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Abstract

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ABSTRACT

Purpose: A repeated measures single-group feasibility study was used to investigate the potential success and feasibility of an adaptive climbing program including group social skills activities to positively impact social skills in children with developmental delays. **Methods:** A convenience sample of 10 children aged 4 to 12 years participated in six social skills activity groups and adaptive climbing sessions at a rock-climbing facility in North Carolina. Trained observers measured targeted social skills via an author-generated social skills tracking form. **Results:** A paired t-test indicates a statistically significant improvement in social skills from session 1 to session 6 ($p < .001$). Trained volunteers, access to an established climbing gym and necessary equipment may increase ease of program implementation. Considerations for future programming should also include programs of longer duration, tailoring climbing experiences to each climber's skill and comfort level, and pairing climbing with social skills activities for opportunities to learn the skills before practical implementation. **Conclusions:** Outcomes suggest participation in a community-based adaptive climbing program that involves group social skills activities may be beneficial for promoting social skill development in children with developmental delays. Opportunities exist for occupational therapists to partner with climbing gyms or other organizations to develop and tailor programming specific to each child's developmental level and needs.

Keywords: adaptive sports, adaptive climbing, social skills, social skills training, developmental delays, community based, sports programs

INTRODUCTION

In the United States, one in six children is diagnosed with a developmental delay each year.¹ The Center for Disease Control states that “developmental disabilities are a group of conditions due to an impairment in physical, learning, language, or behavior areas. These conditions begin during the developmental period, may impact day-to-day functioning, and usually last throughout a person’s lifetime.”¹ Developmental delays occur in children of all races, ethnicities, and socioeconomic statuses. Delays can occur in one or more of the following areas: gross motor, fine motor, language, cognitive, self-help, or social skills.

The development of social skills is of utmost importance for optimal functioning in everyday life. Acquiring social skills is a necessary component of a child’s growth and development.² As early as kindergarten, social competence can be a predictor of outcomes in major areas including education, employment, criminal justice, substance abuse, and mental health.³ “Between 9.5 and 14.2 percent of children ages birth to five years old experience social-emotional problems which negatively impact their daily functioning, development, and readiness for school.”⁴ These social-emotional delays often result in difficulty interacting with others, taking turns, playing cooperatively, and forging relationships with family and peers.

Sports participation rates are lower for children with developmental delays when compared to typically developing children.⁵ Several factors may prevent children with disabilities from participating in sports with typical developing peers, including social isolation, limited availability of sports organizations, and physical limitations.⁶ Differences in sports participation are problematic due to the already existing developmental differences in children with developmental delays.⁷ Individuals who do not participate in sports may experience a lower quality of life and less opportunity to engage in social situations; these potential problems may be inherent due to the nature of their disabilities.⁸

Sports participation in a structured environment can provide opportunities to all children for increasing social skills, and building peer relationships.^{9,10} In addition, pairing children with developmental delays with their typically developing peers in a sports program has resulted in greater understanding of social situations, increased community connections, and establishment of friendships for those with developmental delays.¹¹ The Special Olympics organization as well as other organizations provide opportunities for children with developmental delays to engage in inclusive and/or adaptive sports. Adaptive sport participation can foster self-esteem, confidence, and social integration for children with developmental delays.^{12,13} These adaptive sports programs are more than just opportunities to participate in age-appropriate activities and compete, as they place a strong emphasis on engagement, development, and socialization.

A variety of adaptive sports programs have been investigated relative to the promotion of social skills. Programs focused on hippotherapy, community-based swimming, track, basketball, soccer, and other physical activities and games such as hopping, jumping, Simon Says, and navigating obstacles; all resulted in improvement in social skills in the participants.^{14,15,16,17} Three studies incorporated adaptive climbing but focused on outcomes associated with self-efficacy, alienation, and sense of personal control. Mazzoni et al revealed that wall climbing increased self-efficacy in children with developmental delays when executing necessary steps to complete physical and social tasks that occurred during the climbing activities.¹⁸ Self-efficacy is defined as an individual’s belief that they are capable and have the necessary skills to perform a task. Krüger and Seng demonstrated positive effects in children’s self-efficacy when using indoor climbing as an intervention.¹⁹ Finally, Cross found that rock climbing could decrease feelings of alienation and improve one’s sense of self control.²⁰ No studies to date have specifically explored the use of adaptive climbing to promote social skill development, and improvements in self-efficacy have not been associated with improvements in social skills in these prior studies. Climbing may offer opportunities for children to engage in social situations and practice social skills including following directions related to safety and use of equipment, waiting turns to climb, asking appropriate questions related to safety and asking for help, and initiating and maintain conversations during the experience. Therefore, the purpose of this study was to investigate if participation in an adaptive climbing program could positively impact the social skills of children with developmental delays, as well as to assess the feasibility of such a program.

METHODS

Design

A repeated measures single-group pilot design was used to assess the feasibility of a structured adaptive climbing program to impact specific social skills in children with developmental delays. The 6-week adaptive climbing program included two components during each session: 1.) a structured social skills activity focused on specific social skills, and 2.) adaptive climbing to reinforce and practice the social skills taught. The program was designed for six weeks due to the doctoral capstone requirement. Several prior studies incorporated both a social skills activity group and adaptive sports with positive outcomes related to social skill development, thus further supporting this choice of study activities.^{2,16}

Repeated measures designs are appropriate to evaluate the longitudinal influences of a particular treatment or intervention.²¹ In this case, the participants’ social skills were assessed at baseline, midpoint, and at the conclusion of a 6-week adaptive climbing

program. A feasibility study was indicated since no studies to date have specifically explored adaptive climbing related to the acquisition of social skills. The logistics of conducting a safe adaptive climbing program requires multiple trained volunteers related to the climbing itself as well as data collection to reduce bias. Therefore, this study was also undertaken to determine the feasibility of using an adaptive climbing program to promote social skills in future research. Specific aspects of feasibility explored include availability of resources, equipment, and trained volunteers, safety, alignment with operational procedures at the facility, as well as the potential interest in and success of such a program. The study was approved by the Institutional Review Board at Chatham University.

Participants

Participants in this feasibility study were recruited through convenience sampling from a monthly adaptive climbing program at a rock-climbing facility in Fayetteville, North Carolina. Fliers were displayed at the climbing facility and distributed during the monthly climbing program. Eight participants were recruited via these methods, and two additional participants were recruited via snowball sampling by other adaptive climbers and their families. The final sample size was reflective of the number of participants that could be safely accommodated in the gym space and of the equipment and volunteers available. There were no dropouts, though one participant missed the session in Week 4 due to illness. Inclusion criteria for participation were age 3-18 years, spoke English as their primary language, and had a below average score on the Social Skills Improvement Scale per parent report.²² The Social Skills Improvement Scale is a standardized norm-referenced parent report scale used to evaluate social skills and other problem behaviors for 3–18-year-olds; a score of below average is indicative of one standard deviation below the mean skill level of a typically developing child of the same chronological age.²² The wide age range of participants was purposefully chosen, since developmental skills vary greatly in this population and often do not align with chronological age. Parents of climbers also had to report concern with their child's development in at least one of the following areas: language, cognition, social skills, fine motor, or gross motor skills. Delays in social skills were confirmed via The Social Skills Improvement Scale, and a formally diagnosed delay was not required in order to participate. Climbing participants were excluded from participation if they were non-verbal, demonstrated aggressive behaviors, or had bilateral amputations.

Parents or guardians of all 10 adaptive climbers provided informed consent for their child's participation. They also completed the Social Skills Improvement Scale to confirm inclusion criterion was met. Prior to the first day of the study, the first author met with each family individually to allow them to see the climbing gym and ask questions about the study. At the conclusion of this meeting, an adaptive climber assent form was signed by children seven years of age and older; verbal assent was obtained from children under the age of seven. Of the 10 climbers, seven (70%) were female and three (30%) were male, and they ranged from 4 years to 12 years in age. Eight of the 10 participants had engaged in previous monthly adaptive climbs. Adaptive climber demographics are further described in Table 1.

Volunteers

Volunteers were needed to assist with data collection, to interact with climbers, and most importantly to ensure the safety of the adaptive climbers. Volunteers were recruited via an informational flyer posted on the climbing gym's community board and distributed by the climbing gym manager during adaptive climbing events; the flyer invited interested volunteers to an informational meeting where details of the adaptive climbing program, time commitment, and volunteer responsibilities were reviewed, and questions were answered.

Volunteer participants were required to be over the age of 18 years, sign a volunteer agreement, complete the rock-climbing facility's waiver of liability, and attend a volunteer training. Volunteers who signed up to physically support climbers were required to be independently ambulatory. Volunteers who were fulfilling the role of belayers were required to be belay certified. A climbing belayer is the person who controls the rope while the climber is climbing. Volunteers were not required to have experience collecting data on social skills since this skill was taught and practiced during the training sessions. The total time commitment for the volunteer participants was approximately 15 hours, which included a 1-hour training session followed by the 2.25-hour weekly climbing sessions for six weeks. Ongoing support was provided for the volunteers throughout the six weeks. This time is comprised of session preparation, assisting with the social skill groups, data collection, and assisting adaptive climbers' rock climb. Twenty to 25 volunteers were required per session to cover all required tasks including observing and assessing social skills, belaying, partner climbing, and managing small groups of participants during the social skills activity component of each session.

Thirty-four volunteers signed the volunteer agreement and attended the one-hour training on the climbing program conducted by the first author, who is a registered and licensed occupational therapist and certified to belay climbers. The same training was held at three different times to accommodate all volunteers' schedules; furthermore, holding the trainings in small groups allowed sufficient time to cover all planned content as well as time to address any individual questions or concerns. The training included information on climbing rules, various developmental delays, different techniques to assist climbers, how to utilize the social skill

tracking form to collect data, and how to identify the social skills of focus in the study. The first author was present at all climbing sessions and available to volunteers for ongoing support throughout the program.

Measures

Two outcome measures were used for data collection in the study. A social skills tracking form, developed by the first author, was used to record observations of the climbers demonstrating specific social skills. The tracking form, included in Appendix A, focused on the social skills of following directions, waiting turns, asking questions, maintaining personal space, and initiating and maintaining conversations. These specific skills were purposefully chosen by the first author, an experienced climber, after consultation with other skilled climbers. Through discussion, these skills were agreed upon as the most critical for a safe climbing experience. For example, a climber who does not follow directions could easily cause harm to themselves or others. Additionally, focusing on a limited number of social skills was most feasible given the short duration of the program. This tracking form was developed and trialed as no standardized scale currently exists to measure these skills.

The social skills tracking form provided brief descriptions of each skill as well as space to record tally marks each time a volunteer observed each skill being used by a climber. Data was collected during a 30-minute observation period for each climber, during climbing sessions 1, 3, and 6. Some climbers required breaks during climbing activities, but no data was collected during the breaks nor during setup or clean up times. To improve reliability and validity, the social skills tracking form was trialed with a group of volunteers at one of the monthly adaptive climbing events not associated with this study. After this trial, it was determined that additional descriptions of the social skills and role-playing activities were needed to help volunteers to accurately identify social skills during the feasibility study. Volunteers in this feasibility study were not required to have previous experience in assessing social skills. They were trained in using the social skills tracking form and had the opportunity to practice using the form through role playing prior to actual data collection. During the study, each climber had their own set of two volunteers who were assigned to track their observed social skills via separate social skills tracking forms. Then, the first author averaged the two scores for each climber. Inter-rater reliability was high as data comparison between the two volunteers differed only once during session 1 (87.5% agreement), and twice during session 3 (73.5% agreement). There were no discrepancies in recorded observations during session 6 (100% agreement). Due to the relatively short duration of the program, the intention was to assess changes from week 1 to week 6; however, because of the use of an author-generated tool, data was collected during week 3 as well to further assess inter-rater reliability and the feasibility of using this tool to measure social skills. The tools underwent piloting and were found to have good content validity and interrater reliability.

The second measure was a self-report survey, developed by the first author, which included nine Likert-style "I can" statements to assess perceptions of the adaptive climbing participants regarding their own social skills. Each statement on the survey was paired with a picture to assist children who required visual cues, or who had difficulty understanding emotions or reading. For example, one statement was "I can wait my turn." Survey responses were "always", "sometimes", and "never". A 3-point scale was deemed appropriate to gather opinions from a diverse group of climbers with varying developmental delays, providing more response choices may have been overwhelming for some participants. A team of 3 expert occupational therapists with over 50 years of combined pediatric experience reviewed the survey and determined it to be relevant for adapted climber participants and to have adequate face validity. This measure was specifically designed to receive feedback from climbers on their climbing experience as no standardized test was available to collect this information. The survey was administered at the conclusion of the study. The full survey can be found in Appendix B.

Procedures

The study consisted of one 2.25-hour group session each week for a period of six weeks. The first week's agenda included an introduction to climbing comprised of a review of the required equipment and safety rules; this introduction, provided by the first author, was followed by the first climbing experience of the program for each climber, and simultaneous collection of baseline data. The sessions in weeks 2 through 6 each began with group structured activities, led by the first author, focused on one specific social skill, followed by adaptive climbing. The social skills covered included following directions (week 2), waiting turns (week 3), asking questions (week 4), maintaining personal space (week 5), and initiating and maintaining conversation (week 6). The social skills group portion of each session lasted 30-45 minutes, and all 10 climbers participated in the structured activity or game meant to teach and encourage the specific social skill for that week. All 10 climbers participated in the structured game or activity simultaneously. They were paired based upon developmental skills and volunteers were present to model and facilitate skills. Climbing activities which lasted 60-90 minutes (with breaks as needed) began after the completion of each social skills group.

Prior to climbing, climbers were provided with demonstrations on how to don and secure their harness correctly. Next, the climbers worked with volunteers to decide which climbing activity was the best fit for them. The range of activities and the level of challenge was individually tailored for each climber throughout the sessions. The Wellman Chair was considered the highest level of support or the lowest level of challenge. The Wellman chair utilizes a 3:1 pulley system to assist climbers who have physical impairments

(climbers who have gross motor or fine motor delays) or who need to build confidence before climbing vertically or horizontally on the rock-climbing wall. The next level of challenge was horizontal climbing on the wall to practice motor movement and holding onto rocks. After mastering horizontal climbing, climbers could learn to climb vertically with a partner who could be either another adaptive climber or a volunteer; this is referred to as partner climbing. The level of support provided through partner climbing ranged from verbal encouragement to physical support of ankles and hands on the wall. Adapted harnesses were available for adaptive climbers who required seated or chest support. Additional modifications to climbing activities included the distance the climbers could climb up the wall, practicing climbing up the wall and being lowered, the types of holds utilized and eventually progressing to being timed or following a specific color path. The skill level of climbers increased and decreased each week and activities required modification to align with each climber's ability.

Data Analysis

Using SPSS Statistics Version 25.0, a paired t-test was conducted to analyze baseline and week 6 results related to observed social skills for the adaptive climbers. Microsoft Excel Version 2019 16.0 was used to calculate the percent change in social skills for each climber and for the group in aggregate from week 1 to week 6. A positive result indicates an increase in frequency of the observed social skills, and a negative result indicates a decrease in frequency of the observed social skills. The frequency of aggregate observed social skills at baseline, week 3, and week 6 were graphed to illustrate longitudinal trends over the course of the program. Finally, the responses from the "I Can" survey were tallied to gain insight into the perceptions of the adaptive climbers related to their own social skills. Initially, data analysis was undertaken by the first author, and later verified by the second and third authors.

RESULTS

There was a significant difference in social skills observed from week 1 ($M=18.7$, $SD=9.17$) to week 6 ($M=33.8$, $SD=10.06$); $t(9)=11.7$, $p<.001$. The aggregate frequency of specific social skills observed at Weeks 1, 3, and 6 are displayed in Figure 1.

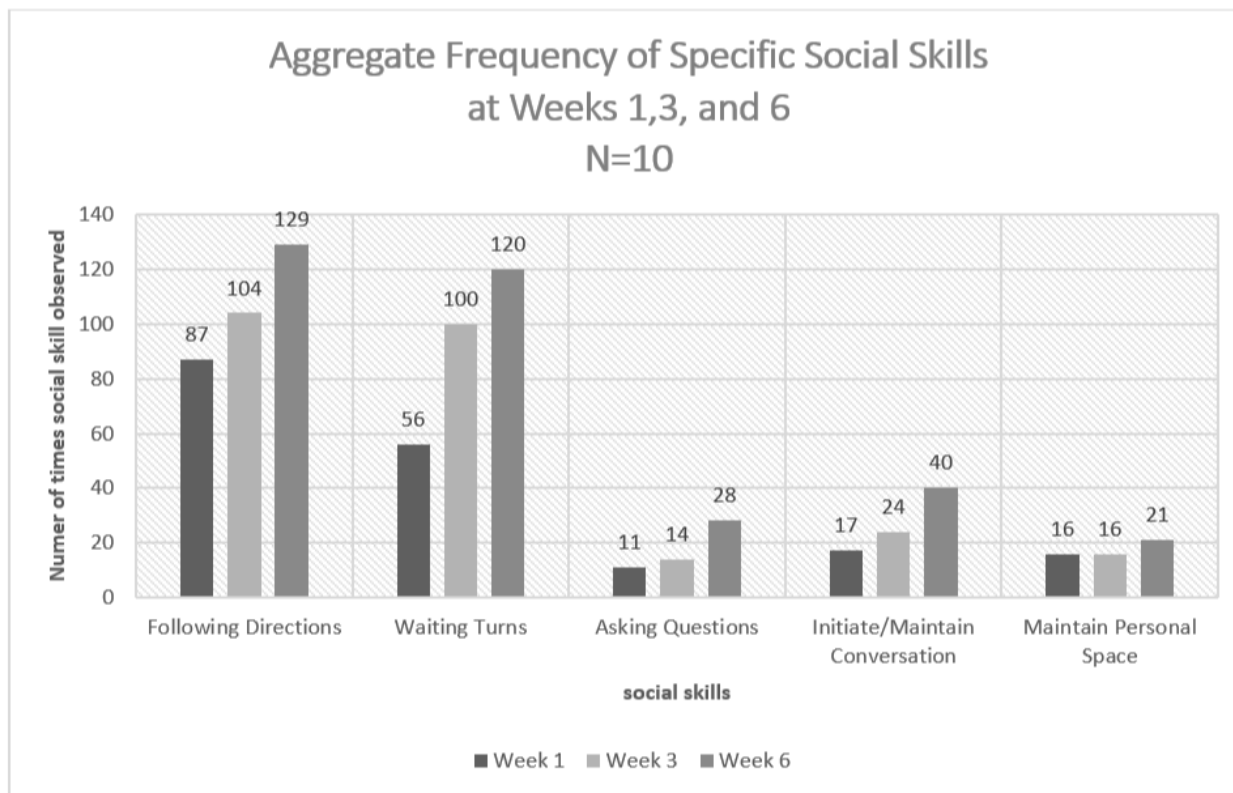


Figure 1. Aggregate Frequency of Specific Social Skills at Weeks 1, 3, and 6.

Volunteers observed the largest percent change in the social skill of asking questions; this skill was observed 11 times in session 1 and 28 times in session 6 which equates to a 154 percent increase. The smallest observed change occurred for the social skill of maintaining personal space with 16 observations in session 1 and 21 in session 6, resulting in a 31% increase. Three adaptive climbers demonstrated an increase in all five social skills (Climbers 4, 6, & 7); four climbers had observed increases in 4 social skills (Climbers 1, 2, 3, & 5); the remaining 3 climbers (8, 9, & 10) demonstrated improvements in 3 social skills areas. The percent

change in all social skills by climber ranged from 42.11% (Climber 9) to 250% (Climber 6). The frequency and percent changes by social skill and climber are included in Table 1. Participant demographics are also included so outcomes can be compared to these characteristics.

Table 1. Frequency & Percent Change in Observed Social Skills from Week 1 to Week 6 by Climber

Climber	Demographics			Frequency & Percent Change in Observed Social Skills					Total Percent Change By Climber
	Gender*	Age in years	Climbing Exp**	Following Directions (wk1, wk6, % change)	Waiting Turns (wk1, wk6, % change)	Asking Questions (wk1, wk6, % change)	Initiate/Maintain Conversation (wk1, wk6, % change)	Maintain Personal Space (wk1, wk6, % change)	
1	F	4	Y	17, 22, 29%	7, 13, 86%	3, 5, 67%	4, 4, 0%	2, 4, 100%	45.45%
2	F	7	Y	4, 11, 175%	4, 8, 100%	0, 2, 200%	0, 5, 500%	4, 4, 0%	150%
3	F	6		12, 16, 33%	6, 12, 100%	0, 1, 100%	0, 2, 200%	1, 1, 0%	68.42%
4	M	7	Y	7, 9, 29%	4, 12, 200%	1, 4, 300%	3, 4, 33%	0, 2, 200%	93.33%
5	F	12	Y	4, 7, 75%	2, 8, 300%	0, 3, 300%	0, 2, 200%	2, 1, -50%	162.5%
6	M	4	Y	2, 8, 300%	4, 9, 125%	0, 1, 100%	0, 2, 200%	0, 1, 100%	250%
7	F	5		8, 11, 37%	7, 19, 171%	2, 4, 100%	3, 7, 139%	0, 3, 300%	120%
8	F	6	Y	14, 18, 29%	7, 15, 114%	3, 3, 0%	4, 9, 125%	5, 3, -40%	45.45%
9	F	4	Y	8, 8, 0%	10, 14, 40%	0, 2, 200%	0, 2, 200%	1, 1, 0%	42.11%
10	M	12	Y	11, 19, 73%	5, 10, 100%	2, 3, 50%	3, 3, 0%	1, 1, 0%	63.64%
Aggregate % Change By Social Skill				48%	114%	154%	135%	31%	

*F=Female; M=Male, Y=Yes

The frequency of responses related to the self-report survey is detailed in Figure 2. In this survey, climbers indicated if they believed they could “always”, “sometimes,” or “never” display specific social skills. Nine out of 10 climbers completed the survey; one climber departed the final session prior to survey administration. Of the nine climbers who completed the survey, one hundred percent reported they always felt like they could “wait their turn” and “stop” when they need a break.

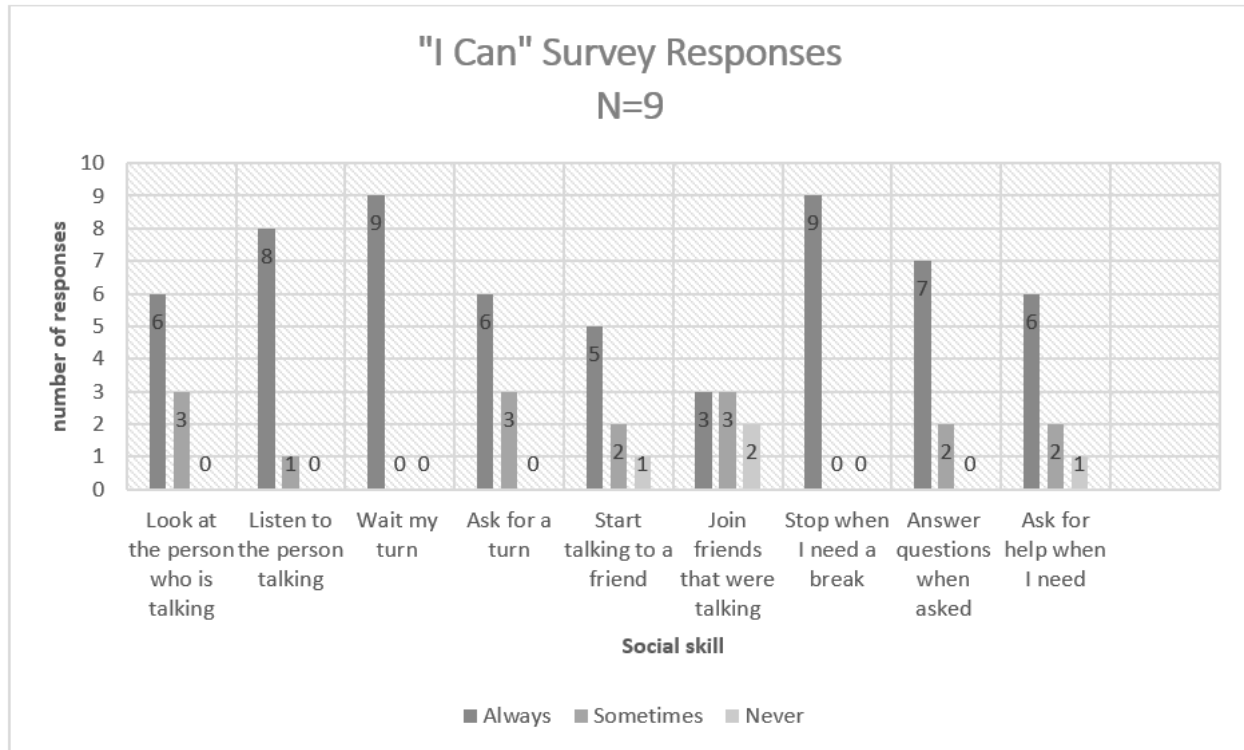


Figure 2. "I Can" Survey Responses at Week 6

DISCUSSION

Although previous studies investigated the impact of various adaptive sports on social skills, this feasibility study is the first to explore the use of a structured adaptive climbing program which included social skills activities for this purpose. After participating in the community-based adaptive climbing program, study participants demonstrated statistically significant improvements in observed social skills. These results add to the existing evidence that adaptive sports participation can promote social skill development for children with developmental delays.^{14,15,16,17} These prior studies incorporating adaptive swimming, track, soccer, basketball, hippotherapy, other gross motor physical activities, and games noted similar improvements in social skills of child subjects. Several of the studies incorporated specific social skills training or activities in conjunction with the adaptive sports, which further supports the design of this adaptive climbing program.^{2,16} Finally, results of the "I Can" survey confirm that the climbers in this study believed in their ability to use a variety of social skills after participating in the program. This finding is supported by prior adaptive climbing studies that reported improved self-efficacy in study participants.^{18,19}

While the aggregate group demonstrated statistically significant improvements in observed social skills, each climber also demonstrated improvements in at least three of the five social skills that were targeted, with mean percent change by climber ranging from +42.11% to +250%. The climbers who had the greatest percent change in social skills (Climbers #2, 5, & 6) were noted to have prior climbing experience. Those with prior climbing experience may have been less anxious about climbing and more knowledgeable of the required procedures, thereby allowing greater engagement in the experience and demonstration of social skills. Also, nine out of the 10 climbers had normal developing siblings which may have provided them with more opportunities for peer modeling of social skills outside of the study. Finally, climbers who demonstrated little to no targeted social skills during the initial observation had the greatest potential for improvement, and their scores yielded higher percent changes.

Those climbers with the least percent change across all social skills (Climbers # 1, 8, & 9) were in a younger age group (aged 4 to 6 years), and several of the targeted social skills begin to emerge in this time period. For example, all three of these climbers demonstrated difficulty with following directions, and this skill is usually observed in typically developing children at approximately 4 years 8 months.²³ These climbers all presented with developmental delays and two of them had only younger siblings which likely diminished the impact of peer modeling.

In the review of data related to all five social skills, the greatest improvements were noted with demonstration of asking questions (+154% change) and initiating and maintaining conversation (+135% change). Opportunities exist to practice these skills in a variety of environments including home, school, and other community settings, which may have reinforced behaviors encouraged

during the adaptive climbing experience. These skills were also emphasized repeatedly by the first author and climbing volunteers to ensure safety during climbing. In addition, these skills are less abstract and sometimes more easily understood than higher level social skills.²³ Conversely, the least improvement was maintaining personal space (+31% change); children with developmental delays often miss the important social cues from others indicating they are too close. In addition, the ability to maintain personal space requires acquisition of a variety of more complex social skills including acting according to social rules, displaying situationally appropriate behaviors, and perceiving others' emotions.²³ While opportunities to practice maintaining personal space were available during climbing, they may have been considerably less so since safety sometimes required climbers to be closer to the volunteers for assistance.

Feasibility of an Adaptive Climbing Program

This study demonstrates the feasibility of using adaptive climbing in conjunction with structured social skills activities to promote social skill development in children with developmental delays. The use of two to three trained volunteers per climber was required to physically support each climber during climbing, monitor safety, and collect data on observed social skills. Volunteers who were belay certified as well as those who were trained by the first author to collect data were required. The support of the climbing gym and many engaged volunteers contributed to the success of this program, and establishment of future programs would rest heavily on the ability to recruit and retain qualified volunteers.

Eight of the 10 climbers in this study had prior climbing experience and as noted, some of the largest gains were among climbers with prior experience. In a relatively short-term program such as this one (6 weeks), having prior climbing experience may allow greater engagement in the experience and demonstration of social skills. Recommendations include longer duration programming especially if participants have no climbing experience, as well as tailoring each climbing experience to the individual's skills and comfort level for maximum safety.

In this study, the adaptive climbing experience was purposefully paired with a group social skills activity each week, so that climbers first learned about each social skill, and then had the opportunity to apply this knowledge during the adaptive climbing experience. This approach helped to bring awareness to the expected skills prior to the climbing activity and may have resulted in greater improvements than if the climbing program would have occurred in isolation. Prior studies that employed a structured social skills group in conjunction with an adaptive sports program made similar conclusions.^{2,16} For these reasons, the incorporation of a structured social skills group into future adaptive climbing programs is recommended. Finally, when coordinating an adaptive climbing program, it may be advantageous to consider age and developmental level of climbers regarding the most appropriate social skills to target. For this study, the authors choose skills fundamentally important for adaptive climbing, which may not have been the most developmentally appropriate for each climber.

Other important considerations in establishing an adaptive climbing program include the availability of resources and equipment and the operational procedures of the gym. The climbing gym used in the study held prior adaptive climbing events and had the required adaptive equipment available for use because of fundraising efforts; they also had an adequate number of trained volunteers. In addition, their mission, goals, and operational procedures aligned with those of this study, which increased ease of collaboration. Seeking out an established adaptive climbing facility could eliminate barriers related to equipment availability or collaboration. The purchase of required equipment and training and certifying volunteers for climbing could be cost-prohibitive, though donations, fundraising, or grant funding could be pursued. Another limitation is the climbers did not need to have a formally diagnosed delay to participate. Finally, this study illustrates the potential interest and success of an adaptive climbing program and justifies future study of this topic on a wider scope.

Limitations

Limitations include the small convenience sample, lack of a control group, a relatively short time frame for execution, no long-term follow-up, and use of author-generated outcome measures. The small sample size, dictated by the need to ensure safety of all climbers and volunteers, could be addressed by running multiple adaptive climbing programs/sessions and collating the data. While the single-group design was appropriate for the feasibility nature of this study, a wait-list control group could be used in the future to increase research rigor. Future studies could also incorporate a three-group design (adaptive climbing only, adaptive climbing + social skills group, and social skills group only) to extrapolate the impact of each study activity. The short-term nature of the study and data collection periods did not allow for assessment of social skills during other aspects of the program such as break time or arrival and departure, or the ability to determine if skills acquired were generalized beyond the climbing program. Expanding the time periods of data collection and considering a post-program follow-up could address these concerns. Finally, author-generated outcome measures were used to collect data as no standardized tools were available that met the study's aims. These tools underwent piloting and were found to have good content validity and inter-rater reliability, but outcomes should be interpreted with caution.

CONCLUSIONS

Results of this study suggest that community-based adaptive climbing programs that include structured social skills activities may promote development of social skills in children with developmental delays. Feasibility considerations for future adaptive climbing programs include the recruitment and retention of enough qualified volunteers, the space and equipment available to safely accommodate simultaneous climbers, the use of a structured social skills group before each climbing experience, and the chronological and developmental level of climbers when choosing which social skills to target. Opportunities exist for occupational therapists to partner with climbing gyms or other organizations such as the Special Olympics to develop and tailor programming specific to each child's developmental level and needs. Incorporating siblings and other typically developing peers into the experience may provide additional opportunities for peer modeling and interactions. Finally, academicians may consider potential community-based fieldwork and doctoral capstone placements for interested students relative to this topic.

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Appendix A: Social Skills Tracking Form

ID Number: _____










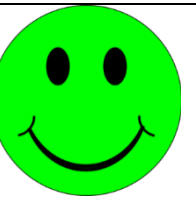



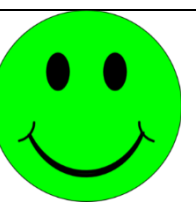



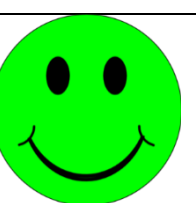



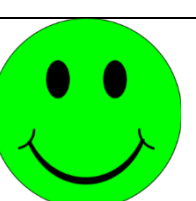
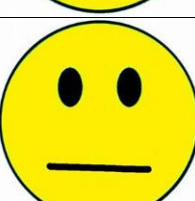
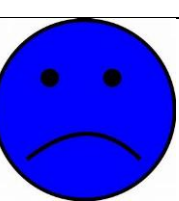

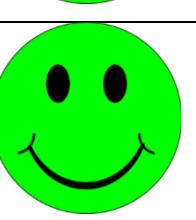
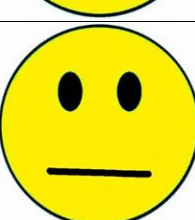

Date: _____





Observable Behaviors: _____

Time Period of Observation: _____

Behavior	Tally every time behavior occurs	Total Number
Following Directions		
Waiting Turns		
Asking Questions		
Personal Space		
Initiate Conversation		
Maintain Conversation (Exchanges with Peers)		

Appendix B: I Can Survey

During the climbing program did I	Always	Sometimes	Never
Look at the person who was talking 			
Listen to the person who was talking 			
Wait my turn 			
Ask for a turn 			
Start talking to a friend 			
Join friends that were talking 			
Stop when I needed a break 			

<p>Answer questions when asked</p> 			
<p>Ask for help when I need</p> 