

Integrating Physical Education to Teach Appropriate Play Skills to Learners Wit; Autism: A Pilot Study

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Abstract:

This pilot study attempted to determine the effects of a collaborative socio-motor, adapted physical education/therapeutic recreation curriculum on the social play and motor development of learners with autism and their nonhandicapped peers in an integrated physical education classroom setting. Six students with autism, ages 4-12, participated with 50 nonhandicapped peers in a 9-week, twice weekly, physical education class at a public elementary school. All participants received training as "Special Friends" as well as instruction in the curriculum which included a variety of lifelong recreation and physical education activities designed to teach social skills and fundamental motor skills. Results of *t* tests indicated significant reductions in inappropriate play behavior for the younger group at the parallel and cooperative/competitive-dyad social levels of play. Although no other significant changes in participants' behaviors occurred, the following observations indicated increased involvement in the activities by the participants: (a) reduced inappropriate play behavior, (b) reduced target inappropriate behaviors, and (c) development of motor proficiency in catching and striking skills.

Article:

Public Law 94-142 mandates that children and youth with disabilities be educated in "least restrictive" regular education settings, unless greater benefit is perceived to result from a specialized, segregated setting (Federal Register, 1977). The first option for students with disabilities in physical education classes, therefore, is instruction alongside peers who do not have handicapping conditions.

The ideal of equal opportunity championed by this law poses many challenges in the world of practicality for most American school systems today. How can sufficient staffing be achieved when the needs of a youngster with a handicap may require an inequitable amount of the instructor's time? How are attitudinal barriers among peers to be bridged to allow social integration of a truly interactional nature to occur? What curricula are to be used to meet the longitudinal social and leisure needs of youngsters with handicapping conditions?

Professionals investigating the play behavior of learners with autism, when participating in segregated physical education and recreation settings, have found a physical exercise precondition to be effective in reducing self-stimulatory behaviors (Watters & Watters, 1980), demonstrated the usefulness of a "prompt and praise" teaching technique to encourage participation in recreational activities (Hawkins, 1982), and recommended the use of social toys (e.g., dolls) rather than nonsocial toys (e.g., blocks) for play instruction (Ferrara & Hill, 1980).

In integrated physical education and recreation programs involving learners with autism and nondisabled peers, peer tutors have been used to facilitate social integration. Strain, Kerr, and Ragland (1979) have demonstrated an increase in positive social behavior in learners with autism as a result of prompt and reinforcement intervention by a peer tutor. Campbell, Scaturro, and Lickson (1983) have investigated a peer tutor program at a public school and observed improved self-concept for the learners with autism and active information sharing about autism among the nonhandicapped peers. In addition, McHale and Simeonsson (1980) noted sustained positive attitudes among peers in an integrated play pro-gram with learners with autism.

Several authors have recommended applying key principles of applied behavior analysis and therapeutic recreation (i.e., the use of task analyses, adaptations, and social reinforcement) with learners with autism (Fine, Feldis, & Lehrer, 1982; Wehtnan & Schleien, 1981; Wuerch & Voeltz, 1982). Sherrill (1980) advised a multidisciplinary approach to assist learners with autism in their social integration and development. Karper and Martinek (1985) found that unacceptable behavior (social and/or motor) could be changed or shaped by rewarding appropriate motor performance when students with handicaps were integrated with nonhandicapped students. Reid and Morin (1981) suggested that children with autism would be more successful in developing motor skills if activities were age-appropriate and commensurate with their abilities. In Kraft's (1983) "treatment" program, small groups and partner activities were used to encourage gross motor and eye-hand/foot coordination. However, the absence of data precludes any conclusions about the use of such a treatment program. Many researchers (Crowe, Auxter, & Pyfer, 1981; Morin & Reid, 1985; Seaman & DePauw, 1982) are concerned about the lack of data based research involving children with autism and the motor domain. In light of the foregoing research and the call for a collaborative approach in meeting the social and motor needs of learners with autism in integrated programs, the investigators of this pilot study attempted to determine the effects of a sociomotor, adapted physical education / therapeutic recreation curriculum on the social play of learners with autism and their nonhandicapped peers in an integrated physical education classroom.

Methods

Subjects and Setting

Six participants with autism, ages 4-12, who attended classes in the autism program at a public elementary school in Minneapolis, participated in integrated physical education classes with 50 nondisabled peers, ages 6-12, from the school's regular education program. Table 1 presents the age, gender, and targeted inappropriate behaviors of the participants with autism. Also, this table presents the TARC (Sailor & Mix, 1975) scores of the participants with autism in this study. The TARC assessment system provides a short-form behavioral assessment of the level of functioning of children who are retarded or otherwise severely disabled on a number of skills related to education. These skills include self-help (toileting, washing, eating), motor (fine and gross), communication (expressive and receptive language), and social skills (direction-following, group behavior, individual behavior, interaction with peers and adults, cooperation, emotional control).

Procedures

Each of the six participants with autism was assigned by age to one of two groups: younger or older. That is, the three youngest participants, ages 4-7, were assigned to the younger group, and the three eldest participants, ages 11-12, were assigned to the older group. This assignment by age coincided with class enrollment of younger or older students in the autism program at the school.

Prior to selection of nondisabled participants, a 30-min Special Friends slide/sound presentation (Voeltz, 1980), followed by discussion, was administered to all regular education students at the public elementary school. Regular physical education students in both younger and older classes were then invited to participate as "Special Friends" in the integrated physical education program. The first 10 (out of a total of 30) regular physical education students from each class to volunteer were selected as participants for the study. As a result, 10 nondisabled regular education students, ages 6-8, were assigned to the younger group, and 10 nondisabled regular education students, ages 9-12, were assigned to the older group.

The nondisabled Special Friends and participants with autism were instructed in a variety of lifelong recreational and physical education activities (i.e., cooperative games, sports, team games) which were designed to teach social skills and fundamental motor skills. All instruction occurred within a large 30 x 75-ft multipurpose room. Instructional materials included balls (e.g., nerf, volley, play-ground, whiffle, beach), hula hoops, bola, paddles with balls on string, scooters, beanbags, volleyball net, parachute, cones, record player, records, soap bubbles, balloons, Twister games, jump ropes, hopscotch diagrams, frisbees, tug of war rope, mats, and lummi sticks. Each participant attended 50-min integrated physical education sessions twice weekly over a 9-week period. All instruction was taught by the school's adapted physical education instructor with assistance from the investigators.

Table 1
Age, Gender, Target Behaviors, and TARC Scores of Subjects With Autism

Participant number	Age	Gender	Target behaviors	Self-help	Motor	Communication	Social	Total
01	4	M	Hand flailing Noncompliance Tantrum	37	39	21	31	128
02	7	M	Finger flapping Silly behavior Tantrum	42	51	16	27	136
03	7	M	Noncompliance Tantrum	46	49	26	32	153
04	11	M	Wiping face w/hands Bolts Cries	43	47	19	25	134
05	11	M	Masturbates Self-stimulation Silly behavior Wanders	45	52	27	17	141
06	12	M	Perseveratory speech Staring at objects/others Wanders	50	60	29	32	171
Total possible TARC score				50	61	38	45	194

Collection of Data

Assessments of the social and motor skills of the students with autism were conducted by the adapted physical educator twice throughout the program: 1 week prior to program implementation (preprogram assessment) and a postprogram assessment during the 9th and final week of the program. During each assessment, the participants were given the opportunity to play in five different age-appropriate activities. These activities were identical for each assessment. Activities were selected to represent five different social levels of play and three fundamental motor skills targeted for instruction.

Social Play Data. Five developmental social levels of play were defined based on social behavior sequences described in psychology and education literature (Avedon, 1974; Paloutzian, Hasazi, Streifel, & Edgar, 1971; Parten & Newhall, 1943; Schlei, 1984). Following are definitions of these social levels of play, with examples representing socially valid activities in which nondisabled peers engage:

Isolate (I): Appropriate action directed toward an object in the environment or physical activity which is solitary in nature (e.g., Jack Be Nimble, Whiffle Ball);

Parallel (P): Appropriate action directed toward an object in the environment or physical activity which is in proximity to a peer (within 5 ft) but which does not involve the other individual (e.g., Balloon Catch, Jump Rope);

Cooperative/Competitive-Dyad (CC-D): Appropriate action involving cooperation and/or competition between two individuals (e.g., Two-Square, Jumpscotch);

Cooperative/Competitive-Group (CC-Gp): Appropriate action involving cooperation and/or competition between three or more individuals (e.g., Bunny Jump, New Newcomb);

Team Play (TP): Appropriate action of a competitive nature between two or more cooperative groups intent on a mutual goal (e.g., Zigzag Ball, Roundball).

Definitions of the appropriate and inappropriate play dependent variables include (a) *appropriate play*: attention in the form of physical manipulation and/or visual attending to the object, activity, or person within the context of the particular activity, and (b) *inappropriate play*: action involving non-goal-directed, non-functional, purposeless, stereotypic, or other behavior out of context to the activity.

Each age group (i.e., younger and older) participated in separate assessment sessions. Therefore, three participants were observed during each assessment. During the assessment, the participants were presented the five activities, one at a time, beginning with the isolate play level and ending with the team play level. A 15-sec observe /5-sec record time-sampling procedure was used to record observations. Observers recorded data by attending to taped observe/record cues transmitted through earphones.

The primary data collector observed the first of the three participants for 15 seconds and recorded the social behavior (i.e., appropriate play, inappropriate play, targeted inappropriate behavior) during the 5-sec recording interval. If the participants played appropriately at the assessed social level for a minimum of 5 consecutive seconds, a plus (+) was recorded at the respective social level. If the participant failed to play appropriately at that social level for a minimum of 5 consecutive seconds (regardless of whether inappropriate play occurred for a 5-sec duration) a minus (—) was recorded at the social level.

If the participant engaged in inappropriate play behavior during the interval observed, either of an ongoing nature (e.g., crying, noncompliance) or event nature (e.g., breaking play materials, hitting another person), a plus (+) was recorded at the inappropriate level. In addition, if the participant exhibited a targeted inappropriate behavior (e.g., hand-flailing, silly behavior, tantrum) at any time during the 15-sec interval, a "T" was recorded at the inappropriate play level.

After recording data for the first of the three participants, the observer watched the second participant for 15 seconds and recorded the social behavior for 5 seconds. The observer then observed the third participant in a similar fashion, recorded data, and continued to repeat the observation sequence (beginning again with the first participant) for a total of 9 minutes. In this way, a total of 27 data points were collected for each social level observed. This procedure was repeated for each of the five social levels of play for a total of 45 minutes.

Reliability data were collected for 50% of the total social play assessments. During these assessments, a trained reliability observer collected data on the same participants as the primary observer. Interobserver reliability coefficients for data collectors were computed by dividing the number of agreements on social play data between the primary and reliability observers by the number of agreements plus the number of disagreements. Interobserver reliability ranged from 79.4 to 95.6 %, with a mean of 89.3% across all sessions.

Motor Data. Motor skills requiring instruction by the six participants with autism were identified from the participants' Individualized Education Programs (**IEP**). These skills included balance, bounce, catch, dribble, jump, kick, pull, strike (one-arm), and throw. From this list of motor skills, three skills that were common instructional objectives for each of the six participants were identified for the motor assessments: catch, jump, and strike (one-arm).

Collection of data on these three motor skills was conducted concurrently with the collection of social data during the pre- and postprogram assessments. The five age-appropriate activities that represented the five social levels of play also included these three motor skills. Table 2 identifies these five activities and their corresponding primary motor skills.

The motor assessment instrument (Breihan, 1980) was a task-analyzed, criterion-referenced checklist in which performance to the required task was evaluated rather than performance as compared to a standardized norm (i.e., norm-referenced). That is, instead of determining the status of a child with a disability in relation to his or her peers, this instrument provided qualitative information regarding part or whole-task successful performance by the child. Based on knowledge of motor development literature (Gallahue, Werner, & Luedke, 1975;

McClenaghan & Gallahue, 1978; Wickstrom, 1977), this instrument was non-categorical (generic) and diagnostic in nature. Motor data were collected on the task-analyzed checklist which outlined specific component movements required in the performance of each particular skill (i.e., jump, catch, strike). Similar check-lists (Morin & Reid, 1985) have been used to assess the qualitative movements of children with autism. One primary and one reliability observer completed motor assessment check-lists for each assessment for all six subjects with autism. Both observers were motor development experts experienced in conducting task-analytic movement assessments of learners with disabilities. Each child was observed performing each motor skill at least three times within the context of the respective activity.

Table 2
Assessment Activities and Corresponding Motor Skills for Each Age Group

Activity	Motor skill
<i>Younger Group</i>	
Jack be Nimble	Jump
Balloon Catch	Catch
Two-Square	Strike
Bunny Jump	Jump
Zigzag Ball	Catch
<i>Older Group</i>	
Whiffle Ball	Strike
Jump Rope	Jump
Jumpscotch	Jump
New Newcomb	Catch
Roundball	Catch

As with the social play data, interobserver reliability was computed by dividing the number of agreements between the two observers by the number of agreement and disagreements. Interobserver reliability for the motor data ranged from 96.2 to 100 %, with a mean of 99.5% across all sessions.

Treatment of Data

Statistical analysis of the data was conducted to determine the occurrence of significant progress in social and motor skills from the initial assessment to the final assessment for each age/condition group. Paired *t* tests based on the difference between individual subject scores for each age/condition group (dependent means) were conducted at each of the five social levels of play (i.e., isolate, parallel, cooperative/competitive-dyad, cooperative/competitive-group, team play) and for each of the three motor skills (i.e., jump, catch, strike). Each social level of play was further analyzed (paired *t* tests) across three social behaviors: play, inappropriate play, and targeted inappropriate behaviors. Paired *t* tests were conducted to determine the occurrence of significant progress in the dependent variables between the pre- and postprogram assessments. In this way, the identification of significant improvement at a particular social level or for a particular motor skill could be determined for each age group (i.e., younger, older) as a result of participation in the integrated physical education program.

Results

The following analyses of data (i.e., paired *t* tests) describe the occurrence of progress or regression in social play and motor skills as a result of participation in an integrated adapted physical education /therapeutic recreation curriculum.

Social Play Data

Results of the analysis of social play data for the younger and older groups are presented in Table 3 across two social behavior categories: inappropriate play, and targeted inappropriate behaviors.

Inappropriate Play. A significant reduction in inappropriate play behavior occurred for the younger group at the cooperative/competitive-dyad level. Significant reductions in inappropriate play behavior also occurred for the younger group at the parallel level. No significant reduction in inappropriate play occurred at any other social level of play for the younger group. In general, results of the analysis of inappropriate play behavior data indicated a trend in the reduction of inappropriate behaviors for the younger group across the first four social levels of play. The only level at which inappropriate behaviors were not reduced was the team play level. No statistically significant reduction in inappropriate play was noted at any social level of play for the older group. A trend in the reduction of inappropriate play behavior occurred at four of the five social levels of play. A slight increase in inappropriate play was found for this group at the cooperative/competitive-group level.

Targeted Inappropriate Behaviors. No significant reduction in targeted inappropriate behaviors was noted at any of the social levels of play. The targeted behaviors of the younger group tended to decrease at three different levels including the parallel, cooperative/competitive-dyad, and team play levels. Targeted inappropriate behaviors were not exhibited by any of the younger participants at the isolate and cooperative/competitive-group levels for either the pre- or post-program assessments. The data indicated a nonsignificant reduction in targeted inappropriate behaviors for the older group at three levels: parallel, cooperative/competitive-group, and team play. However, a slight increase in target behaviors occurred at the isolate and cooperative/competitive-dyad levels.

Table 3
Values of *t* for Social Levels of Play from Pre- to Postprogram Assessments
in Two Social Behaviors (Inappropriate Play and Targeted Behaviors)

Behavior	Group	Social levels of play				
		I	P	CC-D	CC-Gp	TP
Inappropriate play	Younger	.329	4.399*	11.952**	1.388	-1.148
	Older	1.000	1.892	1.976	-1.942	1.732
Targeted inappropriate play	Younger	.000	1.000	1.000	.000	.138
	Older	-1.732	1.000	-1.732	1.000	1.310

*Level of significance at .05 = *t* value of 4.303;

• Level of significance at .01 = *t* value of 9.925;

Note. = Isolate; P = Parallel; CC-D = Cooperative/Competitive-Dyad; CC-Gp = Cooperative/Competitive-Group; TP = Team Play; Positive *t* value indicates progress in social play; Negative *t* value indicates regression in social play.

Motor Data. Although the participants, both younger and older, developed some motor proficiency within the context of the recreation and physical education activities (i.e., catch, strike, jump), no significant differences were found in pre/post program intervention in their motor development. In fact, a slight regression in motor performance in the jumping skill was found. This regression was primarily due to the mature jumping pattern already displayed by several participants during preassessment, followed by a weaker performance of the skill during postassessment.

Discussion

In this pilot study, six learners with autism participated in an integrated school-based physical education program with their nondisabled same-age peers. Integrated physical education and recreation activities were found to be effective environments for encouraging social play among the younger participants in the parallel and cooperative/competitive-dyad social levels of play. A trend in the data reflecting a reduction in inappropriate play behavior and targeted inappropriate behaviors occurred in both the younger and older groups. These findings support previous studies citing reduction in inappropriate behaviors by learners with autism as a result of play instruction (Hawkins, 1982; Ragland, Kerr, & Strain, 1978; Strain et al., 1979; Watters & Watters,

1980). Investigators suggest that integrated physical education and recreation activities may offer students with autism positive alternatives to negative or excess behaviors. Such behaviors have been found to decrease when individuals are engaged in appropriate recreation and physical education activities (Adkins & Matson, 1980; Flavell & Cannon, 1976; Schleiien, Kiernan, & Wellman, 1981; Voeltz & Wuerch, 1981). An important point to be made from these preliminary findings is that the participants in this study did not appear to need a developmental program of isolate, to dyad, to group, to team play—as Fine, Welch-Burke, and Fondario (1985) have suggested—if the metric of successful play is appropriate behavior in a heterogeneous physical education program.

The lack of significant motor performance improvement could be attributed to the lack of time needed to develop the selected motor skills. More than eighteen 50-min class sessions might have been needed to improve both motor and social skills. This substantiates findings (Morin & Reid, 1985) suggesting the presence of depressed motor behavior in lower functioning subjects with autism. Morin and Reid (1985) concluded that such behavior might be attributed to mental retardation rather than autism. Since most of our subjects were low functioning individuals, it is possible that more time was needed to show significant improvement. Also, the motor skills used in this study may not have been appropriate for the subjects' abilities. Mature striking and catching skills usually appear during the later years of motor development (McClenaghan & Gallahue, 1978), and children with autism usually are weak in tasks involving functional objects (e.g., balls, bats) (Geddes, 1977).

Linking motor skill instruction to social games and activities may provide a functional approach to motor skill instruction with the added complementary instructional benefits of peer modeling, peer social interactions, and the building of peer friendships. This supports the work by others (Marini, 1978; Seaman & DePauw, 1982) who have promoted the development of motor skills through participation in various gross motor type recreational activities (e.g., ice skating, swimming).

Due to the inherent problems of this pilot study, such as time constraints, sample size, curricular activities not validated on children with autism, and the exploratory nature of data collection methodology, the following recommendations for future research in integrated physical education are offered:

Additional field testing and validation of physical education and recreation curricula with special populations is needed in order to investigate more fully the various social levels of play and their import for learners with developmental disabilities.

Integrated physical education and recreation programs of longer duration and greater frequency are needed to further validate key integration strategies and collateral skill development in learners with and without disabilities.

Investigation into attitude changes among special friends involving pre-and postprogram attitude surveys are needed in order to explore potential benefits of integrated programming to peers without disabilities. The need for teacher intervention when special friends are available to help with integration efforts, and the development of friendships between peers with and without disabilities must continue to be studied systematically.

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