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# Self-Determination Theory and Intellectual Disability

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## Introduction

Exercise is defined as structured participation in physical activity and repetitive body movement to improve overall health, wellness, and physical fitness (Powers et al., 2021). Exercise for special populations can lead to increased knowledge of nutrition, fitness, and body composition for health benefits (Field et al., 2003). The Centers for Disease Control and Prevention (CDC, 2022) recommended exercise levels includes regular physical activity for adults with or without disabilities, as at least 150 minutes of moderate-intensity aerobic physical activity a week. Along with at least 2 days a week of muscle-strengthening activities that include all major muscle groups. Following this pattern of physical activity helps individuals feel and function better and experience better sleep (CDC, 2022). Researchers have shown aerobic and muscle strengthening exercise leads to reduced anxiety, increased brain health, reduced risk of disease, strengthened bones and muscles, weight management, and improved abilities of everyday activities (Powers et al. 2021). Anyone can experience health benefits related to physical activity regardless of age, ability level, gender, ethnicity, or disability (D'Eloia, & Sibthorp, 2020). This concept of inclusion and accessibility surrounding exercise is related to self-determination theory SDT. In Student-Directed Learning: A catalyst for academic achievement and self-determination for students with intellectual disability, it is explained that self-determination and participant choice lead to increased opportunities for students to practice and refine skills that are meaningful to them. The findings from their study suggest that student-directed learning enhances academic achievement, as students become actively engaged and included in their own learning process (Garrels, & Palmer, 2020). This emphasizes the significance of personal autonomy in physical education and fitness. If participants with disabilities, feel empowered in their decision-making surrounding exercise they will likely be motivated to engage in physical activity as a lifelong practice. This is because participation is self-governed and focuses on the participant's own desire and interest to engage in exercise performance. Individuals with disabilities have the potential to increase their confidence in physical education environments through competence and relatedness. According to Relatedness for Youth with Disabilities: Testing a Recreation Program Model, there is a relationship between five mechanisms including: challenging experiences, peer role modeling, meaningful roles, learning new skills, and informal social experiences with similar peers (D'Eloia, & Sibthorp, 2020). These components are essential to developing relatedness and a sense of belonging. Exercise and fitness follow these concepts of relatedness through challenges individuals encounter when learning new skills, ability to engage with peers in gym and outdoor settings, and opportunities for social interaction through fitness activities. Ultimately, exercise is an outlet for individuals with disabilities to increase health and wellness. While also increasing their competency, confidence, and skills surrounding kinesthetics, equipment, and social experiences. These elements are explored and enhanced through Humboldt Fit Adults which is a program that aims to improve fitness levels for participants with disabilities through a collaboration with graduate-level student populations.

## Method

Humboldt Fit Adults is a program that focuses on promoting fitness, fun, and wellness for populations with disabilities through a collaborative model. The program is designed to build relationships, increase participant self-esteem, improve skills in gym settings, and overall levels of physical fitness in a supportive environment. The purpose of this study is to assess the benefits of exercise and movement for adult populations with disabilities in a self-determination model. The goal was to increase skill level through modeling, task analysis, data collection, and collaboration. This was achieved by working one-on-one with participants to establish personal goals related to physical fitness and support them in making steps to achieve those goals.

### Subject

The subject for this study included an adult male participant who is 52 years of age with an intellectual disability. This participant also has limited mobility due to a knee injury. His weight is 195 lbs., his height is 5 ft 7 in. He lives with family and his mother is his primary caregiver. He has employment doing physical labor including landscaping. Apart from that experience he reported exercising in the form of walking or weightlifting one to two times weekly. This individual has some sensory aversion and reports that he does not like to lay on his back while engaging in physical activity in certain settings. In his free time, he enjoys watching the National Association for Stock Car Auto Racing NASCAR, walking in nature, riding bikes, and spending time with friends and family.

### Setting

The setting for this study was a Student Recreation Center on a University of Northern California campus. This Student Recreation Center included a workout gym with exercise equipment and an indoor artificial turf field. The gym setting consisted of the following equipment and machines: machine weights, treadmill, elliptical, stationary bikes, stair machine, bench press, free weights, and medicine balls. The indoor artificial turf was used for our assessment of progress related to walking, curl-up, and push-up performance.

### Dependent Variables

During this study there were three dependent variables measured. These included the number of laps of self-paced walking for 6 minutes of 100 ft. The number of modified wall push-ups and curl-ups completed within 1 minute. Our overall goal was to increase physical fitness skills within these areas.

### Independent Variables

Within this study there were two independent variables. The first was a self-determination theory (SDT) that allowed the participant to create personal goals. Self-determination theory is the belief that you have the autonomy and right to direct your own life and that you have influence over your own destiny (Field et al., 2003). Through this model individuals have opportunities to make decisions, identify their strengths and weaknesses, express their perspective, and understand one's disability (McGuire & McDonnell, 2008). This decision making led the second independent variable which was a structured exercise program for the gym setting that followed the participant's interests. A task analysis was developed in the areas of free weights, pull down arm extension, rowing machine, bench press, stationary bike, and treadmill. These were all areas and equipment that the participant was interested in engaging with, to develop and increase his skills. My role was to support my participant and empower him through SDT frameworks such as individual responsibility, independence, and personal agency.

### Design

For this study a changing criterion design was utilized to establish a relationship between the self-determination theory and structured exercise program to increase physical activity and skills in the areas of laps walked, curl-ups, and push-ups. Through this process data was collected during each session related to benchmark goals. We tracked the completion of each task in the three target areas of assessment to get accurate data related to progress. The objective was to monitor progress and engage the participant to reach their established personal goals.

### Baseline

At the initial assessment baseline data was collected. The participant was able to complete 6 laps within the 6-minute walk. He was able to complete 3 modified wall push-ups within 1-minute and 0 curl-ups within 1-minute. At times he displayed difficulty following directions and required verbal or physical prompts to complete the tasks. There was a delay in responding to directions, approximately 30 seconds to 1 minute. The participant reported that the activities were difficult, I observed a decrease in stamina and participation near the end of each exercise. We collaborated to establish his personal goals in this study. The participant established a goal of 9 laps for the six-minute walk. Along with the goal of completing 7 modified push-ups and 6 curl-ups by the end of the program.

### Intervention

The intervention used to successfully increase participation and develop skill level surrounded a self-determination model and a positive reinforcement intervention strategy. Within this study we looked at social validity and how an increase in physical activity would benefit the daily lives and health of our participants. This was achieved by considering key elements such as: personal autonomy, relatedness, competence, and intrinsic motivation. These concepts are within SDT and help to instill confidence among participants (Field et al., 2003). The intervention was an exercise program with a task analysis for various gym equipment and activities. These consisted of the following exercises: dumbbell or free weights, treadmill, stationary bike, pull down arm extensions, rowing machine, and bench press. This exercise program was conducted through five sessions and considered the participants specific needs, interests, and present abilities. The exercise program tasked the participant with lifting free weights weighing 10 to 20 pounds with 10 reps for 2-3 sets. He also was to complete 15 to 20-minute sessions on both the treadmill and stationary bike. The treadmill had an incline and speed of 5 that was slowly increased to 8 over time. The stationary bike was set to a resistance of 5 that was increased to 8 over time. The participant engaged in pull down arm extensions with a weight of 30 lbs. 5 reps for 2-3 sets. The same parameters were used for the rowing machine and bench press exercises.

### Data Collection

Major elements within this study include heart rate monitoring, individual exercise program task analysis, evidence-based practices, single subject design, changing criterion design, and different stages of action research including observation, assessment data, designing interventions, analyzing data, and reporting data. Progress was measured through a 6-minute distance walk, number of curl-ups, and number of push-ups completed. At the end of the study, which consisted of five interactive sessions, the team was able to observe an increase in ability and overall skill level surrounding physical fitness and gross motor skills. This was based on the criteria of performance and data collected weekly. This data was compared to the established goals and the previous week's results to track progress and growth. The participant met and/or exceeded their established goals related to timed walks, push-ups, and curl-ups with the support of the individual exercise program self-determination-based intervention through the Humboldt Fit Adults program.

## Results

This study utilized a changing criterion design over the course of six weeks. Following the self-determination theory, the participant was provided the opportunity to establish their exercise goals. Below is a demonstration of the participant performance across the 6-week time frame.

### Baseline Phase

All baseline data was collected on the first day of the program. For the 6-minute walk the participant completed 6 laps. Additionally, the participant completed 3 modified wall push-ups and 0 curl-ups within the 1-minute time frame. During the exercise portion of this study the participants' heart rate (HR) was at a resting level of 59, maintained a moderate HR level for 10 minutes of the 90 minutes, and a peak level of 174.

### Criterion Phase 1

During the criterion phase 1 the participant completed 7.5 laps within the 6-minute walk walking assessment. Additionally, the participant completed 3 modified wall push-ups and 2 curl-ups within the 1-minute time frame. During the exercise portion of criterion phase 1 the participants' HR was at a resting level of 59, maintained a moderate HR level for 0 minutes of the 90 minutes, and a peak HR level of 118.

### Criterion Phase 2

During the criterion phase 2 the participant completed 8 laps within the 6-minute walk walking assessment. Additionally, the participant completed 5 modified wall push-ups and 4 curl-ups within the 1-minute time frame. During the exercise portion of criterion phase 2 the participants' HR was at a resting level of 59, maintained a moderate HR level for 0 minutes of the 90 minutes, and a peak HR level of 120.

### Criterion Phase 3

During the criterion phase 3 the participant completed 8.5 laps within the 6-minute walk walking assessment. Additionally, the participant completed 8 modified wall push-ups and 5 curl-ups within the 1-minute time frame. During the exercise portion of criterion phase 3 the participants' HR was at a resting level of 53, maintained a moderate HR level for 5 minutes of the 90 minutes, and a peak HR level of 138.

### Criterion Phase 4

During the criterion phase 4 the participant completed 9 laps within the 6-minute walk walking assessment. Additionally, the participant completed 12 modified wall push-ups and 7 curl-ups within the 1-minute time frame. During the exercise portion of criterion phase 4 the participants' HR was at a resting level of 69, maintained a moderate HR level for 1 minute of the 90 minutes, and a peak HR level of 129. Below is an illustration of the participants performance across the 6-minute walking test, push-up test, and curl-up test.

Figure 1

*The Total Number of Laps Completed by the Participant*

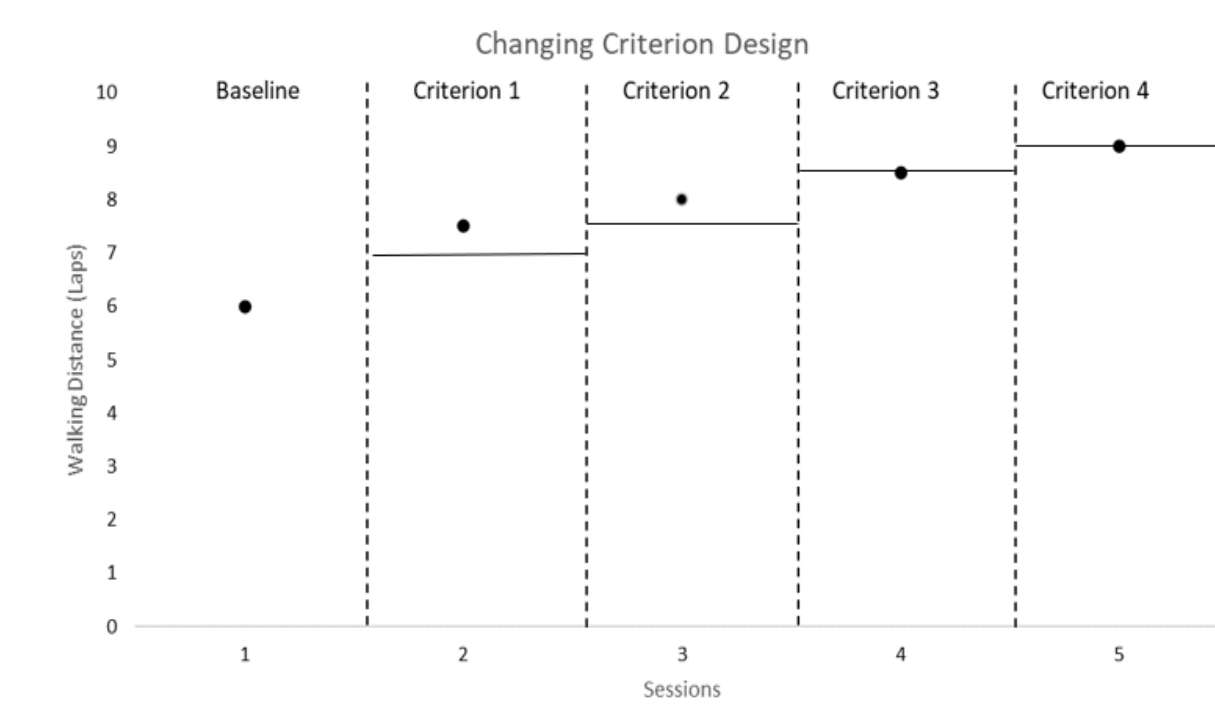


Figure 2

*The Total Number of Push-Ups Completed by the Participant*

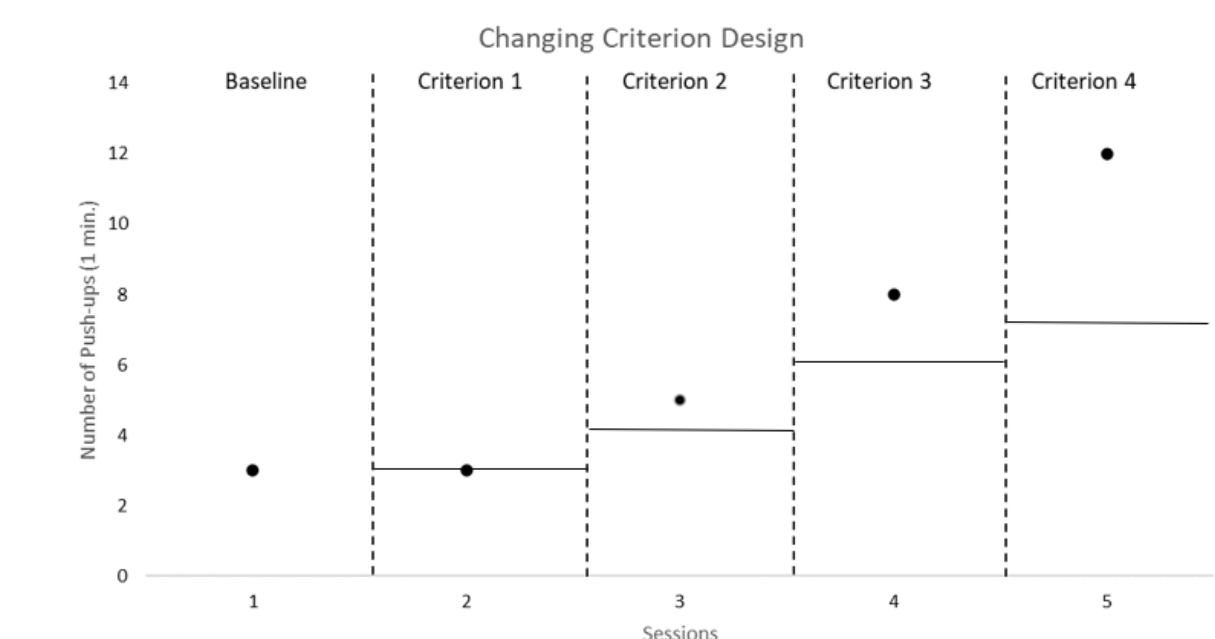
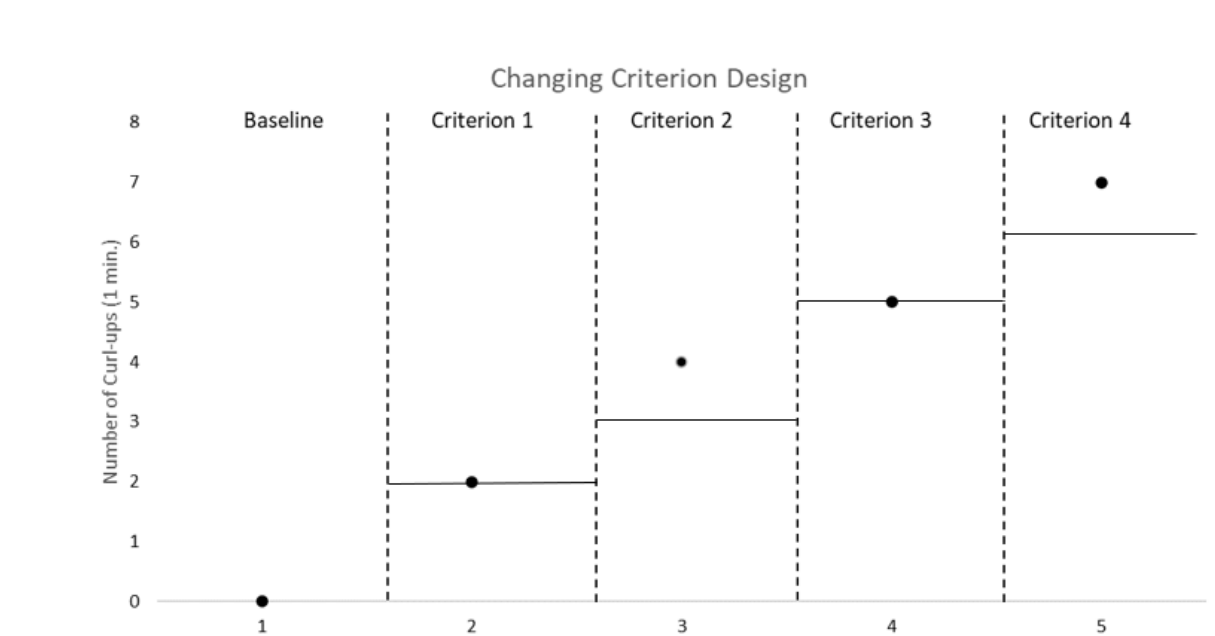


Figure 3

*The Total Number of Curl-Ups Completed by the Participant*



## Discussion

The purpose of this study was to increase physical fitness skills within adult populations with disabilities in the areas of walking, push-ups, curl-ups through a self-determination model SDT. This was achieved through collaborative engagements with graduate-level students. Within this collaboration participants chose exercise goals and success criteria. An exercise program was established to increase their skills over five sessions and teach participants how to be independent in their physical fitness endeavors and environments. The goal was to determine if experiences within this study would lead to increased participation and develop skill level surrounding physical fitness. By the end of the six week study the participant met and exceeded all goals. During baseline the participant completed 6 laps within the 6-minute walk, 3 push-ups, and 0 curl-ups. By the end of the study, he completed 9 laps within the 6-minute walk, 12 push-ups, and 7 curl-ups. It can be concluded that the intervention was successful. Universal Design for Instruction is a paradigm for adults with learning disabilities that fosters self-determination by offering individuals productive opportunities for learning that leads to enhanced abilities (Field et al., 2003). I believe the results of study occurred because of the self-determination model which incorporated personal autonomy, relatedness, competence, and intrinsic motivation.

### Limitations

The limitations within this study surrounded the length of time and limited engagements with my participant. I was only able to conduct my intervention strategy one time each week for a period of two hours. Despite our limitation and ability to only meet once weekly, I made sure to fully utilize the time during our sessions by keeping my participant motivated and engaged to increase skills by the end of the study. A recent study of secondary and post-high school special education programs tracked participant involvement in recreation for a 2-week period. This was also a study in which they conducted research within a limited time frame. The results establish a predictive relationship between recreation and self-determination, indicating that increased amounts of time adolescents and adults spend actively involved in physical fitness were found to be predictive of higher levels of self-determination (McGuire & McDonnell, 2008). So, despite time limitations this study and my own display evidence of increased skills within a self-determination model. Another limitation was my participants' sensory aversion to lying on his back. He reported distress and discomfort when we made attempts to perform curl-ups in the field house setting of the recreation center. I determined that it was in part due to the faux turf field. I made an adaption to our assessment and allowed my participant to practice their curl-ups in a different environment with yoga mats. Although the participant still had some difficulty performing the task, he was able to engage in the exercise, as compared to baseline in which he did not participate in the exercise task. Enhanced self-determination and choice have been linked to more positive quality of life and lifestyle satisfaction for adults with intellectual disabilities (Singh, 2018). Once I made the adaption and offered my participant choice surrounding the exercise, we removed the limitation, and he slowly became more comfortable and confident with lying on his back with partial physical support to get into position.

### Future Research

Future research should consider utilizing a larger adult population and diverse group of participants to measure the effects across multiple participants with varied disabilities. Another direction for an extension of this study would be to increase the amount of session time. Within this study researchers could collect data to determine if increased time would further increase skill level. There is also an opportunity for future research by creating a study that focuses on a self-determination model that is conducted in another physical fitness setting, such as an outdoor recreational environment. Within this study researchers could consider the benefits of physical fitness experiences in nature for adults with disabilities. This future research could be similar to a study in which they measured progress and participation in fitness and recreation programs and facilities among persons with disabilities (Yu et al., 2022). Incorporating an SDT model may help to enhance research and results across settings.

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