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Sport Adaptation, Participation, and Enjoyment of Students With and Without Physical Disabilities

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The purpose was to investigate the effect of sport adaptations on participation and enjoyment of students with and without physical disabilities. Participants (ages 7-12) included 15 with a physical disability and 20 without a disability. Newcomb, a volleyball lead up game, was compared to an adapted newcomb game. Each game was played on three occasions. The participation variables were successful passes, unsuccessful passes, active time on task, inactive time on task, and off task time. Enjoyment was assessed by a questionnaire as well as by interviews. Sport adaptations generally increased participation of all students. Overall, most children enjoyed both games, although older students without a disability did express some dislike for the adapted game.

Adaptation is central to the field of adapted physical activity. The term "adapted" infers that something is modified, changed, or altered (Reid, in press; Sherrill, 1998, p. 8). Sherrill (1995, 1998, pp. 60-69) has promoted adaptation theory as the metatheory for the field and has included a myriad of possible changes under the adaptation umbrella. For example, adaptations can occur at the micro or macro level and might involve changes in activity, assessment, teaching, or physical and temporal environments. The focus of the present study is adaptation in a team sport context of students with and without physical disabilities.

Adaptation is sometimes promoted as means to teach students with and without disabilities in the same setting. Adaptation strategies for inclusion in physical activity are widely available (e.g., Active Living Alliance, 1994; Block, 2000; Downs, 1995). Some research has examined the impact of adaptations such as peer teaching (DePaepe, 1985; Houston-Wilson, Dunn, van der Mars, & McCubbin, 1997; Lieberman, Dunn, van der Mars, & McCubbin, 2000; Webster, 1987), peer helpers (Slininger, Sherrill, & Jankowski, 2000), and consultant models (Heikinaro-Johansson, Sherrill, French, & Huuhka, 1995). Others have investigated adaptation and inclusion from the perspective of students with a disability (Blinde & McCallister, 1998; Goodwin, 2001; Goodwin & Watkinson, 2000; Hutzler, Fliess,

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Chacham, & Van den Auweele, 2002; Place & Hodge, 2001). Overall, however, the database of effective inclusion strategies in physical activity remains limited (Block & Vogler, 1994; Sherrill, Heikinaro-Johansson, & Slininger, 1994). For example, there is little research on the impact of adapting team games and sport to foster inclusion.

Including students with different ability levels in team games and sports is a particular challenge (Arbogast & Lavay, 1986). Inclusion can result in a negative experience for students with and without disabilities, as well as for their teachers. For example, simplifying the complexity of an activity to help a low skilled student could result in lack of interest and feelings of indifference for more highly skilled students. Nevertheless, it has been suggested that students with varying abilities can be accommodated in the same physical education setting by adapting and modifying curricular and instructional strategies and techniques (Block, 2000; Heikinaro-Johansson & Vogler, 1996). A plethora of suggestions and guidelines have been offered for modifying team sports and physical education curriculum to accommodate children of varying abilities, including those with a disability (e.g., Active Living Alliance, 1994; Arbogast & Lavay, 1986; Block, 2000; Block & Vogler, 1994; Downs, 1995; Laurie & Cordin, 1981; Mizen & Linton, 1983; Morris & Stiehl, 1999; Sherrill, 1998).

Empirical support for team sport adaptation remains meager. Bernabe and Block (1994) investigated the effect of modifying rules of a regular softball league to facilitate integration of a girl with severe disabilities. Rule changes were only for this girl and included hitting from a tee, reducing the distance to first base, but maintaining the original distance to first base for defensive throws. Effects of modifications were estimated by comparing performance scores of the girl and her teammates. Overall, the results supported the effectiveness of the adaptations, as the girl's performance was not significantly different from her teammates. Furthermore, the team did not perform significantly better during the games in which she did not participate. While Bernabe and Block (1994) did not compare differences between adapted and nonadapted environments, their research is an example of a data-based investigation of adaptations designed to promote integration in a team sport environment. Other related research on low organization game adaptations evaluated the impact of the adaptations on attitudes and on a "like-dislike" journal entry, rather than playing performance (e.g., Slininger et al., 2000). To the present writers' knowledge, there are no published studies that have compared adapted and nonadapted versions of a team sport played simultaneously by students with and without a disability. This is somewhat surprising given the impressive number of references that offer adaptation suggestions (see list at end of previous paragraph) and the realization that including individuals with and without a disability in a team sport is a significant challenge (Arbogast & Lavay, 1986).

At a general level of description, Block (2000, pp. 222-223) suggested that game modifications should meet four basic criteria. Does the modification

1. Allow the student with disability to participate successfully yet still be challenged?
2. Ensure that the setting remains safe for anyone?
3. Negatively impact peers without a disability (e.g. time on task is not limited and they remain challenged)?
4. Place undue burden on the general physical education teacher?

In addition, Bernabe and Block (1994) suggested that students should participate in the decision-making process for selecting appropriate modifications.

The purpose of our study was to assess the effect of sport adaptations on the physical activity participation and enjoyment of students with and without physical disabilities. We used the first and third criteria of Block (2000) to select our dependent measures. These two criteria indicate that adaptations should promote participation of the students with a disability, but not at the expense of the students without a disability, and that both groups should remain challenged. Systematic observation of game playing offered an ecologically valid assessment of whether or not the adaptations promoted participation, defined by successful play (e.g., number of successful and unsuccessful passes) and use of time (e.g., active time on task, inactive time on task, and off task time). In addition, the notion of challenge was assessed by a subscale of an intrinsic motivation inventory that tapped interest and enjoyment (Ryan, 1982) and by interviewing the participants. Since the children available to the researchers were intact groups, we also felt it prudent to assess the impact of age and gender. For example, females may possess more positive attitudes than males do toward those with a disability (Tripp, French, & Sherrill, 1995), and this may result in more favorable responses to sport adaptations. In addition, we repeated the games on three occasions to determine if any of the dependent variables would change systematically with repetition. It was hypothesized that (a) the adaptations would result in greater participation for the students with disabilities than no adaptations, (b) the adaptations would not reduce participation of the students without disabilities, and (c) there would be no difference in the enjoyment of students while playing the adapted versus nonadapted game.

Method

Participants

There were 35 participants (Table 1), ranging in age from 7 to 12 years. Fifteen had a physical disability (11 males/4 females) and 20 had no disability (8 males/12 females). Five of the students with disabilities were nonambulatory with physical impairments such as cerebral palsy and spina bifida. Ten were ambulatory with cerebral palsy, spina bifida, or arthritis, although two needed supportive equipment for independent walking. The 35 participants attended a reverse integrated special school in a large metropolitan area and thus represent an intact sample. The school was originally created for students with physical disabilities who had no intellectual disability. It began to enroll children without disabilities over 20 years ago, creating classrooms based on age with similar numbers of students with and without a disability. The physical education program was also integrated and consisted of two 40-min sessions per week, once in the gymnasium and once in the swimming pool. The parents or caregivers of participants signed the appropriate informed consent documents, which were part of an approved university ethical review. All students in the three intact groups were allowed to participate.

Instruments and Dependent Variables

The dependent variables were levels of participation and enjoyment of newcomb, a volleyball lead-up game, and an adapted version of newcomb, which used a

Table 1 Numbers of Participants According to Age, Gender, and Disability

	Age (years)					
	7-8		9		10-12	
	M	F	M	F	M	F
Students with a disability	4	1	3	2	4	1
Students without a disability	2	3	2	4	4	5

balloon. Participation variables consisted of (a) active time on task, (b) inactive time on task, (c) time off task, (d) rate per 5 min of successful passes, and (e) rate per 5 min of unsuccessful passes. These variables are typical in studies of systematic observation such as academic learning time in physical education (van der Mars, 1989). A modified interest and enjoyment subscale of the Intrinsic Motivation Inventory (IMI; Ryan, 1982) and interviews following game play were used to assess enjoyment.

Active Time on Task. This was time during game play only, not waiting or transition time. It included time of active responding, interacting, and supporting other participants. For example, a participant moves toward the ball/balloon and is ready to react if needed. Not included is the participant who looks away from the field and shows no interest in the game.

Inactive Time on Task. This was time during the game and during transition and stop periods. It involved waiting and/or transition time as long as the students used this time for the purpose of the game. It was inactive time because the student was not active in pursuit of winning a point. However, it was on task time because behaviors were relevant to the game. It included interactions with other students or the teacher for the purpose of the game. For example, a student runs to retrieve the ball in order to restart the game or asks the teacher for the score if the ball went out of the field of play. Inactive time on task did not include stopping to talk with another student on a topic irrelevant to the game.

Off Task Time. This was time during which a student was not involved in the game and showed behaviors that were irrelevant to the objectives of the game. For example, a student sits down on the court or sidelines during the game or looks at another direction from the ball and seems to be indifferent to the game.

Systematic observation techniques were used to collect the data on active time on task, inactive time on task, and off task time. Treatment conditions were videotaped with two Panasonic AG-195MP cameras placed so that the whole field of play was captured. The researcher, who had been trained in using systematic observation techniques through graduate course work, recorded behaviors. An interval recording procedure was used to chronicle the three participation variables

based on time. Interval recording is an observation technique in which an individual is observed for a specific length of time and a decision is made as to what behavior (active time, inactive time, or off task time, in the present research) best represents the individual's behavior during that time period (Parker, 1989). Thus behaviors were recorded as soon as they occurred during the interval. When two behaviors took place in the same interval, the one that consumed the longest part of the interval was recorded. Each interval lasted 6 s. A total amount of time for each behavior category was determined with this procedure. The data for these timed variables are based on percentage of total time.

Successful Pass. The ball/balloon was successfully hit/caught for the purpose of sending it to another teammate or to the other team's field of play. The game continued after this pass.

Unsuccessful Pass. The ball/balloon was hit/caught for the purpose of sending it to another teammate or to the other team's side, but the game was stopped after the pass. Of course it was deemed successful if the ball or balloon reached the opponents' court and was not played successfully by them.

Event recording was used to collect data on presence or absence of events (i.e., successful or unsuccessful passes). The Systematic Observation of Student Opportunities to Respond (SOSOR) is a tool designed to determine the effects of game modifications on student opportunities to participate (Brown, 1989). It was used to measure the rate per 5 min of successful and unsuccessful passes. The event and interval recording procedures were deemed to be the most direct measures of the five participation variables, which in turn were assumed to be a valid measure of modification success (see Brown, 1989).

Enjoyment Scale. The interest and enjoyment subscale of the IMI scale (Ryan, 1982) was used to measure the enjoyment of the participants following the games. The IMI has been demonstrated to be reliable, and a confirmatory factor analysis supported a five factor hierarchical model with an undergraduate sample in a sport context (McAuley, Duncan, & Tammen, 1989). The interest and enjoyment subscale originally had five items, although research has shown that its alpha coefficient rises to .80 with the four items used in the current study. It is scored on a Likert scale from *strongly disagree* (1) to *strongly agree* (7). The four items were "I enjoyed this volleyball game very much," "Playing the volleyball game was fun," "I would describe this game as very interesting," and "The game held/kept my attention." The ratings of the four items are summed. A high score reflects a positive level of enjoyment, and a low score reflects a negative level. This subscale and the interviews were used to assess enjoyment of the games played. The subscale has not been validated with a population similar to the one used in the current study. However, in order to ensure that all participants understood the content of the questions, their classroom teachers were requested to review the scale and to explain the concepts to the students if the teacher felt that understanding would be difficult. After explaining the items to their students, and informally ascertaining their comprehension, all teachers concluded that the items were easy to understand and would yield valid data.

Interviews. Individual interviews with participants supplemented the data from the enjoyment questionnaire. Participants were interviewed 1 to 4 days after they had completed the treatment conditions. Interviews took place during recess and lunchtime with notes taken by the interviewer, the first author who had studied interviewing techniques in a graduate class. First, open-ended questions were posed

such as "What do you think about the games we played?" or "How do you think you did at both games?" Then, more specific questions were asked. For example, "Did you like both games the same?" "Did you like both games the same during all three times you played them?" "If you liked one game more than the other why was that?" "Which game was easier to play?" "Which game was more challenging?" Which game was more fun to play?"

Procedure

The procedures for both the nonadapted game and the adapted game consisted of three phases. The first involved familiarization of the participants with the rules and the playing conditions of both games during physical education classes. The nonadapted game, newcomb, had been a part of the physical education program. The adapted version had been introduced about 3 months before the actual experiment and was repeated once again immediately prior to data recording for about 10 min. In this way the experimental time was not compromised by rule confusion. Following Bernabe and Block's (1994) suggestion that students should participate in the process of modifying activities, participants were asked if they had any objections about the modifications. Although the students might have been unprepared to make suggestions, no negative responses were offered at this time.

The second phase involved playing the adapted and nonadapted games for 15 min during intact physical education classes. The 35 children were in three different classes. The first class had 10 students who were 7-8 years old: 5 had disabilities and 5 did not. Eleven 9-year-old students were in the second class: 5 of them had disabilities and 6 did not. The third class consisted of 14 students, ages 10-12 years: 5 with a disability and 9 without. All procedures were constant for the three classes except for the instructor. The physical educator, who has been working in this school for 20 years, instructed the 7-8 and the 10-12 year old groups. The physical education assistant, who has been working in this school for 2 years, instructed the 9-year-old group. Having two teachers involved in the experiment was not ideal but was ecologically valid because these teachers were responsible for these particular classes. Moreover, the experiment did not involve the teachers in any major way once the adapted and nonadapted games began to be played. The teacher adopted the role of a referee and moved the game along as necessary but without any instructional or feedback intervention.

The experiment was repeated three times. On the first day of the study, the adapted activity was played first, followed by the nonadapted in the same physical education period. Each game lasted 15 min. On the second day, the order was reversed. Finally, during the third physical education class, the order reverted to that of the first day. There was 1week between each of three physical education classes.

The third phase consisted of assessing enjoyment. Participants responded to the four-item scale six times on the day following the physical education classes for both the adapted and nonadapted games. There were two reasons for the delay in collecting these data. First, time remaining at the end of the physical education period was insufficient to complete the scale. Second, the delay likely avoided biased responses due to group influence or specific incidents that occurred during the specific game, such as winning or losing. The questionnaire was administered to all students individually by the primary researcher.

Experimental Design and Statistical Analysis

There were two primary treatment conditions, a nonadapted and adapted game. The first treatment condition consisted of playing the game of newcomb, a typical lead-up game to volleyball. We considered this to be the nonadapted game. The precise rules of newcomb vary with the source and it is typically described with suggested modifications (e.g., Canadian Association for Health, Physical Education, and Recreation, 1980; Kirchner & Fishburne, 1998, p. 433), hence its rules are not standard. In this study, it was played with six people with a maximum of three touches prior to the ball being sent over the net. The main differences from volleyball were (a) the ball was slightly deflated making it lighter and softer, (b) the serve could be thrown over the net rather than hit, and (c) the ball could be caught but not held or carried. Although these modifications are designed for elementary or middle school students, both children with and without physical disabilities had difficulty in accomplishing the demands of the game, as based on observations earlier in the school year. (As noted, this game was part of the school curriculum.) First, students with disabilities as well as low skilled nondisabled students were often ignored by their teammates and seldom received the ball within the three passes. Second, all students had difficulty serving the ball and catching it successfully. As a result of these problems, the game was frequently interrupted.

Therefore, an adapted game was created that involved four adaptations to newcomb. This constituted the adapted game, the second treatment condition. These adaptations, deemed feasible in a pilot study, included the following:

1. The field dimensions and net height were reduced to that of badminton (about 9m $\times$ 6.2m) to overcome difficulties due to weaknesses in strength, speed, and endurance.
2. A balloon, 18 in (45.7 cm) in diameter, replaced the ball to make it easier for all students to make contact. The lighter weight and slower movement of the balloon was designed to assist hitting success and more accurate passes. While light, the material of the balloon was of sufficient weight to ensure a slow but expected trajectory.
3. A rule was established that all the members of the team must touch the balloon before it was propelled over the net to enhance the participation of students with disabilities.
4. All players were allowed to serve the ball from the front line of the court to increase the possibility of a successful serve.

A quasi-experimental factorial design was employed (Thomas & Nelson, 2001). The five factors were groups of students (disability or no disability), age (7-8, 9, and 10-12 years old), gender (male, female), treatment conditions (adapted, nonadapted), and repetition (each game was repeated three times). Thus, the design was a 2 $\times$ 3 $\times$ 2 $\times$ 2 $\times$ 3 (Group $\times$ Age $\times$ Gender $\times$ Treatment $\times$ Repetition) factorial with repeated measures on the last two factors. The hypotheses of the study did not demand a direct comparison between students with and without disabilities. Therefore, separate 4-way analyses (Age $\times$ Gender $\times$ Treatment $\times$ Repetition) for each participant group were conducted to test the three hypotheses. It was decided apriori that no triple or 4-way interactions would be considered because they would not provide specific information to test the hypotheses. Therefore, the results that follow describe two-way interactions and main effects only.

The .05 level of significance was adopted. The multivariate F was based on Wilks's Lambda. Significant multivariate findings were followed by univariate analyses and Tukey's post hoc tests. Partial eta square effect sizes were calculated following significant univariate results, calculations over .14 being considered large (Stevens, 1996. p. 177). Following significant Tukey results, effects sizes were calculated according to the formula of mean differences divided by MS error, .8 being considered large (Glass & Hopkins, 1996, p. 449).

Two analyses were completed for each participant group: a four-way MANOVA assessed the impact of the five participation dependent variables, and a four-way ANOVA assessed the impact of the enjoyment dependent variable. Although the five participation variables might have been correlated with the enjoyment variable, they were conceptually different according to our three hypotheses and hence were analyzed separately.

Reliability of observation was assessed in two ways for interval recording (active time on task, inactive time on task, off task time) and event recording (successful and unsuccessful passes). First, intraobserver reliability was measured by the main observer reassessing 25% of the videotapes 10 days after initial assessment. This reliability is calculated by the ratio of the number of agreements over the two measurement occasions divided by the sum of the number of agreement and disagreements. The reliability scores were above 93% for the five variables. Second, interobserver reliability was measured by comparing 25% of the main observer's recorded data to that of a second trained observer who was blind to the objectives of the study. The reliability scores for the five variables ranged from 84-96%.

Results

Participation Variables

Means and standard deviations for the five participation variables are found in Tables 2 and 3. There were no significant effects for gender in either group. There were no significant main effects for age either, although a condition by age interaction was significant for the students without a disability.

The only significant MANOVA effect for the students with a disability was condition, $F(5, 7) = 17.79$, $p < .001$. Univariate analyses of variances indicated significant differences in favor of the adapted game for successful passes, $F(1, 11) = 43.99$, $p < .001$ (effect size = .8); and active time on task, $F(1, 11) = 44.83$, $p < .001$ (effect size = .8); and in favor of the nonadapted game for inactive time on task, $F(1, 11) = 19.09$, $p < .001$ (effect size = .63). In other words, the adapted game resulted in more successful passes, more active time on task, and less inactive time on task.

For the students without a disability, there was a significant MANOVA main effect for repetition, $F(10, 7) = 5.29$, $p < .05$ and condition, $F(5, 12) = 42.25$, $p < .001$ as well as a significant interaction for condition and age, $F(10, 24) = 2.48$, $p < .05$. Univariate trend analyses for repetition produced several significant findings. First, a quadratic trend for successful passes, $F(1, 16) = 9.18$, $p > .01$, resulted from fewer successful passes occurring during the second time the games were played (see means on Table 3). Second, a linear trend for unsuccessful passes was produced, $F(1, 16) = 8.96$, $p < .01$, due to fewer unsuccessful passes over the three repetitions. Third, a linear trend for inactive time on task, $F(1, 16) = .57.33$, $p < .001$,

Table 2 Mean Scores and Standard Deviations for Participation Variables for Students With Disabilities in Both Activities

Dependent variables	Time	Adapted game		Nonadapted game	
		M	SD	M	SD
Successful passes	1	5.5	2.1	1.0	1.2
	2	5.1	3.7	1.2	1.6
	3	6.1	3.9	0.9	1.3
Unsuccessful passes	1	0.2	0.3	0.5	0.5
	2	0.4	0.7	0.4	0.7
	3	0.3	0.5	0.6	0.9
Active time on task	1	44.9	15.3	19.8	12.4
	2	31.8	14.8	16.8	10.4
	3	30.4	15.9	14.2	7.5
Inactive time on task	1	48.4	17.0	70.6	10.2
	2	64.4	10.3	66.8	20.7
	3	65.4	11.2	81.5	12.5
Off task time	1	3.5	4.2	6.8	9.4
	2	5.5	8.4	11.2	15.5
	3	6.5	8.5	4.5	9.4

resulted from increasingly more inactive time on task over the three repetitions. Finally, both linear trends, $F(1, 16) = 25.38$, $p < .001$ and quadratic trends, $F(1, 16) = .5.48$, $p < .05$, resulted for active time on task. For this variable, there was a decrease from Game 1 to 2 but minimal change from Game 2 to 3.

The significant effect for condition for those without a disability resulted from the same variables as with the participants with a disability. Univariate analyses of variance indicated significant differences in favor of the adapted game for successful passes, $F(1, 16) = 204.93$, $p < .001$ (effect size = .93); active time on task, $F(1, 16) = 51.70$, $p < .001$ (effect size = .76); and in favor of the nonadapted game for inactive time on task, $F(1, 16) = 130.71$, $p < .001$ (effect size = .89). The adapted game resulted in more successful passes, more active time on task, and less inactive time on task.

The interaction of condition and age was attributed to off task time, $F(2, 16) = 5.82$, $p < .01$; all other univariate interactions were nonsignificant. The means for off task time for condition and age are found in Table 4. A Tukey test for unequal *ns* was performed to determine which means were statistically different. The adapted game produced more off task time for the oldest children than the nonadapted game (HSD = 7.10, effect size = 1.74). There were no other significant differences.

Table 3 Mean Scores and Standard Deviations of Participation Variables for Students Without Disabilities in Both Activities

Dependent variables	Time	Adapted game		Nonadapted game	
		M	SD	M	SD
Successful passes	1	8.6	3.3	1.8	1.0
	2	7.5	2.3	1.5	0.9
	3	8.5	2.3	1.8	0.9
Unsuccessful passes	1	0.9	1.3	0.9	0.9
	2	0.1	0.3	0.5	0.43
	3	0.2	0.2	0.3	0.4
Active time on task	1	48.9	10.3	26.6	13.6
	2	37.9	12.2	21.5	10.5
	3	36.5	11.7	20.0	6.1
Inactive time on task	1	45.0	9.5	63.9	13.3
	2	49.0	7.2	72.8	9.1
	3	56.4	8.5	75.9	7.2
Off task time	1	5.4	5.8	10.3	9.4
	2	12.2	12.3	5.4	6.7
	3	9.5	10.8	4.1	4.6

Table 4 Means and Standard Deviations for Off Task Time for Both Conditions Across Age for Students Without Disabilities

	Age (years)					
	7-8 (n = 5)		9 (n = 6)		10-12 (n = 9)	
	M	SD	M	SD	M	SD
Adapted game	6.87	4.20	7.67	10.64	11.11	10.68
Nonadapted game	9.80	6.72	8.33	9.73	3.00	2.83

Enjoyment Variable

IMI Questionnaire. The means and standard deviations for this variable are found in Table 5. The ANOVA for the group with a disability produced only a significant main effect for condition, $F(1, 11) = 10.53$, $p < .01$. The effect size was .49. These youngsters expressed more interest and enjoyment toward the adapted game. All other effects were nonsignificant.

Table 5 Means and Standard Deviations of the Enjoyment Variable for Students With and Without Disabilities in Both Activities

		Adapted game		Nonadapted game	
		M	SD	M	SD
	Time				
Students with a disability	1	6.5	0.4	5.5	1.8
	2	6.4	1.5	4.9	1.9
	3	6.4	1.5	5.4	1.9
Students without a disability	1	5.3	1.8	5.9	1.4
	2	4.9	2.2	5.7	1.9
	3	5.1	1.9	6.3	1.0

Table 6 Means and Standards Deviations for Enjoyment for Both Conditions Across Age for Students Without Disabilities

	Age (years)					
	7-8 (n = 5)		9 (n = 6)		10-12 (n = 9)	
	M	SD	M	SD	M	SD
Adapted game	6.07	.78	6.07	1.23	4.02	2.16
Nonadapted game	6.18	.82	5.83	1.55	6.07	1.77

The only significant finding for the students without a disability was the interaction between condition and age, $F(2, 16) = 3.79$, $p < .05$. These means are reported in Table 6. A Tukey test for unequal numbers was performed to determine which means were statistically different from each other. The interaction is explained by the older students finding the adapted game to be less interesting and enjoyable than the nonadapted game (HSD = 1.77, effect size = 1.76), while the younger two groups expressed no difference between the games.

Interviews With Students With Disabilities. Individuals in the youngest group (7-8 year old) reported that they liked both activities. Almost all students said that "both games were fun" and they "would like playing both." Although they believed that the adapted game was easier to play, they did not consider it less challenging and they perceived themselves to be competent at both activities. They

acknowledged that their peers without disabilities were more cooperative and helpful during the adapted game than during the nonadapted game. When asked if repetition of either game had any influence on their interest, they replied that they liked both games each time played.

Participants with disabilities in the 9-year old group were more judgmental. Although they also reported that both games were fun, they showed a preference for the adapted game. One ambulatory participant remarked "I was always scared that the ball would hit me on the face." Two nonambulatory participants indicated "I could not throw the ball over the net" and "I did not get the ball many times," which accounted for their preference for the adapted game with the balloon. Congruent with their younger peers with disabilities, they acknowledged that the adapted game was easier to play, but they found it challenging nonetheless. They also enjoyed hitting the balloon with some assurance, which helped maintain their attention to the game.

Participants with disabilities from the oldest group (10-12 years old) liked the fact that their peers without disabilities cooperated with them during both activities and they did not feel ignored. Both activities were described as challenging. However, one ambulatory male with more profound physical disabilities said that it was almost impossible to be competent at the nonadapted game, although he appreciated the feeling of being a team member in this game. Another student recalled how he felt during the nonadapted game when he performed a difficult but successful pass and won a point for his team: "They also applauded and liked me more because they had never thought that I could get this point."

Interviews With Students Without Disabilities. Comments from participants without disabilities seemed to be influenced by age and gender. Participants in the two younger groups (7-8 and 9 years old) had similar responses to their peers with disabilities. They believed both games were fun and interesting. Although they acknowledged that the adapted game was easier to play, they said that it was not boring. Moreover, they perceived themselves to be equally concentrated and involved in both games. Nevertheless, they indicated that repetition influenced their enjoyment level in both games, as their excitement was not as high during the third time they played the games as it was during the first and second time.

Different results emerged from oldest group (10-12 years) without disabilities. Most female participants said that time was a basic factor that influenced their interest. They stated that both games were fun the first time they played them but the adapted game became less enjoyable during the second and third repetitions. Two of the five female participants indicated that they disliked both games.

The opinions of the older male participants (10-12 years) were rather divided, much like the older girls. Some of them said that time had a negative influence on their interest. After the first session, they did not like the adapted game as much as they liked the nonadapted one. They also reported that the adapted game was "kind of different" as opposed to newcomb, which seemed more "normal" to them. Two of the four boys had more extreme responses, indicating they did not like the adapted game at all. The negative reactions were captured in phases like "this game sucked" or "this game was just boring." The slow pattern of the balloon in the air was reported to be their biggest problem. In addition, they complained that during the adapted game, it was harder to win points as the balloon did not easily touch the ground. This difference made the activity less competitive for them, reducing their interest. On the contrary, they had no objections at all with the

nonadapted game, and it seemed to keep their interest. The reaction of these two participants was in agreement with their individual enjoyment scores on the questionnaire. They had responded with a 1 for the adapted game and 7 for the nonadapted game, indicating extreme dislike and much enjoyment, respectively. Nevertheless, all participants acknowledged that the adapted game helped their peers with disabilities; therefore, they would not have any objections to play it once in a while. When asked to suggest alternative ways of making the game accessible for their peers with disabilities and still be challenging for themselves, they suggested that a ball be used with the rule that all players must touch it before sending it to the other side. Such a modification with a volleyball was attempted in a pilot study but was judged to be too difficult for most of the students with physical disabilities since they had difficulty passing the ball.

Discussion

Hypothesis 1 stated that the adapted game would result in greater participation for the students with disabilities compared to the nonadapted game. Statistical analyses revealed that students performed more successful passes and spent more active time and less inactive time during the adapted game than during the nonadapted game. The adaptation of using a slower moving projectile (balloon rather than volleyball) enabled all students to realize more successful passes. Of course, the rule that all players had to touch the balloon before the team sent it to the other side of the net also accounted for increased opportunity for a successful pass. These modifications also kept the game flowing with fewer stoppages in play, as indicated by the increase in active time and decrease in inactive time during the adapted game when compared to the nonadapted game. This was supported by the interviews as well. Some students said that they were more concentrated and focused on the game because they knew they would have to touch the balloon before it was sent to the other side. Together, the results are in agreement with the suggestions of Block (1994) and Sherrill (1998), and interview findings of Slininger et al. (2000) that modifying the object of a game as well as the official rules can facilitate participation for students with disabilities. Therefore, Hypothesis 1 was supported.

Hypothesis 2 stated that the participation of the students without disabilities would not be reduced by the adaptations. Participants without disabilities also performed more successful passes, were more active, and spent less inactive time during the adapted game than the nonadapted game. Thus, their participation and performance were not compromised to accommodate their peers with disabilities. The significant condition by age interaction was accounted for by the variable "off task time" only. The adapted game produced less off task time for the youngest group but more off task time for the older group. However, the means were quite low and actually accounted for very little time during the games, significant interaction notwithstanding. During play of both games, there was little off task time, suggesting all youngsters were largely focused on the task at hand. Indeed, in terms of time, both games were largely composed of active time on task and inactive time on task. Inactive time was a reflection of ball retrieval, repositioning, checking score, and getting ready to resume play. This was positive time in the sense that such activity was relevant to the game.

The repetition effect was not straightforward and may have been confounded by order of play. Recall that the adapted game was played first on days 1 and 3,

while the nonadapted game was first on day 2. Thus, the finding that fewer successful passes occurred on the second day of playing might in some way be due to playing the nonadapted game first, followed immediately by the adapted game. Why this might have occurred, however, does not have an easy explanation. In addition, some trend analyses are difficult to explain (e.g., fewer unsuccessful passes over the 3 days; a positive finding in terms of programming; and a decrease in inactive time on task from the first time the games were played to the second time, a negative programming implication). We believed that it was important to have a repetition factor in this type of research because participants might quickly change in their enjoyment, but we unwittingly confounded order of games, a factor that can not be teased out in the present study because order is a repeated measure. Future research of this nature should address the issue of repetition but avoid or control for the order effect a limitation in the present research. Overall, the play of the students was not adversely affected by the adapted game. Thus, Hypothesis 2 was supported.

Hypothesis 3 stated that there would be no difference in enjoyment of the adapted and nonadapted games. The students with a disability indicated that they found the adapted game to be more enjoyable than the nonadapted game. However, the mean for the nonadapted game was 5.3 (see Table 5) on a 7-point scale, which cannot be interpreted as indicating that they did not enjoy that game, only that they did not enjoy it as much as the adapted game. The interview data provided a more detailed account of how the students with a disability reacted to the two games. These perceptions were quite mixed. Many said they enjoyed both games and acknowledged that their peers without a disability were cooperative. Also, most realized that the adapted game was easier and provided more opportunity for them to play. However, a few of the students with a disability in the 9-year old group were quite blunt in their belief that the nonadapted game did not provide sufficient chances for them to play and may have been dangerous because the ball traveled too quickly for their hands and arms to defend themselves.

The significant interaction of condition and age with the questionnaire data showed that older participants without disabilities (10-12 years old) did not enjoy the adapted game as much as the nonadapted game. In fact, some students without a disability were more vocal regarding their dislike of the adapted game during the interviews. Some of them perceived the adapted game to be less challenging and interesting than the nonadapted game, particularly during the second and third time of play. The older male students expressed the most negative responses. A number of them argued that the adapted game was not very challenging because it was too easy, not competitive, and different from what they were used to. The younger students found both games to be enjoyable and interesting, although the adapted game was not quite as much fun on the third repetition. Overall, Hypothesis 3 was only partially supported. As children age, some may become more interested in traditional games and find significant adaptations to accommodate their peers with disabilities to distract from their own desire for competition and challenge.

There were no significant differences with regard to participation variables for gender. The girls and boys were equally successful in both nonadapted and adapted games, which is encouraging because gender differences are typical in object control activities (Ulrich, 2000). It seems that both genders were equally involved in the games. We might have hypothesized that the girls would describe

equal or greater enjoyment in both games compared to the boys because their attitudes are usually more favorable toward peers with a disability (Tripp, et al., 1995). There was no indication of such differences in the data from the IMI questionnaire or the interviews. Some older girls, much like the older boys, expressed some reservations about the adapted games, although they were not as negative as two of the boys. Admittedly, these observations were based on only a few students, but future research might explore gender influences more fully to determine if overall positive attitudes toward individuals with disabilities might not always be translated into positive perceptions of specific sport adaptations.

This research supports the professional contention that sport adaptation can be a valuable tool when integrating students with and without disabilities in the same physical education activities (Block & Vogler, 1994; Sherrill, 1998; Slininger et al., 2000). Physical educators should feel comfortable when modifying the basic structure of traditional activities, as students of different abilities will participate more successfully. Nevertheless, adaptations do not have the same effect for all students. Some students without disabilities, as they approach ages 10-12 years, may not perceive the adapted activity as challenging, interesting, and enjoyable as their younger peers. It seems that no adaptation can be the magic solution for all individuals.

In fact, we interpret these results as direct support for Bouffard's (1993) caution about aggregating data and his cogent argument that we should search for person by treatment interactions. If we had not included age as a factor, nor conducted the interviews, our statistical analyses based on group data would have led us to a conclusion that adaptations did not adversely affect the enjoyment of the activity. But some individual students were quite negative about their experience with the adapted game, which was captured clearly through the interviews, although, as noted, this was consistent with their individual responses on the questionnaire. Hence, our conclusions would have been remarkably different if based only on the group findings. A person by treatment interaction is exactly what was found. While some students (in fact most) did respond in a positive manner to the adaptations, a small group of older students did not, and these negative reactions were influenced by the number of times the adapted game was played. Thus, a conclusion of a generally positive impact of the adaptations but with some exceptions related to age and repetition describe the results more veridically.

From an applied perspective, it seems that no specific adaptation should be used as a rule of thumb, as successful adaptation in team settings is a dynamic process. This dynamic dimension is consistent with Sherrill's (1998) multifactor description of adaptation and creativity related to adaptation. If a successful and popular adaptation is found, some readjustment might be in order to keep the activity more challenging for the older students without disabilities, yet accessible to their peers with disabilities. It may be prudent for teachers to offer multiple games directed toward the same goals during the same class and allow students to choose. Also, repetition of the activity must occur cautiously. An effective adaptation used too frequently may lose its appeal over time. Given the dynamic nature of adaptations, their ongoing evaluation seems warranted.

In summary, the main purpose of this study was to evaluate the effects of sport adaptations on participation and enjoyment of students with and without disabilities in an integrated school setting. Within its limitations, results indicated that the adapted game helped students participate more successfully. In addition,

the enjoyment level of the participants was high for both activities, although some older students did not enjoy the adaptations despite acknowledging the positive impact for their peers with disabilities. These results support the notion that students with disabilities can be included successfully in the sport component of integrated physical education programs without compromising the program for most students without disabilities in the 7 to 12 year-old age range. We suggest that physical education teachers should realize that adaptation is a dynamic process, and ongoing vigilance regarding the impact of any specific adaptation is required. It is possible that a balloon in lieu of a volleyball might be particularly unattractive to students age 10 and above. It is also important to acknowledge that the current research was conducted in a gymnasium setting of near equal number of children with and without disabilities, which is not the norm in most inclusive settings. Future research should explore other adaptations, different teaching/learning contexts, and systematically tackle the issue of activity repetition.

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