the pilot testing of the FSS-2, Jackson

and Eklund (2002) calculated reliability estimates for the multidimensional model between .80 and .90 (*M*=.85) in the first study and between .80 and .92 (*M*=.87) in the cross-validation study. In another study, internal consistency of the FSS-2 was found to range from acceptable to good (α=.76 to α=.92), with an average score of .85 (Jackson et al., 2008). The FSS-2 has also shown to have evidence of reliability in people with disabilities participating in adaptive sports, with scores ranging from .80 to .90 (*M*=.84) (Sutton, 2009).

Validity. The FSS-2 has established evidence of validity in athletes without disabilities (Jackson et al., 2010) and was found to be somewhat valid in athletes participating in adaptive sports (Sutton, 2009). Evidence of construct validity, the ability of a scale to measure its intended concept (APA, n.d.-b), was first established in the FSS by basing the original instrument off Csikszentmihalyi's (1990) nine dimensions of flow, reviewing literature to determine appropriate wording for items, and through a panel of experts that assessed the original item pool (Jackson & Marsh, 1996; Jackson et al., 2010) to ensure that the scale accurately measured the flow. The FSS-2 was designed to improve the validity of the FSS as the understanding of the flow dimensions evolved over time (Jackson & Eklund, 2002; Jackson et al., 2010). New items were developed and statistically weaker items were changed in the FSS-2 to build upon the evidence of construct validity already established in the original FSS (Jackson et al., 2010). Confirmatory factor analysis, testing a scale to see if there is a relationship between the items and the underlying concept (APA, n.d.-a), was also used in the original FSS and FSS-2 to examine construct validity (Jackson & Marsh, 1996; Jackson & Eklund, 2002; Jackson et al., 2010). In the first study and cross-validation study of the FSS-2, Jackson and Eklund found that both models were supported through factor loadings, chi-square values, and goodness of fit measurements exhibiting that the scale is an appropriate measurement of flow in athletes. Through exploratory

factor analysis, Sutton (2009) discovered that initial analysis results indicated that only seven of the nine dimensions of flow loaded correctly in athletes with disabilities, and that cross loading was a problem with some of the factors. In the secondary analysis, correct factor loading was forced, and the two outliers were much closer to loading correctly (Sutton, 2009). Differences in factor loading in the adapted sport athlete population than other populations could be attributed to a distinctive experience of flow in people with disabilities (Sutton, 2009).

Intentions for Continued Participation

In addition to the FSS-2, four items were included to assess intentions for continued participation. A series of prompts for participants to rate how much they agree on a five-point Likert scale were included in the questionnaire (i.e., "I would like to climb indoors again") to remain consistent with the FSS-2. Two of the items aimed to gather intentions for climbing outside were scored as one item, depending on if the participant had climbed outside previously.

Data Collection

Following IRB approval, data were collected between January and March of 2023. The questionnaire was administered to participants in the adaptive climbing workshops and patrons of the climbing gyms where the agency hosted adaptive climbing workshops and the university climbing wall. Participants were given the informed consent form, instrument, and frequently asked questions document shortly after completion of an adaptive climbing workshop or climbing session. The researcher attended some of the agency's workshops during the collection period to build rapport with chapter coordinators and the target populations at each location, encourage participation in the study, and assist in questionnaire completion or answering questions regarding the study, as needed. Since participation in adaptive climbing workshops was limited in certain chapters ([Agency Contact], personal communication, September 26,

2022), volunteering for the monthly workshop in some of the locations could be integral to reaching the desired sample size. The researcher visited five of the nine chapters (Virginia, Tennessee, Georgia, and two in North Carolina) once during the data collection period. The researcher also trained an agency volunteer in these, and other locations, on administration of the questionnaire to recruit more participants.

Questionnaires were handed out to participants after climbing, with responses of the FSS-2 recommended to be completed within one hour of activity completion (Jackson et al., 2010). Time after completion of climbing to questionnaire administration varied widely in this study, from immediately after up to two hours, and 19 minutes on average. Pilot testing of the FSS-2 reported that it took around 25 minutes for people without disabilities to complete the questionnaire (Jackson & Eklund, 2002), and around 20 minutes for people with physical disabilities in Sutton's (2009) study. Based on this, the instrument used in this study was expected to take participants 20 to 25 minutes to complete and ended up taking participants anywhere from 5 to 25 minutes. When the researcher was present, participants were assisted in filling out the questionnaire as needed (e.g., reading the questionnaire out loud to visually impaired climbers). Organization volunteers from two locations (Tennessee and Georgia) administered questionnaires when the researcher was not present and mailed completed questionnaires to the researcher. These volunteers were provided with instructions on administration and gave participants the questionnaire in a concealed envelope. These envelopes included the informed consent sheet, instrument, and frequently asked questions (see Appendices C and D). Participants were to return the completed questionnaire back to the chapter coordinator in the envelope.

Data Analysis

Data were entered into a database using Jeffrey's Amazing Statistics Program 0.17.1 (JASP). Data were then reviewed for missing data or other errors. Normality of data from each group was assessed by looking at skewness, kurtosis, and the Shapiro-Wilk test, since it is more appropriate for smaller sample sizes (Mishra et al., 2019) and was found to be normal. Reliability of the FSS-2 subscales and participation items were tested and reported using Cronbach's alpha for the total sample and for each group. Analyses for research questions were then conducted.

The first research question used an independent samples *t*-test. A descriptive analysis of data was performed, reporting the average score and standard deviation for each subscale and total scale of the FSS-2. Differences of flow between groups was analyzed after calculating the dimensional flow scores, by finding the average score for each dimension and by adding together the dimensional flow scores and dividing by nine for the global flow score. Because the independent samples *t*-test assumes homogeneity of variance, the Levene's test was run to see if this assumption was violated (Wang et al., 2017). One flow dimension, control, violated this assumption and Welch's *t* was reported (Moser & Stevens, 1992). Once statistically significant differences were determined, a one-way analysis of variance test was run to see if climbing experience was associated with scores for that dimension for climbers with disabilities. Since there were statistical differences between groups, a post-hoc analysis was conducted using a Scheffé test.

The second research question used a linear regression. For the items to measure participation, a descriptive analysis was performed, reporting the sample size, average score, standard deviation, and the standard error for the climbers with disabilities group. To see if the flow experience predicted intentions for continued participation, a linear regression was

performed using the global flow score from the FSS-2 as the independent variable, and the average score from the intention to participate items as the dependent variable.

Results

This study sought to determine whether climbers with and without disabilities experience flow differently and if flow influences intentions for continued participation in climbing for climbers with disabilities. Participants completed a paper questionnaire in person that included a demographics section, the FSS-2, and four items aimed to assess intentions for continued participation, after climbing.

Reliability

In this study, internal consistency of the FSS-2 dimensional items was found to range between .55 to .93 for the total sample (M=.82). For the climbers with disabilities only, internal consistency was found to range from .61 to .93 (M=.82). For the climbers without disabilities, internal consistency was found to range from .55 to .92 (M=.67). The goal-related items had the lowest internal consistency in all three cases. Additionally, all time-related items correlated negatively with the questionnaire for the total sample and climbers without disabilities, while only the first two time-related items correlated negatively with the questionnaire for climbers with disabilities. Overall, the FSS-2 had evidence of good internal consistency in the total sample (α=.88) and when each group was looked at individually (i.e., α=.88 for climbers with disabilities and α=.87 for climbers without disabilities).

Four intention for continued participation items were formulated specifically for this study. Internal consistency for the total sample was not acceptable (α=.44) and items questioning intentions to climb outside were dropped. With the remaining two items, internal consistency for the total sample rose to 0.69 and was 0.56 for climbers with disabilities and 0.79 for climbers without disabilities. Data analysis was conducted using the revised two item scale.

Demographics

At the end of data collection, a total of 45 participants completed the questionnaire, which included 19 climbers with disabilities and 26 climbers without disabilities (see Table 1). Most of the participants were between the ages of 18 and 35 (*n*=32, 72.7%). One participant did not report their age. Over half of the participants were male (*n*=24, 53.3%). Most of the participants were White (*n*=31, 68.9%).

Of the climbers with disabilities, 13 different disabilities were either checked on the questionnaire or self-reported under "other". The most common were visual impairment (*n*=4, 21.1%), cerebral palsy (*n*=2, 10.5%), amputation (*n*=2, 10.5%), and Parkinson's disease (*n*=2, 10.5%). Other participant disabilities included spina bifida, traumatic brain injury, subarachnoid hemorrhage, dystonia, tremors, semi-paresis, multiple sclerosis, Ollier disease, and type 1 diabetes (*n*=1 for each these disabilities). Most of the participants had disabilities since birth (*n*=8, 44.4%) or for 16 or more years (*n*=4, 22.2%). One participant reported having their disability for less than a year (5.6%), two between one and five years (11.1%), and three between 6 and 10 years (16.7%). One participant did not report how long they had their disability.

Table 1

Participant Demographics (N=45)

Characteristic	Climbers with Disabilities		Climbers without Disabilities		Total Sample	
	n	%	*n*	%	*n*	%
Age						
18-25	5	27.8	16	61.5	21	47.7
26-35	6	33.3	05	19.2	11	25.0
36-45	1	5.6	02	7.8	3	6.8
46-55	3	16.7	0	-	3	6.8
56+	3	16.7	3	11.5	6	13.6
Gender						
Male	9	47.4	15	57.7	24	53.3
Female	10	52.6	11	42.3	21	46.7
Race						
White	10	52.6	21	80.8	31	68.9
African American	3	15.8	1	3.8	4	8.9
Asian/Pacific Islander	4	21.1	2	7.7	6	13.3
Hispanic	1	5.2	2	7.7	3	6.7
Other	1	5.2	0	0	1	2.2

Background: Climbing, Recreation, and Sports Experience

A majority of all the participants in the study were more experienced in climbing as indicated by checking the option they had 21 or more climbing sessions at the time of questionnaire administration (*n*=29, 64.4%) and the second highest group of climbers were newer to the sport as indicated by checking 1 to 5 sessions on the questionnaire (*n*=9, 20.0%) The same primary and secondary categories occurred for each group of climbers, where 42.1% (*n*=8) and 26.3% (*n*=5) of the participants with disabilities and 80.8% (*n*=21) and 15.4% (*n*=4)

without disabilities reported climbing 21 or more sessions and 1 to 5 sessions, respectively (see Table 2).

Another category asked on the questionnaire included years of participation in sports and recreation in general. Climbers with disabilities (*n*=19) participated in adaptive sports and recreation, on average, for six years (*SD*=4.75, Max=18, Min=0) and climbers without disabilities (*n*=26) participated in sports and recreation, on average, for 11 years (*SD*=13, Max=50, Min=0).

Table 2

Participant Climbing Experience (N=45)

Characteristic	Climbers with Disabilities		Climbers without Disabilities		Total Sample	
	n	%	*n*	%	*n*	%
Total Climbing Sessions						
1-5	5	26.3	4	15.4	9	20.0
6-10	3	15.8	0	-	3	6.7
11-20	3	15.8	1	3.8	4	8.9
21+	8	42.1	21	80.8	29	64.4

Flow State Scale – 2

The first objective of this study was to determine if people with disabilities experienced flow differently than people without disabilities in a sample of climbers. An independent samples *t*-test was used to analyze scores from the FSS-2 (see Table 3). The global flow score on the FSS-2 indicated that climbers with disabilities (*M*=4.0, *SD*=0.4) and climbers without disabilities (*M*=4.1, *SD*=0.4) both experienced a "flow-like" (Jackson et al., 2010, p. 18) state. Climbers without disabilities (*M*=4.3, *SD*=0.5) reported a statistically significant higher level of a sense of

control than climbers with disabilities (*M*=3.8, *SD*=0.8), *t*(43)=2.24, *p*=.045, *d*=0.65. Approaching significance, climbers without disabilities (*M*=3.8, *SD*=0.8) reported a higher merging of action and awareness than climbers with disabilities (*M*=3.3, *SD*=0.9), *t*(43)=1.80, *p*=.084, *d*=0.53. Additionally, approaching significance, climbers with disabilities (*M*=4.8, *SD*=0.3) reported feeling higher autotelic experience than climbers without disabilities (*M*=4.5, *SD*=0.6), *t*(34)=-1.77, *p*=.084, *d*=-0.53.

Table 3

Results of Independent Samples t-Test Comparing Flow State Scale-2 Scores

Flow Dimension	Climbers with Disabilities		Climbers without Disabilities		*t*(43)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Global Flow Score	4.0	0.4	4.1	0.4	0.67	.510	.201
Balance	4.2	0.6	4.2	0.6	-0.32	.750	-.097
Goals	4.3	0.5	4.3	0.5	-0.23	.819	-.069
Feedback	4.1	0.7	4.2	0.5	0.45	.652	.137
Control	3.8	0.8	4.3	0.5	2.24[a]	.045[*]	.652
Time	3.0	1.3	3.3	0.9	0.97	.339	.292
Merging	3.3	0.9	3.8	0.8	1.80	.084[†]	.534
Concentration	4.3	0.6	4.2	0.7	-0.36	.724	-.107
Consciousness	4.3	1.0	4.1	0.8	-0.64	.526	-.193
Autotelic	4.8	0.3	4.5	0.6	-1.77	.084[†]	-.534

[a]Welch's *t* reported due to factor violating homogeneity of variance assumption.

[*]$p<0.05$. [†]$p<0.10$.

Climbing Experience and Sense of Control

To better understand the difference in flow state experience, three one-way analysis of variance tests were performed to see if climbing experience was associated with sense of control dimension scores (see Table 4). For the climbers with disabilities, there was a statistically

significant difference between the total number of climbing sessions and control scores ($F(3,15)=3.43$, $p=.045$, $\eta_p^2=.407$). Post hoc analysis using the Scheffé post hoc criterion indicated that climbers with disabilities who reported one to five climbing sessions ($M=3.2$, $SD=0.3$) reported lower control scores than climbers with disabilities who reported 21 or more climbing sessions (($M=4.2$, $SD=0.6$), $p=.073$). Additionally, there was no statistically significant difference between the total number of climbing sessions and reported control scores for climbers without disabilities ($F(1, 24)=1.13$, $p=.298$, $\eta_p^2=.045$).

Table 4

Means, Standard Deviations, and One-Way Analysis of Variance in Control Dimension for Climbers With Disabilities

Measure	1-5		6-10		11-20		21+		$F(3,15)$	η_p^2
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Control	3.2	0.3	3.6	0.9	4.3	0.9	4.2	0.6	3.43*	.407

*$p<.05$.

Intentions for Continued Participation

The second objective of this study was to determine if scores on the FSS-2 predicted intentions for continued participation when considering people with disabilities in the sample of climbers. A linear regression analysis was utilized to determine the relationship (Table 5). Scores on the participation items indicated that climbers with disabilities intended to keep climbing ($M=4.9$, $SD=0.3$). Although not significant, there was a positive, linear relationship between the global flow score and intentions for continued participation scores for climbers with disabilities ($R^2=0.12$, $F(1,17)=2.29$, $p=.150$) although not statistically significant. The small subsample of climbers with disabilities likely limited the statistical power of the analysis. However, when considering the total sample in a secondary analysis, there was a statistically significant positive,

linear relationship between the global flow score and intentions for continued participation score (R^2=0.14, F(1,43)=6.74, p=.013).

Table 5

Regression Coefficients of Flow on Intentions for Continued Participation

Variable	*B*	β	*SE B*	*t*	*p*
Constant	3.75		0.44	8.55	<.001**
Global Flow	0.28	0.37	0.11	2.60	.013*

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

Discussion

The current study is the first to compare FSS-2 uni- and multidimensional scores of climbers with and without disabilities and investigated whether people with disabilities experienced flow differently than people without disabilities. The study also explored if the experience of flow predicts intentions for continued participation in climbing when considering participants with disabilities. Csikszentmihalyi's (1990) flow theory was a guiding framework. This study was cross-sectional in design and sampled 45 adult climbers, 19 with disabilities and 26 without. The FSS-2 was used to assess the experience of a "flow-like" (Jackson et al., 2010, p. 18) state among nine subscales and one global flow score. In addition to the FSS-2, two items were included to measure intention for future participation in climbing.

The results showed that both climbers with and without disabilities similarly experienced a "flow-like" (Jackson et al., 2010, p. 18) state while climbing indoors; however, there were differences among three subscales (i.e., autotelic and merging), with one being significantly different (i.e., control). The results also indicated flow likely predicts continued participation in climbing for climbers with disabilities. The following sections provide more discussion on these areas of the results.

Global Flow Experience

Overall, climbers with and without disabilities experienced flow largely the same in this study. Nakamura and Csikszentmihalyi (2012) state that flow can be experienced by anyone regardless of age, gender, class, culture, or activity. This study suggests that disability can be added as another demographic. A better understanding of how people with physical disabilities experience flow is an integral part of RT practice. In this study, climbers with and without disabilities experienced flow largely the same, with only the control dimension demonstrating a

significant difference between the two groups. On average, a flow-like state was experienced by participants, regardless of climbing experience, reinforcing Csikszentmihalyi's (1990) idea that flow occurs when both challenge and skill are matched and when there are well-defined goals coupled with clear, immediate feedback. These findings assume that climbers in this study experienced flow because they selected a climb at an appropriate difficulty to their perceived skill level that aligned with their distinct goals and received feedback as they climbed from both the actual experience itself and the encouragement of facilitators as support. Csikszentmihalyi (1990) explains that people with disabilities can experience flow through developing new and necessary skills.

Different barriers exist that prevent individuals with disabilities from sharing recreation experiences (Valet, 2018). In climbing specifically, each individual faces constraints intrinsic to the activity, fighting against gravity, regardless of ability and an importance is placed on equipment to overcome this constraint (Simone, 2021). Harnesses, ropes, and climbing-specific shoes are all pieces of "adaptive" equipment used by almost every climber to overcome individual limits. Adaptive climbing equipment specifically designed for individuals with disabilities or any other adaptation should be viewed no different than any other piece of climbing equipment, since it is used based on individual needs. Adaptive equipment for any recreation activity "levels the playing field" (p. 214) and actively breaks down barriers to participation (Lundberg, Taniguchi et al., 2011). Adaptive equipment has already been designed with the experience of flow in mind through a focus on creating an enjoyable experience by matching challenge and skill for participants (Aslaleem, 2020). Despite this, there is still a need for further exploration into the influence that specific adaptive equipment has on flow.

Sense of Control

The control dimension associated with flow is the sense that someone is able to control their own actions, with a focus on mastery (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). In this study, people with disabilities reported lower feelings of control than people without disabilities. Of note, Ottiger et al.'s (2021) meta-analysis found that individuals with neurological diseases also reported lower average scores in the control dimension than other flow dimensions within Jackson and Marsh's (1996) original Flow State Scale; however, they did not compare these scores to people without disabilities or look at the influence of experience in an activity. For climbers with disabilities, climbing experience influenced sense of control, with more experienced climbers reporting higher feelings of control than inexperienced climbers. Previous studies on control in climbing have included climbers with, on average, multiple years of experience (e.g., Csikszentmihalyi, 1975; Kiewa, 2001), and have not included anyone climbing for their first few times.

As expected, a climber with more experience would feel a better sense of control, with respect to personal mastery and competence. For an inexperienced climber, there is a lot of new equipment, gear, and climbing techniques to learn and become familiar. In this study, climbers without disabilities showed no statistically significant difference between experience and control; however a statistical difference did show for those with disabilities between less experience and less sense of control. As mentioned above, adaptive equipment can level the playing field, but experience may play a role here in Csikszentmihalyi's (1990) paradox of control. He states,

> what people enjoy is not the sense of being in control, but the sense of exercising control in difficult situations. It is not possible to experience a feeling of control unless one is willing to give up the safety of protective routines. Only when a doubtful outcome is at

stake, and one is able to influence that outcome, can a person really know whether she is in control. (p. 61)

In relation to their own sense of control, the more inexperienced climbers with disabilities may have felt overwhelmed with a variety of aspects more than the climbers without disabilities, like, trying something new, the environment of the climbing gym, or placing trust in another individual to belay them. Interestingly, experienced climbers with disabilities reported similar feelings of control as climbers without disabilities, indicating an increased sense of control with more climbing experience. This indicates that experience and number of times engaging in an activity, even noted as risky such as climbing, is impactful in establishing a sense of control for people with disabilities. Physical activity participation has shown to increase people with disabilities' sense of physical control (Blinde & McClung, 1997; Imrie, 2000). This could explain why more experienced climbers with disabilities scored similarly to climbers without disabilities.

In climbing, control has been divided into two different themes: self-control related to competence and mastery and climbing as a space of personal control (Kiewa, 2001). As previously discussed, this first aspect of self-control is strongly related to the premise of flow (Csikszentmihalyi, 1990), with more experienced individuals (with or without disabilities) in any activity likely to feel a higher sense of control, specifically in climbing. While this relationship exists, people with disabilities with less experience may feel little control due to different constraints (Imrie, 2000). Disability and lack of experience in an activity may compound to further reduce feelings of control. Since physical activity participation is linked to promote a higher sense of control (Blinde & McClung, 1997; Imrie, 2000), participation in any physically

active flow activity could increase sense of control. A sense of control is a vital part of a leisure lifestyle (Stumbo & Peterson, 2009), furthering the importance of leisure participation.

The second aspect of control identified involves climbing serving as a space to exercise personal control of actions, acting as an almost safe space (Kiewa, 2001). In fact, leisure participation, in general, gives opportunities for individuals to implement personal control (Stumbo & Peterson, 2009). Individuals with spaces to exercise their personal control, like in leisure and recreation, are more likely to have an internal locus of control versus an external locus of control (Stumbo & Peterson, 2009). Individuals with physical disabilities also shift their locus of control more internally after adaptive sport participation (Hutzter & Bar-Eli, 1993). In this study, climbers with disabilities may have already experienced a shift in locus of control, compared to more inexperienced participants. Additionally, Kleiber (1999) asserts that leisure participation is in important part of identity formation. In addition, Calsius et al. (2015) found that climbing plays a role in helping shape identity for individuals with disabilities. Other outdoor leisure pursuits also increase feelings of control and influence identity in people with disabilities (Burns et al., 2013). With this in mind, increased feelings of control lead to empowerment (Dempsey & Foreman, 1997), which is often a main outcome in RT service.

Merging of Action and Awareness

The results also showed climbers with and without disabilities differed in the merging of action and awareness, though not statistically significant. Climbers with disabilities reported marginally lower merging of action and awareness than climbers without disabilities. The combination of action and awareness in the flow state involves movements becoming instinctive (Csikszentmihalyi, 1990). Disability can influence body awareness, shifting from being in the background to constantly in the foreground (Calsius et al., 2015). This shift separates one's body

from their mind, no longer being “something I am, but just something I have” (p. 2394). Because of this, climbers with disabilities in this study may have struggled with making the correct movements automatically due to their condition when climbers without disabilities did not, resulting in lower scores on the questionnaire.

The act of climbing heavily relies on multiple specific, repeatable movements (Christensen et al., 2017). Disabilities that affect movement and motor abilities, like those reported by participants in this study, may have led participants to be more conscious of making actions while climbing and less fully absorbed in the activity. Most climbers with disabilities in this study were visually impaired, which can add another layer to merging of action and awareness. For these participants, the belayer, or another person, acts as a guide and instructs the climber on the location of handholds and footholds (Simone & Galatolo, 2019). In this case, mutual understanding is required between the climber and the guide to execute the climb (Simone & Galatolo, 2019; Simone, 2021). Climbers with visual impairments perform their actions based on the instructions given by the guide and guides must provide instructions that match the motion of the climber (Simone & Galatolo, 2019). The unique feedback loop formed between both the climber and guide may also influence a climber’s merging of action and awareness based on the directions given by the guide.

Autotelic Experience

In this study, climbers with disabilities scored marginally higher for autotelic experience than climbers without disabilities. The autotelic experienced in flow encompasses the idea that the activity is intrinsically rewarding or is an end in itself (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). A rewarding and enjoyable experience is integral to the flow state (Csikszentmihalyi, 1990) and the autotelic experience dimension of flow had the highest

agreement for all climbers in this study. Though not explicitly analyzed, scores on the FSS-2 indicate that all participants had a gratifying experience. Best described by Csikszentmihalyi (1990) quoting a climber, "'the mystique of rock climbing is climbing…there is no possible reason for climbing except the climbing itself'" (p. 54). Echoing this sentiment, Richman (2020) shares that climbers with disabilities state that climbing increased their happiness. Simply put, climbing is just plain fun. Similar feelings are expressed after participation in other outdoor adaptive sports (Lundberg, Taniguchi et al., 2011).

As mentioned, climbers with disabilities reported feeling a slightly higher autotelic experience in this study, although not statistically significant. Csikszentmihalyi (1990) presents that individuals with acquired disabilities report their disability as one of the most negative and positive things in their lives by providing clarity and purpose, with respect to flow activities. Kleiber (1999) expands this idea affirming that leisure should play an integral role in adjustment and transformation. Lundberg, Taniguchi et al., (2011) recount hearing individuals with disabilities say that participation in outdoor adaptive recreation was life changing through truly meaningful participation. Calsius et al. (2015) reported that participation in adaptive climbing offers a renewed sense of self. While similar experiences of identify formation and a renewed sense of self are mirrored in climbers without disabilities (Hardie-Bick & Bonner, 2016), these individuals likely did not experience the same barriers to participation that climbers with disabilities did. Overcoming barriers and constraints, not in place for individuals without disabilities, may have led climbers with disabilities in this study to have a more meaningful experience, resulting in increased enjoyment.

Flow and Participation

The experience of flow has shown to promote continued participation in flow facilitating activities (Csikszentmihalyi, 1975). In this study, experience of a "flow-like" (Jackson et al., 2010, p. 18) state appears to predict intentions to continue climbing. Since a flow state offers so many benefits, like an increase in well-being and quality of life (Boudreau et al., 2020; Stumbo & Peterson, 2009), this information can be used to help recreational therapists plan interventions. Leisure plays an important role in life satisfaction (Stumbo & Peterson, 2009) and utilizing interventions aimed to increase leisure awareness, education, and participation are paramount to RT practice. With the barriers to leisure participation that people with disabilities face (e.g., Burns et al., 2013; Dorsch et al., 2016; Lundberg, Bennett, & Smith, 2011; Madsen et al., 2021; Menzies et al., 2021), they are less likely to be physically active and participate in recreational activities (Caldwell & Gilbert, 1990). The importance of leisure and recreation participation has long been established, and people with disabilities are entitled to meaningful recreation experiences (Stumbo & Peterson, 2009).

This study focused solely on climbing, and while that might not be the activity for everyone, the knowledge that experiencing flow can lead to continued participation is foundational to RT practice and outcomes. Csikszentmihalyi (1975) expresses a similar notion, telling everyone to climb is not a solution since each individual is different, but that a better understanding of flow lays the groundwork for an intentional shift in society. At its heart, RT is client-centered and based off client strengths and preferences. Knowing that flow is the optimal experience, recreational therapists should select interventions for their clients to promote this experience. Nakamura and Csikszentmihalyi (2012) state that flow can be experienced *regardless of activity.* Therefore, flow is individualized, making this another concept that is

foundational to RT. Flow, as a therapeutic outcome, should be in the forefront of every practitioner's mind when implementing interventions. Nakamura and Csikszentmihalyi identify that there are two types of interventions aimed at fostering flow: those that shape the experience and environment and those that assist individuals in finding flow. RT interventions could fall into either, or both, of these types. Ellis (1983) states that recreational therapists should foster an environment that is best to facilitate flow, focusing on the matching the client's perceived skill with the perceived challenge. Once someone is more familiar with leisure activities, they can shift from having an environment constructed to facilitate flow to finding flow for themselves. Nakamura and Csikszentmihalyi (2012) state that the ultimate goal of interventions is not to directly create flow, but to enable individuals to recognize activities they enjoy.

Implications for Practice

Ellis's (1983) discusses the importance of flow as a goal in RT. With a better understanding of how people with physical disabilities experience flow, practitioners can better design interventions to facilitate this experience. Recreational therapists play an important role in intervention design and set the stage for flow to occur (Ellis, 1983; Stumbo & Peterson, 2009) and should be aware of what they need to do to better promote flow. This study highlights the importance of people with disabilities' sense of control in flow, especially when participating in newer activities or interventions. While not specifically studied, control could be even more important in more novel interventions, like climbing or other adventure-based activities. Control also plays an important role in goal setting during assessment, planning, and implementation in the RT process, and should be considered for any intervention. Also, while this study did not assess climbing as an intervention, practitioners should further investigate using climbing to promote physical and social benefits. Since people with disabilities are often less active and

participate less in recreational activities, "flow activities" (Csikszentmihalyi, 1975, p. 74), like climbing, should be used to promote continued participation.

Future Research

Future research should focus on recruiting more participants to increase the generalizability of the results in similar studies. More research could investigate the impact that climbing experience has on the different dimensions of flow for people with disabilities. Additionally, an approach using qualitative methods could be taken in future studies to gain first-hand insight into experiences of climbers with disabilities. The items used to assess intentions for continued participation in this study had poor reliability and an instrument with more established evidence for reliability and validity should be used in further studies looking at participation. Future studies could also explore if different adaptive climbing equipment or setting, indoors versus outdoors, has an influence on experiences while climbing.

Limitations

This study was not without limitations, and many can be attributed to study design and setting. This study had a relatively small population (N=45) and reduces its broad generalizability. In addition, flow is reported to be a difficult experience to measure (Jackson & Elkund, 2002) and omission of open-ended questions on the questionnaire could have possibly led to exclusion of useful information about the flow state in climbing. There is also very little research on flow and people with disabilities and even less on adaptive climbing. This study was the first of its kind and there were not any similar studies on which to build. The main instrument used, the FSS-2, has good evidence of reliability, but limited testing within disability populations (Sutton, 2009) and could have restricted conclusions from being drawn from the collected data. Additionally, more specific wording of some demographic questions, specifically interested in

all recreation and sports experience, could have led to participants responding more accurately. The time after climbing to questionnaire completion varied widely in this study and may have influenced accurate recall of the experience. Last, with regards to the challenges-skill component of flow, the level of difficulty of climbs that climbers in both groups chose to attempt could not have been controlled and could have influenced whether flow was experienced.

Conclusion

This study sampled the flow experience in climbers with and without disabilities and identified the sense of control dimension of flow as a distinct difference between the two groups, with merging of action and awareness and autotelic experience also differing. Despite these differences, climbers with and without disabilities experienced flow similarly overall. Climbing experience was discovered to influence feelings of control in climbers with disabilities, with inexperienced climbers reporting a lower sense of control than experienced climbers. The experience of flow was also found to predict intentions for continued participation in all climbers. While sample size reduces generalizability of these results, this study provides insight into the relationship between disability and flow. Recreational therapists should be aware of how flow can best be used in treatment to promote an active leisure lifestyle.

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SECTION II: EXTENDED LITERATURE REVIEW

Recreational Therapy Adventure-Based Interventions

Leisure has been recognized as an important part of daily life (Caldwell & Gilbert, 1990), with participation in outdoor recreational activities on the rise for the past decade (Outdoor Foundation, 2022). People with disabilities have lower participation rates in leisure activities (Blauwet et al., 2017; Lape et al., 2018; Madsen et al., 2021; Yazicioglu et al., 2012), and much of their leisure time is spent indoors (Labbé et al., 2019). Participation in physical activity has long been established to improve quality of life and life satisfaction (Blauwet et al., 2017; Carless et al., 2014). Additionally, participation in outdoor recreation has shown to have a positive influence on physical health, well-being, and social involvement among other positive outcomes (Dorsch et al., 2016; Madsen et al., 2017; Menzies et al., 2021).

RT is a unique field positioned to facilitate the use of adventure-based interventions in people with disabilities (Groff, 2016; Hatala, 2016) by providing satisfaction through recreational activities and enabling individuals to apply skills learned to everyday life (Caldwell & Gilbert, 1990; Groff, 2016). These types of interventions, commonly called adventure therapy, use adventure or outdoor activities to achieve treatment goals (Groff, 2016; Hatala, 2016). Adventure therapy is most used as an intervention in behavioral and mental health settings (Groff, 2016; Hatala, 2016), but adapted outdoor activities can benefit people with physical disabilities (Dorsch et al., 2016; Lundberg, Bennett, & Smith 2011). Programs dedicated to facilitating adventure therapy and adventure-based activities and interventions exist across the United States (e.g., Catalyst Sports, National Ability Center, Adaptive Sports Center, Common Ground Outdoor Adventures), and provide a wide range of interventions like rock climbing, high ropes courses, paddling, skiing, and hiking. These interventions offer benefits to physical,

psychological, and social functioning for individuals with disabilities (Labbé et al., 2019; Madsen et al., 2021).

Physical Disabilities and Adventure-Based Interventions: Barriers and Benefits

People with disabilities face barriers to leisure participation, including physical, attitudinal, social, programmatic, and transportation barriers (Burns et al., 2013; Dorsch et al., 2016; Lundberg, Bennett, & Smith, 2011; Madsen et al., 2021; Menzies et al., 2021). Physical barriers are architectural parts of both a manmade or natural environment that either inhibit or block mobility (CDC, 2020, September 16). A common physical barrier to adventure-based interventions includes lack of accessibility (Dorsch et al., 2016; Menzies et al., 2021). Attitudinal barriers stem from how society views disability and can include making assumptions and stigmatizing an individual based on their disability (CDC, 2020, September 16). In outdoor activities, attitudinal barriers include placing misguided limitations on an individual's abilities based on perceptions of functioning, most often associated with risks related to adventure activities (Burns et al., 2013; Dorsch et al., 2016). Social barriers relate to the spaces in which people live, learn, and work (CDC, 2020, September 16). Lack of support from family members, friends, and teachers are social barriers that can restrict inclusion and participation (Dorsch et al., 2016). Programmatic barriers, like expensive adaptive or accessible equipment (Menzies et al., 2021) and lack of knowledge of opportunities (Dorsch et al., 2016), limit delivery of adventure-based interventions. Lack of transportation options also act as barriers in adventure contexts (Caldwell & Gilbert, 1990; Dorsch et al., 2016; Menzies et al., 2021). There is an expressed need for broad-scope changes to be made regarding accessibility to outdoor spaces and access to adaptive equipment (Menzies et al., 2021). Despite these constraints, participation in adapted

outdoor activities were found to offer opportunities for individuals with disabilities to overcome social and attitudinal barriers (Madsen et al., 2021).

Adventure-based interventions offer the opportunity for individual with physical disabilities to challenge their perceptions, which can have a profound impact on an individual's self-concept (Beringer, 2004; Caldwell & Gilbert, 1990; Groff, 2016). Self-concept involves the fundamental beliefs, thoughts, and feelings an individual has about themselves (Gecas, 1982). This sense of self is tied to identity, with participation in adaptive outdoor sports and recreation shown to influence a redefinition of identity and offer full self-expression in individuals with physical disabilities (Burns et al., 2013; Lundberg, Taniguchi et al., 2011) A change in thoughts about oneself can enable an individual focus on their abilities instead of limitations (Burns et al., 2013; Calsius et al., 2015; Madsen et al., 2021). For individuals with acquired disabilities, outdoor-based rehabilitation has helped in reforming their identities (Beringer, 2004). RT services can be used to offset some of the barriers to participation and promote meaningful change within individuals with physical disabilities (Beringer, 2004). Focusing on empowerment, recreational therapists can counteract constraints and facilitate growth through adventure-based interventions. This fact can be paramount for treatment in people with physical disabilities (Beringer, 2004; Madsen et al., 2021).

Adaptive Climbing

Rock climbing is currently used as a therapeutic intervention, primarily for its mental health benefits (Austin, 2018; Frühauf et al., 2021) In individuals without physical disabilities, climbing has shown to improve upper body and core strength, overall fitness, and emotional health (DelGrande et al., 2020; Frühauf et al., 2021). Adaptations to outdoor activities are becoming increasingly common, making climbing accessible to various populations (Denq &

Delasobera, 2017). Equipment like adaptive harnesses, pulley systems, and special made climbing prostheses can be used to break down barriers to participation for climbers with disabilities, among many other adaptations and considerations (De Luigi & Cooper, 2014; Denq & Delasobera, 2017; Lundberg, Taniguchi et al., 2011; Outdoors For All, 2019; Paradox Sports, 2015).

Research regarding adaptive climbing is limited, but participation in adaptive rock climbing was linked to physical fitness benefits in people with intellectual disabilities (Bibro & Żarów, 2021) and increase social participation in children with autism spectrum disorder (Oriel et al., 2018) and cerebral palsy, as well as improve motor skills in children with cerebral palsy (Christensen at al., 2017). Adaptive climbing was also found to improve physical being, psychological being, physical belonging, community belonging, practical becoming, and leisure becoming aspects quality of life in an individual with spinal cord injury (DelGrande et al., 2020). In these studies on adaptive climbing, the interventions all took place in an indoor climbing gym. With constraints for people with physical disabilities, this approach can aptly instruct individuals on accessibility through adaptive climbing gear and familiarize them with climbing in general, techniques, and safety measures in a more controlled environment before transitioning outdoors (Paradox Sports, 2015). Adaptive climbing outside can have an intense effect on body awareness and identity in climbers with multiple sclerosis, evident by a renewed sense of self (Calsius et al., 2015). In fact, leisure participation in general is in important part of identity formation for people with disabilities (Kleiber, 1999) and individuals with disabilities are likely to transition from an external locus of control to an internal locus of control after adaptive sport participation (Hutzter & Bar-Eli, 1993).

Dimensions of Flow

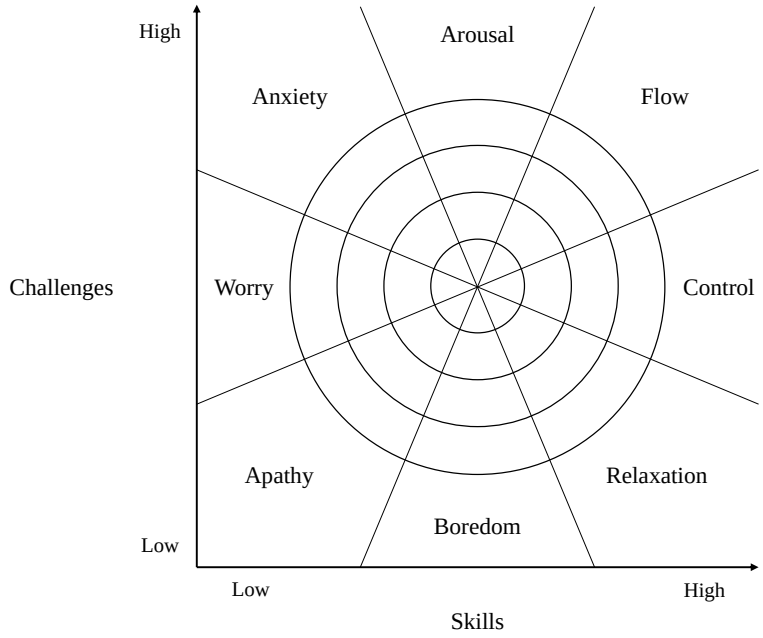
Csikszentmihalyi (1990) defines flow as "the state in which people are so involved in an activity that nothing else seems to matter" (p. 4). Flow is experienced similarly by everyone, regardless of gender, age, culture, or activity (Nakamura & Csikszentmihalyi, 2012). The flow state is marked by nine different dimensions, three antecedents and six characteristics that define the experience (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). These dimensions are the balance of challenge and skill, well-defined goals, clear feedback, total concentration on the task, time distortion, combination of action and awareness, sense of self-control, loss of self-consciousness, and intrinsic motivation (Csikszentmihalyi, 1975, 1990; Nakamura & Csikszentmihalyi, 2012). Flow, as a construct, is commonly analyzed through two separate lenses: a multidimensional model and unidimensional model (Jackson & Eklund, 2002; Jackson et al., 2010). The multidimensional approach to flow takes each of the nine factors into account individually and provides more detail into the experience of flow. On the other hand, the unidimensional model provides a global concept of flow that is gathered from the nine factors necessary for flow to occur (Jackson et al., 2010).

For flow to occur, there must first be a balance between challenge of the activity and an individual's perceived skill level (Csikszentmihalyi, 1990). At the most basic level, when the challenge at hand is too high for someone's skill level, anxiety is experienced. When the challenge is too low for the skill level, boredom is experienced (Nakamura & Csikszentmihalyi, 2012). People also report feeling more energetic, blissful, and creative when both challenge and skill are high (Csikszentmihalyi & LeFevre, 1989). The original model included only anxiety and boredom but has been expanded to include more states, such as worry, apathy, relaxation, and control as the understanding of flow theory has become more comprehensive over time (see

Figure 1) (Nakamura & Csikszentmihalyi, 2012). Well-defined goals and clear, immediate feedback must also be present to bring about flow (Nakamura & Csikszentmihalyi, 2012). These two factors work together to create a feedback loop that allows an individual to adjust their current actions or continue to move closer to achieving flow (Csikszentmihalyi, 1975).

Figure 1

Model of the Flow State



Note. Emotions experienced depending on the balance between an individual's perceived skill level and the perceived level of challenge. Adapted from Nakamura, J. & Csikszentmihalyi, M. (2012). Flow theory and research. In Snyder, C. R., & Lopez, S. J. (Eds.), *The Oxford Handbook of Positive Psychology* (2nd ed., pp. 195-206). Oxford University Press. https://doi.org/10.1093.oxfordhb/9780185187243.013.0018. Copyright 2012 by Oxford University Press. Adapted with permission.

Once the challenge-skill balance is met, coupled with distinct goals and direct feedback, an individual enters the flow state and experiences total concentration on the task, combination of action and awareness, time distortion, sense of self-control, loss of self-consciousness, and intrinsic motivation (Csikszentmihalyi, 1975, 1990; Nakamura & Csikszentmihalyi, 2012). When in flow, an individual is focused solely on the current activity and is not concerned with normal, day-to-day life, including any unpleasant thoughts or feelings (Csikszentmihalyi, 1990). With absorption in the task, an individual's action and awareness combine into one and there is no longer a distinction between themselves and the movements they are making (Csikszentmihalyi, 1990). With this characteristic, Csikszentmihalyi (1975, 1990) describes that actions become almost instinctive. Closely linked with the blending of action and awareness, time distortion is also experienced in the flow state (Csikszentmihalyi, 1975). Time may either seem to speed up or slow down, depending on circumstances of the activity (Csikszentmihalyi, 1975; 1990). The sense of self-control that occurs within flow involves a lack of concern about losing control (Csikszentmihalyi, 1990) and the belief that the individual will know how to respond to whatever happens next in the task at hand (Nakamura & Csikszentmihalyi, 2012). Loss of self-consciousness includes the loss of "the concept of self" (Csikszentmihalyi, 1990, p. 64), the key details of how people identify themselves, and often the sense of merging with the environment (Csikszentmihalyi, 1990). Last, intrinsic motivation, or the autotelic experience, is a key factor that occurs with the experience of a flow state (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012). The activity is rewarding in and of itself and any extrinsic benefits do not matter (Csikszentmihalyi, 1990; Nakamura & Csikszentmihalyi, 2012).

Flow and Individuals with Disabilities

Since disability may influence some of the dimensions of flow, namely the balance between challenge and skill (Loy et al., 2023), individuals with disabilities may experience a flow state differently than people without disabilities (Sutton, 2009). Sutton (2009) also suggests that different factors, such as constraints to participation and increased self-consciousness, may contribute to a different experience of the flow state. In people with disabilities, flow has been facilitated in people with intellectual disabilities through a music intervention (Soltani et al, 2011), in individuals with neurological disorders in a variety of interventions (Ottiger et al., 2021), and in people with physical disabilities through adaptive sports (Sutton, 2009) and dance (Swaine et al., 2020). In individuals with intellectual and neurological disorders, the importance of matching challenge and skill was concluded to be one of the most important predictors of the flow state (Ottiger et al., 2021; Soltani et al., 2021), echoing the significance established by Csikszentmihalyi (1990). Recreational therapists should also purposefully design interventions tailored to appropriately challenge people with disabilities (Ellis et al., 1983; Stumbo & Peterson, 2009). Therapeutic use of flow includes two approaches, either specifically creating an environment to promote the experience of flow or assist individuals in discovering activities that can facilitate flow for the individual (Nakamura & Csikszentmihalyi, 2012). Fostering flow in people with disabilities can create more meaningful leisure experiences (Ellis et al., 1983; Stumbo & Peterson, 2009)

Flow and Climbing

From interviews with rock climbers, Csikszentmihalyi (1975; 1990) describes how rock climbing is one of the ideal activities to experience a flow state. Climbing is considered a “deep play” (Csikszentmihalyi, 1975, p. 75) activity since the risks appear to outweigh the reward.

While climbing might seem senseless from an outside perspective, the danger serves as a channel to greater meaning for those who accept the risk (Csikszentmihalyi, 1975). The conceptualization of rock climbing as deep play fundamentally links the activity to the experience of flow since risk plays a role in many of the dimensions of flow (Csikszentmihalyi, 1975; Hardie-Bick & Bonner, 2016). The balance of challenge and skill is also associated with the risks of climbing and participants must judge their competence against the difficulty of the climb, either increasing or decreasing threats to their safety and, subsequently, the experience of flow (Csikszentmihalyi, 1975; Kiewa, 2001). Csikszentmihalyi (1975) posits that danger is an integral part of the climbing experience and as such, requires a sense of self-control and total concentration on the climb. Control over your own actions enhances flow in climbing (Hardie-Bick & Bonner, 2016) and promotes personal mastery (Kiewa, 2001; Nakamura & Csikszentmihalyi, 2012). Feeling self-control is a vital attribute in rock climbing (Kiewa, 2001) and allows a climber to receive feedback on performance in relation to completion of the goal, that is, if an individual feels like they are in control of their actions they are "doing well" (p. 85) in their performance and moving closer towards finishing the climbing route (Csikszentmihalyi, 1975). Total focus in climbing creates a connection between an individual and the environment, leading to the loss of sense of self (Csikszentmihalyi, 1975; 1990). This loss of self-consciousness when an individual is fully immersed leads to action and awareness combining into one movement, becoming automatic (Csikszentmihalyi, 1975; 1990). In the fusion of action and awareness, the passage of time seems to be altered (Csikszentmihalyi, 1990). In climbing, the speed of time passage is determined through the feedback received during the activity, with time seeming to pass faster when feedback on performance is positive and slower when feedback is negative (Csikszentmihalyi, 1975). Last, intrinsic motivation is essential in flow activities like climbing. Csikszentmihalyi

(1990) explains that "'the mystique of rock climbing is climbing…there is no possible reason for climbing except the climbing itself'" (p. 54). Intrinsic motivation to participate in risky, "deep play" activities is the key element to flow, and these autotelic experiences experienced in a flow state provide meaning and enjoyment (Csikszentmihalyi, 1975; 1990).

Flow and Intentions for Continued Participation

The experience of flow in an activity can provide a strong motivation for continued participation (Boudreau et al., 2020). Flow, as an experience, is intrinsically rewarding, leading individuals seek out activities that facilitate this state (Nakamura & Csikszentmihalyi, 2012). Activities that are rewarding in and of themselves are more likely to be repeated (Schüller & Brunner, 2009). Flow has been identified as a motivator for participation in adventure activities (Ewert et al., 2020; Frühauf et al., 2022), and is directly linked to continued participation in running (Schüller & Brunner, 2009). In addition, the balance between challenge and skill dimension of the flow state has also been identified to bring about participation (Frühauf et al., 2022).

The experience of flow can contribute to long-term participation in physical activity, with intrinsically rewarding activities more likely to be engaged in repeatedly (Schüller & Brunner, 2009). This information is vital from a RT perspective, as people with physical disabilities are less likely to participate in physical (Martin Ginis et al., 2021) and recreational activities (Blauwet et al., 2017; Lape et al., 2018; Madsen et al., 2021; Yazicioglu et al., 2012). The physical, psychosocial, and social benefits associated with physical activity (Blauwet et al., 2017; Carless et al., 2014) are compounded in adventure-based interventions (Dorsch et al., 2016). Considering the barriers to participation that individuals with disabilities face (Burns et al., 2013; Dorsch et al., 2016; Lundberg, Bennett, & Smith, 2011; Madsen et al., 2021; Menzies

et al., 2021), the experience of flow in different activities may be inhibited (Ellis et al., 1983). When constraints are so high that performance in participation is reduced, it is less likely that an activity will be intrinsically rewarding (Alsaleem, 2020). Adaptive equipment can, and should, be used to overcome barriers in adventure activities (Alsaleem et al., 2020; Menzies et al., 2021). Since technology already exists to make climbing more accessible (Denq & Delasobera, 2017; Outdoors For All, 2019; Paradox Sports, 2015), barriers to participation are reduced, leading to the potential for flow to be experienced. Through this flow state motivation for continued participation is found (Boudreau et al., 2020; Ewert et al., 2020; Frühauf et al., 2022).

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APPENDIX A: LETTER OF SUPPORT

November 4, 2022

Dear Ms. Warner,

[redacted] is a non-profit based in the southeast and provides over 1200 opportunities for individuals with physical disabilities to engage with us on an annual basis. Through various types of adaptive equipment, we are able to remove barriers and provide access to climbing, kayaking, and mountain biking. [redacted] adaptive climbing program is our flagship program with operations in 12 cities we believe everyone should have access to the walls that surround them. We have opportunities for first-time athletes to come and try all the way up to training for competitive athletes.

This letter is designed to express our full support for your research project. We would be more than happy to leverage our network for this project. Please contact me if you have any further questions.

Sincerely,

[redacted] CTRS / ATP
Founder / Executive Director
[redacted]

APPENDIX B: IRB APPROVAL

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
rede.ecu.edu/umcirb/

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Emily Warner
CC: Cari Autry
Date: 1/17/2023
Re: UMCIRB 22-002314
Perspectives on Flow: Using the Flow State Scale-2 to Compare Climbers With and Without Disabilities

I am pleased to inform you that your research submission has been certified as exempt on 1/15/2023. This study is eligible for Exempt Certification under category # 2a.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

Document	Description
[redacted] Volunteer Training.pdf(0.01)	Additional Items
[redacted] Workshop Schedule.pdf(0.01)	Additional Items
Consent Letter.pdf(0.02)	Consent Forms
Instrument.pdf(0.01)	Surveys and Questionnaires
Protocol.pdf(0.02)	Study Protocol or Grant Application
Thesis Proposal.pdf(0.01)	Study Protocol or Grant Application
Verbal Recruitment Script.pdf(0.02)	Recruitment Documents/Scripts

For research studies where a waiver or alteration of HIPAA Authorization has been approved, the IRB states that each of the waiver criteria in 45 CFR 164.512(i)(1)(i)(A) and (2)(i) through (v) have been met. Additionally, the elements of PHI to be collected as described in items 1 and 2 of the Application for Waiver of Authorization have been determined to be the minimal necessary for the specified research.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX C: INFORMED CONSENT FORM

Informed Consent to Participate in Research

Dear Participant,

I am a student at East Carolina University in the Recreation Sciences. I am asking you to take part in my research study entitled, "Perspectives on Flow: Using the Flow State Scale-2 to Compare Climbers With and Without Disabilities."

The purpose of this research is to determine if people with disabilities experience flow differently than people without disabilities while climbing. By doing this research, I hope to learn more about the impact of adaptive climbing**.** Your participation is completely voluntary. We will not be able to pay you for the time you volunteer while being in this study.

You are being invited to take part in this research because you have participated in an adaptive climbing workshop or are a non-adaptive climber. The amount of time it will take you to complete this survey is 20-25 minutes.

If you agree to take part in this survey, you will be asked questions that relate to your experience while climbing. Please take time to think about your answers and reflect purely on the ways you felt during your climbing session.

This research is overseen by the University and Medical Center Institutional Review Board (UMCIRB) at ECU. Therefore, some of the UMCIRB members or the UMCIRB staff may need to review your research data. However, the information you provide will not be linked to you. Therefore, your responses cannot be traced back to you by anyone, including me or study co-researchers.

Please call Emily Warner at 252-328-6064 for any research related questions. If you have questions about your rights when taking part in this research, call the University and Medical Center Institutional Review Board (UMCIRB) at 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, call the Director of Human Research Protections, at 252-744-2914.

You do not have to take part in this research, and you can stop at any time. If you decide you are willing to take part in this study, continue with the survey below.

Thank you for taking the time to participate in my research.

Sincerely,

Emily Warner, Principal Investigator.

APPENDIX D: INSTRUMENT

Identification Number: _____ (Completed by ECU Researcher)

MEASURING FLOW IN ADAPTIVE AND NON-ADAPTIVE CLIMBERS

Directions: Please fill in the blanks for items 1, 3, 7, and 9. Check the appropriate box for items 2-6 and 8-11.

1. **Gym location (City, State):** _____
2. **Event completed:** ___ Adaptive Climbing ___ Non-Adaptive Climbing
3. **Approximately how long ago did you finish climbing today?** _____ (minutes)
4. **Age:** ___18-25 ___26-35 ___36-45 ___46-55 ___56+
5. **Gender:** ___Male ___ Female
6. **Race:** ___ White ___ African American ___ American Indian, Alaskan
   ___ Asian/Pacific Islander ___Hispanic
   ___ Other (Please Specify): _____
7. **Years participating in adaptive or non-adaptive sports and recreation:** _____
8. **How many climbing sessions have you had?** ___ 1-5 ___ 6-10 ___ 11-20 ___ 21+
9. **How many times did you climb today?** _____
10. **Type of disability:**
    ___ Amputee, please answer the following:
    Check one: ___ Upper Limb ___ Lower Limb
    Do you climb with a prosthesis? ___ Yes ___ No
    ___ Spinal Cord Injury, please answer the following:
    Level and number of injury: ___Cervical ___Thoracic ___Lumbar ___ Sacral
    Check one: ___ Incomplete ___ Complete
    Check one: ___ Paraplegia ___ Tetraplegia
    ___ Cerebral Palsy, please answer the following:
    Check one: ___ Spastic ___ Athetoid ___Hypotonic ___ Ataxic ___ Mixed
    ___ Spina Bifida, please answer the following:
    Check one: ___ Occulta ___ Myelomeningocele ___ Meningocele
    ___ Traumatic Brain Injury
    ___ Other (Please Specify): _____
    ___ No Physical Disability
11. **Years with disability:** ___ Congenital ___ <1 ___ 1-5 ___ 6-10 ___ 11-15 ___ 16+
    ___ No Physical Disability

PLEASE CONTINUE WITH THE NEXT PAGE

FSS-2 Instrument

The FSS-2 Nine Dimensions of Flow and Five Copyright Approved Sample Items for Thesis

FSS-2 Dimensions	FSS-2 Sample Items
Challenge-Skill Balance	
Merging of Action and Awareness	Q11: Things just seemed to be happening automatically
Clear Goals	Q3: I knew clearly what I wanted to do
Unambiguous Feedback	
Concentration on the Task at Hand	Q5: My attention was focused entirely on what I was doing
Sense of Control	
Loss of Self-Consciousness	Q7: I was not concerned with what others may have been thinking of me
Transformation of Time	
Autotelic Experience	Q36: I found the experience extremely rewarding

Note: As reported by the publisher, Mind Garden, Inc. these five sample items from the FSS-2 instrument as specified above may be included in a thesis or dissertation. The entire instrument may not be included or reproduced at any time in any other published material to maintain integrity and value of the instrument (Jackson et al., 2010, p. 20-21).

Intentions for Continued Participation

Identification Number: _____ (Completed by ECU Researcher)

Continued…		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	I would like to climb indoors again	1	2	3	4	5
2	I would like to spend more time climbing	1	2	3	4	5
If you have previously climbed outdoors, answer question 3 only. If you have NOT previously climbed outdoors, skip to question 4.						
3	I would like to climb outdoors again	1	2	3	4	5
4	I would like to climb outdoors, if available	1	2	3	4	5

THANK YOU FOR COMPLETING THIS SURVEY

FREQUENTLY ASKED QUESTIONS

1. **What is this survey for?**
   This survey is designed to collect information about your experience while climbing today. Please answer honestly, thinking about how you felt, as there are no right or wrong answers.

2. **What is a climbing session?**
   A climbing session is a visit to an indoor or outdoor location. For example, you may go to a climbing gym and climb 5 times in that session.

3. **How do I know how many times I climbed today?**
   Please use the number of climbing routes you have both attempted and/or completed today to determine how many times you have climbed.

4. **What if I have participated in adaptive or non-adaptive sports and recreation for less than a year?**
   You may either indicate your participation with a zero (0) or with a decimal. For example, you may use 0.5 to designate 6 months of participation.

5. **What if I disagree with all of the statements?**
   Since this survey is about your personal experience, it is okay if you do not agree with the statements. Everyone's experience today was different and will result in diverse answers on the survey.