Investigating the Outcomes and Perceptions of an Inclusive Aquatic Exercise Class for University Students with Physical Disabilities

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Abstract

The purpose of this study was to determine whether university students with physical disabilities (SWD) gained similar benefits from recreational physical activity participation as able-bodied (AB) university students as reported in the literature. Researchers designed an inclusive, university-offered aquatic exercise class for SWD. Six SWD volunteered for participation and six SWD volunteered for the control group. Quantitative survey measures were used to compare group changes in exercise self-efficacy, quality of life, and social inclusion following the five-week testing period. Qualitative interviews were used to explore the experiences of intervention participants. Independent t-tests revealed no significant differences in pre/post changes between groups, however thematic analysis of qualitative interviews indicated intervention participants perceived numerous positive outcomes and experiences resulted from the intervention, very similar to those found in AB university students. Results from this study provide important information on participant experiences, outcomes, and assist in future recommendations for recreational physical activity for SWD.

Keywords: Disability, inclusion, college students, adapted recreation, health

In 2011, over 1.1 million university students in the U.S. had a physical disability, effecting nearly 6% of the undergraduate population (Brault, 2012). It is well studied that physical inactivity levels in the adult population of persons with physical disabilities (PWD) are critically high. Despite the known benefits of physical activity (PA) participation, less than 30% of PWD meet the aerobic PA recommendations for health and a mere 15% meet resistance training recommendations (Erickson, Lee, & von Schrader, 2010; U.S. Department of Health and Human Services [USDHHS], 2011). Unfortunately, current research has demonstrated that the PA levels of university students with physical disabilities (SWD) may be reflective of the adult population of PWD (Dysterheft et al., 2016; Yoh, Mohr, & Gordon, 2008). While 70-88% of full- and part-time university students utilize recreational PA services (Lindsey & Sessoms, 2006; Stier, Schneider, Kampf, Haines, & Wilding, 2005; Tinto, 2006; Watson, Ayers, Zizzi, & Naoi, 2006), less than 30% of SWD regularly used their campus recreation facilities (Yoh et al., 2008).

This is particularly alarming as PA is considered one of the most pivotal factors in successful rehabilitation and health management for PWD. PWD who are physically inactive are at an elevated risk of physical deconditioning, which often leads to severe chronic health implications, such as cardiovascular disease and diabetes, overuse injuries, and pain (Ballinger, Rintala, & Hart, 2000; Curtis et al., 1999; Dearwater et al., 1986; Noreau, Shephard, Simard, Pare, & Pomerleau, 1993; Siddall, McClelland, Rutkowski, & Cousins, 2003; van der Ploeg et al., 2007; Washburn, Zhu, McAuley, Frogley, & Figoni, 2002), as well as secondary physical symptoms, such as increased spasticity, pressure sores, and high blood pressure (Heath & Fentem, 1996; Liou, Xavier Pi-Sunyer, & Laferrere, 2005; Noreau et al., 1993; van den Berg-Emons et al., 2011). Most alarming, however, are the secondary psychosocial symptoms of physical inactivity, which include increased risk of anxiety, depression, decreased quality of life, poor activity tolerance, and decreased independence (Dijkers, 1997; Le & Price, 1982; Manns & Chad, 1999; Santiago & Coyle,

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2004; Tomasone, Wesch, Martin Ginis, & Noreau, 2013). Inactive PWD are also more likely to experience feelings of social isolation, lack of acceptance by peers, and negative self-perceptions (Devine & Koch, 2003; Devine & Lashua, 2002; Devine & O Brien, 2007; Devine & Parr, 2008; McLaughlin, Bell, & Stringer, 2004).

PA participation is known to not only counter these negative consequences, but also provide profound benefits. Specifically, these benefits have been observed in university students participating in recreational physical activities, such as recreational programming and activity courses. Research on recreational physical activity participation in able-bodied (AB) university students has observed improvements in students' university adherence, academic performance, peer inclusion, comfort with diverse populations, and healthy lifestyle habits (Astin, 1999; Devine, 2013; Devine & Lashua, 2002; Elkins, Forrester, & Noël-Elkins, 2011; Henchy, 2011; Kampf & Teske, 2013). Recreational activities have also been found to result in life-long benefits, aiding students in stress reduction, empowerment, and socialization into adulthood and the workforce (Devine, 2013; Miller, 2011). Unfortunately, little research exists on whether SWD gain the same outcomes from recreational physical activity as their AB peers. Previous research has reported that PWD gain social and confidence benefits with recreational physical activity participation (Ashton-Shaeffer, Gibson, Autry, & Hanson, 2001; Blinde & Taub, 1999; Choi, Johnson, & Kriewitz, 2013; Devine & Koch, 2003; Devine & Lashua, 2002; Devine & O Brien, 2007; Kang, Zhu, Ragan, & Frogley, 2007). Additionally, PA levels during college and perceived disability levels were two strong predictors of PA levels into adulthood (Hedrick & Broadbent, 1996). However, the lack of information on SWD is particularly worrisome, as SWD may suffer higher social, personal, and academic consequences if the benefits of recreational physical activity are not obtained due to the physical and social consequences associated with disability (Devine & Lashua, 2002).

Although numerous studies have examined the benefits and barriers of recreational physical activity in SWD, few have addressed programming implementation of the specific and unique environment of university campuses. It is postulated that because SWD often have specific needs to perform physical activities, a lack of accessible and appealing activities may contribute to low participation levels and misconceptions of abilities (Devine, 2013; Martin, 2013). As many universities provide disability resource centers and adapted recreation opportunities, it is pertinent for disability services providers to understand the programming wants, experiences, and outcomes of SWD participation in recreational physical activity. More so, the lack of SWD presence in university recreation facilities indicates a need to re-evaluate SWD wants and experiences in recreational physical activity in order to effectively enhance and design recreational programs (Yoh et al., 2008).

Therefore, the primary purpose of this study was to design and implement an recreational physical activity course for SWD, based on SWD input, to examine their experiences and outcomes of recreational physical activity. Using a mixed-methods analysis, we aimed to examine the experiences and outcomes of SWD participating in a recreational aquatic exercise (AE) class to gain a better understanding of adapted programming and design. It was hypothesized that participants in the AE class would have significantly greater improvements in exercise self-efficacy, perceived social inclusion, and quality of life (QOL) in comparison to an inactive control group. It was also hypothesized that survey results would be supported by qualitative data collected during the interviews. Information gained from this study may indicate SWD have similar benefits of recreational physical activity participation, as well as assist universities with adapted recreation program design to improve the university experiences and lifestyle habits of SWD (Bartholomew et al., 1998).

Procedures

Participants

The study protocol was approved by the university institutional review board. Study participation required that students be 18+ years of age, currently enrolled at the participating university, and identify as a PWD. Intervention participants were recruited from a new, adapted AE course offered by the participating university. After students registered for the course, the instructor provided them information about voluntary participation in the current study that would not influence their grade or activity in the course. For control comparison, undergraduate SWD who were not participating in any activity courses, competitive athletics, or regular recreational PA volunteered for the study control group. These participants were recruited from a sample of SWD from multiple universities who were participating in a parallel study. A total of six SWD qualified for the intervention group and six participants qualified for the control group. For participant demographics, see Table 1.

Intervention Design

Focus groups were conducted to gain more information from SWD for the design of recreational physical activity intervention (Staeger-Wilson & Sampson, 2012). Based on the findings from the focus groups, a socially-inclusive, adapted AE class was designed to address these findings as a recreational physical activity intervention for the current study. To promote social inclusion and address assistive needs, kinesiology undergraduates were invited to volunteer as exercise personal assistants and were required to assist participants with all AEs, as well as complete transfers, and clothing changes. Each participant was paired with two to three s, based on their personal and physical needs. Of the 20 undergraduate kinesiology students who volunteered for exercise personal assistant positions, 17 were able to participate during the class time.

Prior to working with participants, exercise personal assistants received two weeks of intensive education and training on AE, care, transfers, etc. Exercise personal assistants also received three experiential academic credits in the kinesiology department to participate in the AE course and facilitate each participant's exercise program. Under the supervision of the instructor, exercise personal assistants conducted all clothing changes, transfers, and AEs with their participant for each class period. With the permission of the instructor, exercise personal assistants were allowed to adjust or make additions to the exercise programs to fit their participant's personal wants or needs.

Prior to beginning the course, the instructor performed initial physical assessments on each participant to determine their capabilities and physical goals. Based on this assessment, the instructor created an individualized exercise program for participants. These programs were given to the exercise personal assistants to carry out with participants. Classes were held twice each week on campus, during the regular spring semester, and lasted 50 minutes.

Demographic and Quantitative Measures

Data were collected prior to starting the intervention or control period and after five weeks of participating in the intervention or the control period. Pre-intervention measures included a demographic information form and multiple, reliable and validated survey tools examining current recreational physical activity levels, perceived QOL, exercise self-efficacy, and social inclusion. These survey tools were repeated during the second session.

The Leisure Time Physical Activity Questionnaire for People with Spinal Cord Injury (LTPAQ-SCI) was used to measure recreational physical activity levels of participants (Ginis, Phang, Latimer, & Arbour-Nicitopoulos, 2012). The six-item scale is a validated and reliable self-report measure developed for individuals with spinal cord injury and easily translates for individuals with other physical disabilities. LTPAQ-SCI scores were reported as cumulative values using the Godin LTPA equation.

To measure perceived QOL, participants completed the WHO Quality of Life-BREF (Chapin & Holbert, 2010; Skevington, Lotfy, & O'Connell, 2004). The WHO QOL-BREF has been found to be a valid and reliable with multiple populations of PWD. Mean scores for each domain are used to calculate the final domain scores, ranging between 4-100. Higher scores indicated a greater perceived QOL of participants for the domains. For this study, the domains will be reported as QOL Physical Health, QOL Psychological Health, QOL Social Relationships, and QOL Environmental Health.

Exercise specific self-efficacy was measured using the SCI Specific Exercise Self-Efficacy Scale (ESES; Barnes et al., 2012). The ESES is a valid and reliable, 10-item scale measuring a PWD's confidence in performing PA and exercise (Kroll, Kehn, Ho, & Groah, 2007). Each item is rated on a four-point Likert scale and results are summed to produce a final score ranging from 10-40. Higher scores indicate a greater perceived exercise self-efficacy.

To measure perceived social inclusion and opportunities the Social and Community Opportunities Profile – Shortened Version (SCOPE) was used (Huxley et al., 2012). Due to the extensive length and broad coverage of the SCOPE, only two domains, the Opportunities for Recreational Physical Activity and Opportunities for Inclusion, were used for this study. Domains of the SCOPE can be scored and summed. Higher values indicate more perceived opportunities and levels of inclusion.

Qualitative Measures

Post-intervention, the qualitative survey measures were repeated, and individual interviews were conducted. Interviews took place in quiet, private locations, based on participant preference. As interviews were aimed to understand participant experiences, control group participants were not interviewed. Interviews were conducted by the lead researcher, who was not involved in the administration or instruction of the course. Ten formal semi-structured, open-ended interview questions were developed prior to data collection using structured questions from previous literature (Blinde & McClung, 1997; Wolfensberger, Nirje, Olshanksy, Perske, & Nirje, 1972). These questions were modified to address participant experienc-

es in the AE course and outcomes resulting from the course. The lead researcher used intensive interview strategies and freely developed secondary questions to help direct conversation and encourage participant elaboration. At the end of the interview, participants were given the opportunity to provide any additional thoughts or comments about their experiences with the course. Interviews lasted an average of 28 minutes. All participant interviews were audio recorded using a digital voice recorder (Apple Voice Memo; iPhone 6, Apple Inc., Cupertino, CA, USA). Following the interviews, audio recordings were transcribed verbatim and then reviewed for accuracy by the interviewing researcher.

Data Analysis

Quantitative analysis. Analysis of demographic and survey data was performed using IBM SPSS Statistics Version 22 (SPSS, Inc., Chicago, IL). Prior to analysis of pre- and post-intervention survey scores, all data was analyzed for violations of normality, outliers, and errors. A Shapiro-Wilk test was used to test for normality of data distribution. Histograms and Q-Q plots were used to determine outliers. Demographic and survey data were analyzed for descriptive statistics. Based on normality of data distribution, Independent t-tests were used to compare changes in WHO QOL-BREF domains, ESES, and SCOPE domain pre- and post- intervention scores between groups. A Mann-Whitney U test was used to compare changes in the LTPAQ-SCI pre- and post-intervention scores between groups. Due to running multiple t-tests, a Bonferroni correction was used to set statistical significance at $p < 0.01$. Descriptive statistics are reported as mean (M) ± standard deviation (SD).

Qualitative analysis. To analyze the data from participant interviews, two researchers first read over three transcriptions and identified, analyzed, and interpreted primary themes found in the data (Braun & Clarke, 2006). The researchers used line-by-line, open coding strategies to develop primary themes found in the data until no additional novel themes were found (Corbin & Strauss, 2014). For further examination, researchers re-read the transcriptions and developed subthemes within each primary theme. Researchers then compared results of preliminary analysis to identify commonalities and discrepancies. Once the researchers came to a consensus of the recurring themes and patterns relating to the original research questions, a final codebook was developed. A third researcher was trained, and all transcriptions were coded by all three researchers, according to the final codebook. Each of the final coded transcriptions was checked for consistency. Additionally, an auditor, who did not take part in the data collection process, was used to review all primary and subthemes, as well as coding. The auditor helped to examine transcription codes for bias and discrepancies, as well as address any data concerns (Braun & Clarke, 2006; Charmaz, 2014). Any discrepancies that occurred were discussed and a general consensus was reached.

To ensure credibility and transferability of the results during analysis standardized, pre-structured interview questions were used during all interviews to maintain reliability of data collection, questions were open-ended to allow participants to discuss their personal experiences, the interviewing researcher was not affiliated with the instruction of the course to allow for open discussion with participants, and interview data was triangulated with survey results and demographic data. Finally, the auditor aided in searching for negative cases, or outliers, to determine if any participants or data were not consistent with the emerging themes. While measures were carried out to ensure the credibility and transferability of the data, it is advised that readers use caution when generalizing the results of this study. These results may differ in other environmental contexts and with other populations as this intervention was performed at a university recognized for its disability services and efforts to be a disability-friendly campus.

Results

All descriptive statistics of the intervention and control groups are reported in Table 1. Due to the nature of the data, quantitative and qualitative results will be reported in an integrated structure. Results of the Shapiro-Wilk test indicated that all variables, except the LTPAQ-SCI ($p < 0.01$) had normal distributions. No outliers were removed from the dataset. Descriptive measures and results of the surveys are reported in Table 2. Results of the Mann-Whitney U test indicated significant differences between groups for LTPAQ-SCI pre- and post-intervention changes ($U = 2.00$, $z = -2.58$, $p = 0.01$). The control group did not show increases in recreational physical activity from pre- to post-intervention.

Quantitative and Corresponding Qualitative Results

Physical QOL. Results of the QOL Physical Health domain indicated that no significant differences occurred in pre- and post-intervention scores between groups (Table 2). Both the intervention and control groups had Physical Health domain scores similar to those found in previous studies on PWD (Barker et al., 2009; Yazicioglu, Yavuz, Goktepe,

& Tan, 2012). In contrast, data collected from participant interviews indicated participants perceived improvements in physical health, specifically facets included in the Physical Health domain of the WHO QOL-BREF, such as sleep quality, mobility, energy, and capacity (Skevington et al., 2004). All participants in the intervention group stated they perceived positive physical outcomes resulting from the AE class. Participants stated the AE class gave them more energy, helped them sleep better, and improved muscular strength, flexibility, muscular endurance, and mobility. For example, one participant with cerebral palsy stated that as a result of the AE, "I'm just really happy because…I've gotten to do stuff that I honestly never thought I could do." She expanded on this by explaining her improvements in walking up stairs and in a straighter line. Similarly, another student explained, "we're only half-way through the semester and I've gotten so much better with certain [exercises] so…it just makes me feel like…I can basically learn to do anything, given the right people".

Psychological QOL. Results of the QOL Psychological Health domain surveys also indicated no significant differences in pre- and post-changes between groups (Table 2). The intervention group had higher Psychological Health domain scores, whereas the control group had similar scores to those previously reported for PWD in the literature (Barker et al., 2009; Yazicioglu et al., 2012). The intervention group showed a small, but non-significant increase in mean QOL Psychological Health domain scores (Table 2). Data collected from the interviews supported this increase, as all participants reported positive outcomes in facets of the Psychological Health Domain, including self-esteem, learning, thinking, and positive feelings (*see Outcomes of Participation section*) (Skevington et al., 2004). Of the six participants, four stated they felt a sense of accomplishment and all six stated having positive feelings as an outcome of the AE class. Participants stated participating in the class gave them confidence to complete other exercises and activities. For example, when asked how the class affected her physical abilities, a participant responded,

> I think it's changed a lot. Especially because I know how far I can push my body...now that I've actually pushed it to the limits…it's helped translate into giving [me] confidence in regular therapy too, because…it's like, if I can do this in the water, I can do this here.

Similarly, multiple participants explained they felt more willing to try new things, knowledgeable about their own abilities and exercises to improve their health, and confident in overcoming tasks. One participant, who was also a competitive wheelchair racer, explained,

> So of course I'm not like experienced in swimming, but it's nice to see that growth…I guess you can translate that to my life because I feel better about myself when I get out of class…that's nice for me to have something mentally that I'm excited for because wheelchair racing can be so competitive, it's nice to have that builder-upper.

Social QOL. No significant differences were found between groups for pre- and post-changes in QOL Social Relationships domain survey results (Table 2). Both groups had similar scores to those previously found in the literature of PWD (Barker et al., 2009; Yazicioglu et al., 2012). The intervention group did have a moderate, but not significant, increase from pre- to post-intervention (Table 2). Data from the interviews supported this increase with all participants reporting positive social outcomes, such as improved personal relationships and social support (facets of the Social Inclusion domain). Although some participants reported having a large peer network prior to participating in the intervention, all participants reported positive social relationships with their assigned exercise personal assistant. Most participants recognized the role of the exercise personal assistant was to assist, however as one participant explained,

> For me it's like, yes, they are 'working for me' or helping me do whatever I need to do…but they're also, like we get to know each other and I can guarantee you the three of us will be friends after they graduate, guarantee you.

Another participant expanded on this by stating the exercise personal assistants being undergraduates, "makes them easier to talk to because, you know, while you're lying there stretching you can talk about 'hey did you see this happen on campus this weekend' or things like that". Most participants described the exercise personal assistants as relatable, which helped them to build a personal connection and made the class more relaxing. Additionally, three of the six participants stated the AE class helped them to build social connections with the other participants, as it served as a common factor between them. For example, one participant stated that although the participants often did not interact during the class,

> It is nice walking around campus and seeing some of the other students in the class and you do ac-

> knowledge them and that's nice to see, you know, someone who isn't in track, but also has a physical inconvenience that you can like walk by and say hello to.

Environmental QOL. No significant differences between group changes were found for QOL Environmental Health domain (Table 2). Following the intervention period, the control group had similar scores, but the intervention group had higher scores in comparison to those found for PWD in previous literature (Barker et al., 2009; Yazicioglu et al., 2012). A small, but non-significant increase in QOL Environmental Health domain scores was observed for the intervention group (Table 2). No themes were found in the interview data that corresponded to the facets of the QOL Environmental Health domain to support or refute these changes.

ESES. No significant differences were found scores between groups for changes in ESES scores from pre- to post-intervention (Table 2). Both groups had similar scores to those previously reported in the literature for PWD, with the intervention group having moderately, but not significantly higher ESES scores than the control group (Fliess-Douer, Vanlandewijck, & van der Woude, 2013; Kroll et al., 2012; Nooijen et al., 2013). The intervention group mean decreased slightly following the intervention (Table 2). In contrast, data from the interviews revealed nearly all participants (n = 5) reported feeling more confident and likely to attempt new exercises or activities as an outcome of participation in the AE class. Similar to the results reported for the Psychological Health domain, participants reported feeling less intimidated by new exercises or movements, more motivated to try new activities, and more confident in their ability to perform various movements or exercises. One participant explained that with her gains in strength,

> I'm more willing to like try different stuff…because like, I was really nervous to do the stairs the first time because I thought I would fall backwards, which thankfully I didn't, but now I'm less scared to try to do new stuff.

Additionally, participants discussed feeling more confident as a result of the knowledge they gained from their participation. For example, one participant stated, "I know more about myself…I know more of my strengths and weaknesses". She expanded on this by explaining,

> Well it's like, people can go to the gym and they know what amount of dumbbells to lift…(1) I don't do that and (2) I wouldn't know, so I think [AE] is like my workout and how I determine [what to do].

Social inclusion. Results of the SCOPE revealed no significant differences in pre- and post-intervention changes between groups for the Perceived Opportunities for Recreational Physical Activity and Perception of Inclusion domains (Table 2). Post-intervention group results of the SCOPE are as follows: five control participants and six intervention participants agreed there were leisure, sports, or entertainment facilities on their campus. Only one of the control participants reported using these facilities, while five intervention participants reported use of them. On a rated scale from one-seven (one = Terrible, seven = Delighted) about how participants felt about their opportunities for leisure on their campus, the control group reported a mean score of 4.16 ± 0.75 and the intervention group reported a mean score of 5.00 ± 1.09. In a short answer response option to describe what they would like to change about their leisure opportunities on campus, participants reported a need for increases in accessible sports, activities, equipment, assistance, and facilities. Participants also placed emphasis on a need for more leisure-based activities over competitive sports. When asked about the availability and range of opportunities to be involved with their campus, control participants reported mean scores of 5.50 ± 0.84 and 4.5 ± 0.84, respectively. Intervention participants reported mean scores of 3.50 ± 1.52 and 5.33 ± 1.50, respectively. Lastly, when asked to what extent they felt included within their campus community, control participants reported a mean score of 4.00 ± 1.60 and intervention participants reported a mean score of 5.50 ± 1.04.

Qualitative Results

Analysis of the interview transcriptions resulted in three primary themes and eight subthemes based on 19 codes. Research questions, primary themes, subthemes, and corresponding codes are reported in Figure 1. Following the first research question, examination of the overall experiences of SWD participating in a recreational AE class resulted in two primary themes: Initial Perceptions and Future Recommendations and SWD Experiences. From the second research question, examination of SWDs' perceived outcomes from participating in a recreational AE class resulted in one primary theme: Outcomes of Participation.

Theme 1: Initial perceptions and future recommendations. During the interviews, participants were asked to describe and elaborate on their experiences during the AE class. On their own accord, many participants described initial perceptions or expectations prior to beginning the class, as well as recommendations for the design of future programs. These underlying themes created the two subthemes of Motivations & Anticipated Experiences and Recommendations.

Motivations and anticipated experiences. In the subtheme, Motivations and Anticipated Experiences, participants expressed their reasoning for registering for the AE class. Three of the six intervention participants had participated in AE or therapy previously and stated this as a reason for participation. The other three participants stated they had heard previously of the benefits of AE. All the participants explained that exercise for health and symptom management was a primary motivator for participation in the class. Examples of participant reasoning for participation included muscle maintenance, increased energy, increased flexibility, lung functioning, and continuing progress from rehabilitation. Two of the participants also stated athletic training and conditioning for a competitive sport was an additional reason.

The subtheme, Motivations and Anticipated Experiences, also included participants' explanations of their initial expectations for the class. As stated by participants, based on their previous experiences with adapted exercise classes, their expectations for rigor of exercises, knowledge of exercise personal assistants, and organization of the course was very low. When asked to elaborate on her expectations of the rigor of the class, one participant explained, "I get pushed really hard [during class]. Like honestly…not to offend you, but I didn't think it was going to be this detail oriented, I thought it was going to be kind of kicking and floating." Another participant described his anticipations for the exercise personal assistants by stating, "[The exercise personal assistants] are nice, they know what they're doing. They're not stupid, I was kind of worried they might be." When asked to explain why, he continued, "Well, because it's a brand-new class, so I figured [the instructor] might end up winging it a little bit, so I might get some people who don't know what they're doing." Many of the participants expressed having these initial concerns for the class. Additionally, five of the six participants explained that friendly, knowledgeable exercise personal assistants are significant to their enjoyment of the program. As one participant explained,

> The biggest thing is making friends with the people that help me and honestly like, when people have to change you in and out of a bathing suit, it'd be kind of awkward if you couldn't have a conversation, so like that's really nice.

Most participants elaborated on this, stating that feeling comfortable with their exercise personal assistant was critical.

Recommendations. In the second subtheme, Recommendations, participants described aspects of equipment, class organization, safety measures, and exercise personal assistants that they felt were positive, as well as what could be done to improve future programming. Most participants (n = 4) reported a need for additional equipment to prevent waiting for use. This equipment included chair lifts, water wheelchairs, water weights, and water dumbbells. In contrast, most participants (n = 5) reported that having three exercise personal assistants seemed to be too many for the amount of assistance needed. Two of the participants recommended that participants meet the exercise personal assistants prior to beginning the class to review personal preferences. Five of the participants stated having undergraduates as exercise personal assistants was preferred to older graduate students or adults and should be maintained in future classes. Although one student stated that she and her undergraduate exercise personal assistant lose focus at times when in conversation, all participants stated undergraduates were more relatable. Participants also stated that having exercise personal assistants "their own age" made them easier to talk to and the classes more relaxed. Additionally, all participants stated that having undergraduate students interested in physical or occupational therapy was beneficial. One participant described the importance of exercise personal assistant interested in healthcare fields,

> That's a big thing…finding the right people who want to be with people with physical inconveniences and want to learn more about that because, as much as they can offer to much, I feel like we can offer the same to them.

Four of the participants stated they would like to have more independence during the activities, however, due to safety regulations they understood it was not always possible.

Theme 2: SWD experiences. Many participants described their overall experiences while participating in the AE class. The descriptions of these experiences created the two subthemes of Experiences during the Class: Positive and Negative and Class Continuation.

Experiences during the class: Positive and negative. The first subtheme, Experiences during the Class: Positive and Negative, included participant reflections on their experiences with the exercise programs, their exercise personal assistants, and their experiences in the water. All participants reported positive experiences in the water. Participants with higher mobility limitations due to their disability stated that the water enabled them to move more freely, with less resistance. One participant described being in the water as, "I'm happy I can like move in ways that I normally can't move." Another participant explained,

> I guess it is just different for us because we can do so much more in the water…I feel like I'm doing more of the exercises on my own, by myself, but like at therapy, normally someone is doing [the exercises] to me.

Similarly, other participants explained in the water they felt relaxed and free to move.

All the participants also reported having positive experiences with their exercise personal assistants, citing their undergraduate status, interest in therapy, and knowledge as primary reasons. At the same time, three participants also reported having negative experiences with certain exercise personal assistants, two reporting that themselves and their assistants got distracted at times from conversation and one participant reporting that she had an assistant who was not engaged in the class. All participants stated they had positive experiences with the exercises provided to them, with two of the participants recommending more individualized exercises.

Class continuation. The second subtheme, Class Continuation, consisted of participant statements of whether they would continue the class if it were provided the following semester. All the participants stated they would like to continue the class. Additionally, multiple participants requested it be offered multiple semesters for further continuation.

Theme 3: Outcomes of participation. The last theme included a statement describing the perceived outcomes they gained from participating in the AE class. The descriptions of these outcomes constructed the last four subthemes of Physical Benefits, Psychological Benefits, Social Benefits, and Academic Credit. Additional details related to these themes have been described earlier in the Quantitative and Corresponding Qualitative Results section.

The subtheme of Physical Benefits included participant statements of positive physical outcomes they received from participating in the class. All participants reported physical benefits.

The subtheme of Psychological Benefits included participant statements of positive psychological outcomes they received from participating in the class, including stress reduction, improved self-awareness and confidence, feelings of accomplishment, and knowledge. All participants reported psychological benefits as a result of participation in the class.

The subtheme of Social Benefits included participant statements of positive social or peer outcomes they received from participating in the class. Examples of these outcomes included participants stating they gained friendships, felt peer connections, or gained peer relationships outside of the class. Four of the participants reported gaining peer benefits, either inside or outside of the class.

The final subtheme of Academic Credit included participant statements of the importance of receiving academic course credit for participation in the class. As one participant explained,

> This is going to sound strange, but the ability for us to receive the academic credit for this goes a long way because there's a lot of my friends that take like ice skating and, you know, all of the random [kinesiology] one credit [activity] classes when they need them as seniors and this is kind of my equivalent for that.

The same participant expanded on this by stating,

> How many [kinesiology activity] classes are there for one credit for the average student? And [SWD] have two, we have [physical therapy] and then this. If you can open that up and like, some people can't swim, maybe they have like a feeding tube or something and they can't swim, but if there were another sport they could do then they could have the same benefits of, "hey, look what I learned to do."

All of the participants made recommendations for future classes, emphasizing the want for growth in an adapted recreation program and inclusive kinesiology activity classes.

Discussion

As the literature examining what influences SWD to participate in recreational physical activity grows, so does the need to understand their wants and experiences in recreational physical activity, to better develop appealing and effective adapted recreation programming. Using mixed-methods, we were able to examine participant's personal outcomes, includ-

ing recreational physical activity levels, exercise self-efficacy, perceived social inclusion, and QOL and compare outcomes to an inactive, control group. This study provides information to help disability services and staff understand the beneficial experiences and outcomes of an exercise class for SWD. Most importantly, educators and staff in disability services may be able to use these valuable perceptions and experiences to improve adapted programming and SWD experiences at the university level.

Our first hypothesis was not completely supported, as no significant differences occurred between the intervention and control group for pre- and post-measures, except recreational physical activity (Table 2). While the intervention group reported significantly greater increases in recreational physical activity levels than the control group (Table 2), this was, in part, due to the addition of the AE class participation. However, participants reported feeling more confident in trying new exercises and activities. Future studies may incorporate more quantitative measures to compliment this design. Wearable sensors, such as accelerometers, show great promise in quantifying movements of wheelchair users in real-world environment (Learmonth, Kinnett-Hopkins, Rice, Dysterheft, & Motl, 2015).

While the intervention group did show large increases in recreational physical activity level following the intervention, no other personal outcomes from the WHO QOL-BREF domains, ESES, or SCOPE domains surveys significantly improved. However, information from the interviews contradicted these findings. This discrepancy may indicate a lack of sufficient power to detect post-intervention changes or the survey measures used were not sensitive enough to capture changes following the intervention. Future research should investigate interventions with larger sample populations, more sensitive survey measures, or the development of a mixed-methods survey to better analyze the outcomes and effectiveness of adapted recreation programming for SWD.

Despite the lack of significant changes in survey measures, information collected from participant interviews support that SWD may have similar, yet still very unique, experiences and benefits of recreational physical activity participation as their AB peers. Much like AB university students, participants reported having positive social outcomes from the class. However, unique to the participants, these social outcomes were primarily results of building relationships with their exercise personal assistants and less with other participants in the class. The comfort and development of relationships with their AB peers may assist in reducing feelings of social isolation, resulting from social stigma of disability (Buffart, Westendorp, van den Berg-Emons, Stam, & Roebroeck, 2009; Devine & Dattilo, 2000; Promis, Erevelles, & Matthews, 2001). Also, similar to AB university students, participants described improvements in stress reduction, confidence to complete exercises, and willingness to try new exercises and activities. Unlike their AB peers, much of the confidence to complete new exercises transferred into therapeutic exercise or activities of daily living settings. Although recreational physical activity opportunities are still limited at the university level for SWD, this confidence may also transfer into greater levels of independence, as well as activities outside of therapy and daily living. Disability services should consider integrating inclusive recreational physical activity for SWD early in their university years to help promote feelings of confidence and social inclusion on their college campus. These positive social and personal experiences may improve both SWD academic success and adherence to university programs (Astin, 1984; Tinto, 2007). While these results are in line with those of previous studies on PWD (Ashton-Shaeffer et al., 2001; Blinde & Taub, 1999; Choi et al., 2013; Devine & Lashua, 2002), further research should examine additional positive outcomes of recreational physical activity participation, such as possible academic benefits and long term benefits (Henchy, 2011; Kampf & Teske, 2013; Miller, 2011).

Specific outcomes very unique to SWD were also found. First, multiple participants emphasized they gained knowledge and self-awareness with exercise as a result of participation in the AE class. Although findings of improved health and interest in exercise have been found for AB university students (Henchy, 2011), these particular benefits may be much more critical for SWD. Interviews from previous research shows some SWD do not perceive themselves as able to exercise (Dysterheft et al., 2016) and find their disability to be a major barrier to exercise (Buffart et al., 2009; Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004). As observed in participants from this study, recreational physical activity participation may assist in improving a perceived ability to exercise, as well as inform SWD how to exercise and what they are capable of. Secondly, it was particularly interesting that participants emphasized earning academic credit as a positive outcome. This may indicate that SWD would be more likely to participate in recreational physical activity if they were able to obtain academic credit, increasing the likelihood of achieving the observed positive outcomes. Disability staff and educators should take this into consideration and advocate for academic recreational physical activity course credit

opportunities for SWD. The opportunity for academic credit not only may affect the participation rates and success of adapted recreation programs but could provide more equal opportunities for SWD.

Perhaps the most important information gained from this study was the participant expectations for the class and their recommendations for future programming. Alarmingly, most participants reported low expectations for the class design, rigor of exercise programming, and knowledge or dedication of the exercise personal assistants. Participants explained these expectations were based on previous experiences, which may give indication of a major barrier to recreational physical activity participation, previously unknown. Past studies have revealed that appeal of activities, degree of difficulty, and personal assistants/instructors are influential to both PWD and SWD PA levels (Dysterheft et al., 2016; Rimmer et al., 2004). Future research should focus on examining the extent to which negative previous experiences with adapted recreation programming acts as a barrier to PWD.

Additionally, participants made recommendations on equipment and exercise personal assistants. Participants recommended that enough equipment be available to prevent waiting or sharing or materials. This is in line with previous studies, in which lack of equipment was reported as a barrier to participation (Buffart et al., 2009; Martin, 2013; Rimmer et al., 2004). Based on the positive experiences with exercise personal assistants, many participants suggested that for future programming, assistants remain undergraduate students with career goals in physical and occupational therapy. Participants emphasized that they felt exercise personal assistants were more relatable, as well as dedicated to the class when these criteria were met. It was also suggested that exercise personal assistants and participants meet prior to the start of exercises to allow participants to explain personal preferences and abilities to their assistant. This likely may help SWD build trust with their exercise personal assistants prior to beginning an exercise program. It should be noted, during the focus groups and contact with the lead instructor, participants stated the necessity for exercise personal assistants to be provided by the class for participation. Although the participating university provided PA's for students, specific activities and locations are not included in that provision. Therefore, participants would have had to hire PA's specifically for the class. This was particularly interesting, as it may also indicate a previously unknown barrier to recreational physical activity participation.

Based on this information, disability services educators and staff should be mindful of multiple components when designing adapted recreational programs for SWD. To ensure effective design and program implementation, disability services educators and staff should use programming strategies, such as Benefits Based Programing (Rossman & Schlatter, 2011). Originally developed to address social issues, Benefits Based Programming has been used to focus on the outcomes gained by those who participate in recreational opportunities. In order to specifically address SWD at their universities, disability services educators and staff should be aware of what activities their students want (Rossman & Schlatter, 2011; Specht, King, Brown, & Foris, 2002). SWD should be included on committees and panels to help with the design and renovation of programs (Staeger-Wilson & Sampson, 2012). By providing SWD with input and the ability to help choose available programming, the disability services providers can maximize benefits SWD gain from participation and ensure cost-effective program planning (Coleman, 1993).

Findings from this study should also be considered during the program planning process. It is pertinent for disability services providers to ensure that instructors involved in adaptive recreational physical activity can modify activities for multiple levels of ability. As stated by participants in this study, some adapted programming may not challenge SWD, thus undermining physical abilities or prevent participation (Devine, 2013). More so, instructors should be knowledgeable of adaptations to exercises, as well as social constructs of disability. Previous studies have observed that a perceived lack of knowledge of instructors/assistants, and negative perceptions or attitudes towards SWD can act as significant barriers to recreational physical activity participation (Devine & Dattilo, 2000; Devine & Parr, 2008; Rimmer et al., 2004). It is also recommended that all programs provide assistants to SWD to prevent the need for external provision. Overall, disability educators and staff should review their current programs to determine if they are meeting the expectations and goals of SWD, and then bring awareness to the successes or needs of the program (Rossman & Schlatter, 2011).

Limitations

Prior to drawing conclusions, some limitations of the study should be addressed. First, the data collected in this study is from a relatively small sample of SWD who self-selected to either participate in the AE class or not to participate in recreational physical activity at all. This resulted in a lack of randomization and should be addressed in future studies. Additionally, although participant demographics did not significantly differ, the intervention group

was selected from one university, whereas the control group participants were recruited from multiple universities. Next, the study took place at a highly accessible university, with a reputation for its dedication to inclusiveness of PWD. This dedication and the cooperation of the university kinesiology department and campus recreation allowed the intervention to be provided as a 100-level kinesiology course. Therefore, these results should be interpreted with caution and the acknowledgement that they may not apply to more diverse campuses and populations. Also, it should be noted that although the quantitative measures used failed to sufficiently denote changes from pre- to post-intervention, they may be effective in larger sample populations or following longer intervention periods. Finally, as with any qualitative study, analysis is subject to researcher bias. While multiple measures were used to minimize any bias during data collection, analysis, and interpretation, caution is recommended when generalizing results to other populations and environments.

Conclusion

Disability services providers have the opportunity to facilitate personal relationships with SWD and use SWD input to design successful, beneficial adaptive, inclusion recreational physical activity programming. Based on the results of this study, disability educators and staff may be able to better design adaptive recreation programming to provide positive social and personal outcomes to SWD.

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Table 1

Intervention and Control Group Demographics

Demographic	Intervention	Control
n	6	6
Age (years)	20.0 (1.26)	21.83 (2.48)
Gender	*M* = 1 (17%)	*M* = 4 (67%)
Years at University	1.42 (1.16)	2.75 (1.94)
Enrollment	Full = 6 (100%)	Full = 6 (100%)
Years since Injury/Diagnosis	20.0 (2.0)	12.67 (9.73)
Disability Types	CP (3), MD, SMA, PFFD	Arthro (2), FD, NN, RA, SMA

Note. M: Males; Full: Full-time enrollment; CP: Cerebral Palsy, MD: Muscular Dystrophy, SMA: Spinal Muscular Atrophy, PFFD: Proximal Femoral Focal Deficiency, Arthro: Arthrogryposis, FD: Fibrous Dysplasia, RA: Rheumatoid Arthritis, and NN: Nerve Neuralgia.

Table 2

Survey Outcome Measures

Survey	Group				
	Control		Intervention		Change Comparison
	Pre *M* (*SD*)	Post *M* (*SD*)	Pre *M* (*SD*)	Post *M* (*SD*)	*t*-score (*p*)
Godin RPA	13.66 (25.97)	10.17 (11.41)	16.17 (19.89)	40.83 (23.25)	2.00 (0.01)*
QOL Physical	62.50 (13.07)	62.83 (12.40)	71.00 (8.20)	69.00 (17.41)	-0.33 (0.75)
QOL Psychological	62.50 (13.07)	57.33 (18.74)	80.33 (12.40)	82.50 (7.45)	1.35 (0.21)
QOL Social	58.33 (31.71)	57.33 (31.33)	59.33 (17.24)	73.00 (19.74)	1.48 (0.17)
QOL Environmental	68.83 (14.87)	66.00 (23.63)	81.33 (10.52)	85.67 (8.69)	0.81 (0.44)
ESES	28.83 (3.25)	28.17 (3.54)	33.33 (3.56)	32.50 (4.85)	-0.96 (0.93)
SCOPE: Opportunities for RPA	8.67 (1.37)	8.67 (1.21)	9.33 (2.07)	9.50 (1.64)	0.14 (0.89)
SCOPE: Opportunities for Inclusion	18.00 (5.40)	19.33 (5.61)	17.17 (2.79)	17.67 (3.33)	-0.28 (0.79)

Note. Recreational Physical Activity (RPA): Leisure time PA, QOL: Quality of life, ESES: Exercise self-efficacy score; M: Mean, SD: Standard deviation. Independent t-test used to compare pre- to post-intervention outcome changes between groups. *denotes statistical significance.

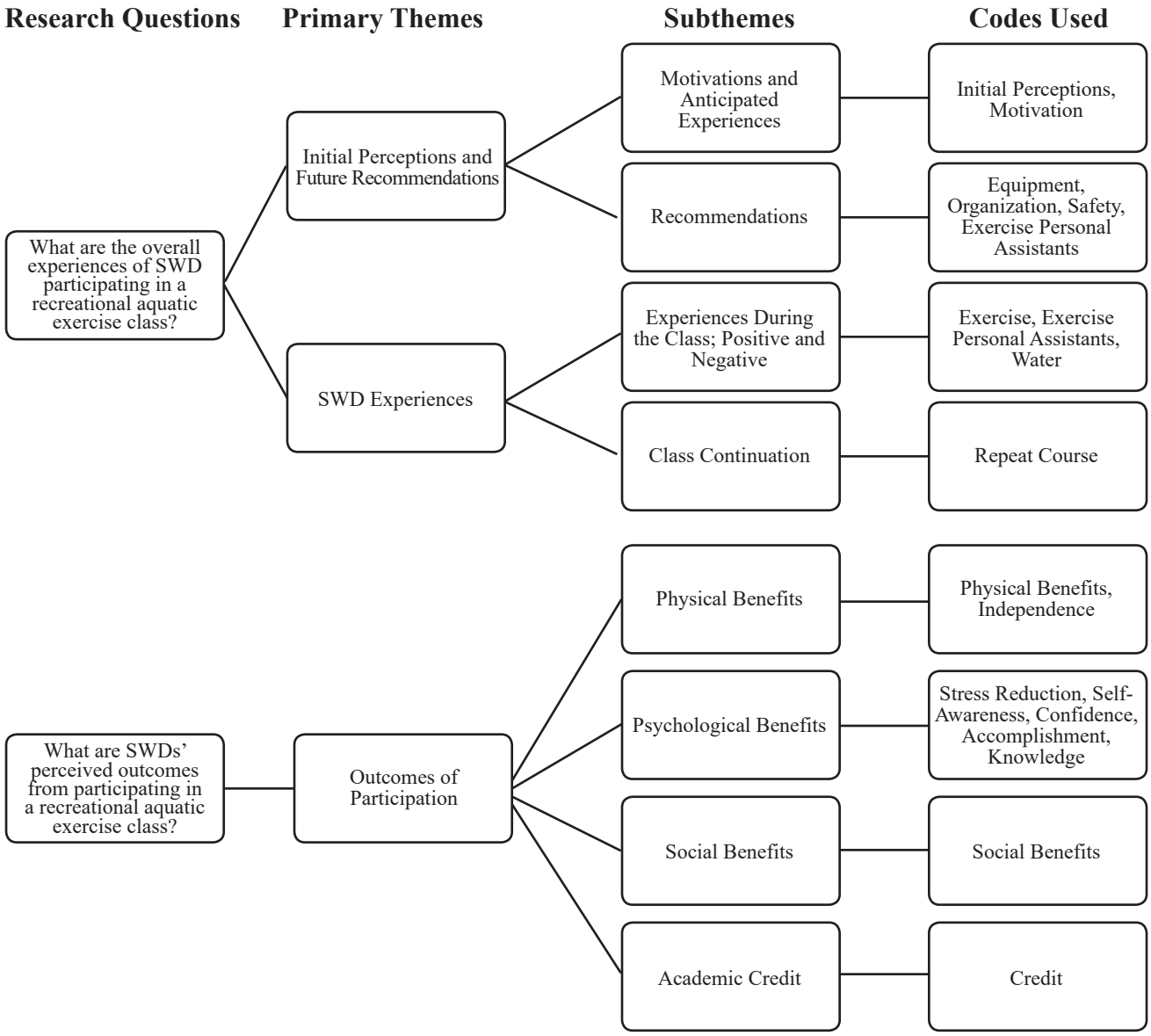

Figure 1. *Qualitative interview results*