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Brief Report

Effects of two distinct group motor skill interventions in psychological and motor skills of children with Developmental Coordination Disorder: A pilot study

Priscila Caçola, Ph.D.*, Michael Romero, B.A., Melvin Ibana, M.S., and Jennifer Chuang, B.B.A.

College of Nursing and Health Innovation, University of Texas at Arlington, USA

Abstract

Background: Children with Developmental Coordination Disorder (DCD) have an increased risk for mental health difficulties.

Objective: The present pilot study aimed to determine whether distinct group intervention programs improved several psychological variables (anxiety; adequacy and predilection for physical activity; participation, preferences, and enjoyment for activities) and motor skills from the perspective of a child with DCD as well as parental perceptions of motor skills, rate of function, and strengths and difficulties.

Methods: Eleven children participated in Program A and thirteen in Program B. Both involved 10 sessions of 1 h each. Program A focused on task-oriented activities in a large group involving motor skill training and collaboration and cooperation among children, while Program B was composed of three groups with a direct goal-oriented approach for training of skills chosen by the children.

Results: Results indicated that children improved motor skills after both programs, but showed distinct results in regards to other variables – after Program A, children showed higher anxiety and lower levels of enjoyment, even though parents detected an improvement in rate of function and a decrease in peer problems. With Program B, children decreased anxiety levels, and parents noted a higher control of movement of their children.

Conclusions: Regardless of the group approach, children were able to improve motor skills. However, it is possible that the differences between groups may have influenced parents' perception of their children's motor and psychological skills, as well as children's perception of anxiety. © 2016 Elsevier Inc. All rights reserved.

Keywords: Developmental coordination disorder; Group intervention; Motor skills; Psychological skills

Developmental Coordination Disorder (DCD) is a disorder that defines children with problems in their motor coordination development despite their intelligence levels, impacting about 2–7% of school-age children.[1] The impairments in balance, coordination, and handwriting skills tend to significantly interfere with academic achievements and activities of daily living.[1] DCD is considered one of the major health problems among school-aged children worldwide,[2] with the outcomes often extending beyond the motor domain to include secondary mental health, emotional, and behavioral issues.[2–4]

Recently, robust evidence has been added to the notion that children with DCD have an increased risk for mental health difficulties.[5,6] Teachers report that school-aged children with DCD have fewer friends and are more socially isolated than their peers,[7,8] and tend to report lower self-esteem,[4,9] possibly because of the fewer social contacts and friendships.[8,9] Because of that, it is possible that group interventions could be effective for children with DCD. However, to the best of our knowledge, no studies have explored the value of these interventions on psychological abilities, even though it has been suggested that interventions focusing on increasing self-esteem, tackling bullying, and enhancing social interaction may alleviate some of the risk of depression and behavioral difficulties in children with DCD.[5,10]

To that end, the present study aimed to determine whether two distinct group intervention programs for children with DCD improved several psychological variables (anxiety, adequacy and predilection for physical activity, participation, preferences, and enjoyment for activities) and from a child perspective as well as parental perceptions of motor skills, rate of function, and strengths and difficulties of their children. The secondary outcome of interest

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* Corresponding author. Department of Kinesiology, University of Texas at Arlington, Arlington, TX 76019, USA. Tel.: +1 817 272 6320.

E-mail address: cacola@uta.edu (P. Caçola).

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was the improvement of motor skills. The two programs used different approaches to target motor improvement: The first (Program A) focused on task-oriented activities in a large group that involved motor skill training as well as collaboration and cooperation among children, and the second (Program B) was composed of three smaller groups with a direct goal-oriented approach for training of skills chosen by the children. We expected that both groups would provide changes in the children's motor and psychological skills.

Methods

Participants

Children with DCD between 7- and 12-years of age participated in the study, 11 enrolled in Program A (1 female, 10 males; Age: 9.09 ± 1.51; % Rank on MABC-2: 2.5 ± 3.0) and 13 in Program B (4 females, 9 males; Age: 8.46 ± 1.50; % Rank on MABC-2: 3.2 ± 3.1). Qualification for DCD was based on the fit to the diagnostic criteria defined by the DSM-5[1]: (A) a score below the 9th percentile on the Movement Assessment Battery for Children, 2nd ed., MABC-2[11]; (B) experience of motor coordination difficulties that had an impact on their daily function as assessed by a parental report Developmental Coordination Disorder Questionnaire, DCD-Q[12]; (C) elimination of another general medical condition such as cerebral palsy, hemiplegia or muscular dystrophy (report from pediatrician). None of the children were involved in any activities with the exception of Physical Education in their schools at the time of the intervention.

The experimental protocol and consent form were approved by the Institutional Review Board (IRB) for the ethical treatment of human subjects. Participants were informed of the experimental procedures and voluntarily signed a consent form before participating in this study; children provided verbal consent after parents signed the consent form.

Measures

Participants were assessed with the *Movement Assessment Battery for Children, 2nd ed. (MABC-2)*[10] for motor skills, the *Children's Self-Perceptions of Adequacy in and Predilection for Physical Activity Scale (CSAPPA)*[13] for adequacy and predilection for physical activity; the Children's Assessment of Participation and Enjoyment (CAPE) and Preferences for Activities of Children (PAC)[14] for participation, preferences, and enjoyment for activities, and the *Spence's Child Anxiety Scale (SCAS),*[15] for anxiety.

Parents filled out the *Developmental Coordination Disorder Questionnaire (DCD-Q)*[12] for perception of motor skill difficulties, the *Strengths and Difficulties Questionnaire (SDQ)*[16] for psychological attributes, and the *Children Activity Scale (ChAS)*[17] for rate of function.

Procedure

Families of children who participated in other studies and met the inclusion criteria for program participation were contacted and told about the study, and upon agreement, an appointment was scheduled where the child and one parent (at least) signed the consent forms and committed to program attendance. Placement in programs was based on guardian and child availability – every guardian that replied to the study announcement was told of the two programs and the number of sessions, and was able to choose which one they wanted to be involved with. At that time, researchers also scheduled one appointment to complete the pre-test assessments within two weeks of the beginning of the program and were told they would schedule similar appointments within two weeks of the end of the program. Both programs involved 10 sessions of 1 h each, once a week, after school hours, in a small gym of the University Recreation Center. With Program A, the intervention consisted of task-oriented activities that required collaboration among members. Children were encouraged to cooperate and support each other and watching/discovering new strategies to perform the skills.[18] One trained instructor administered the sessions while four additional assistants supported the children in performing the activities.

With Program B, the large group was divided into three smaller groups based on motor skill level and gender (Group 1 = 4 females, Group 2 = 4 males, Group 3 = 5 males). At the beginning of the program, the children were offered the possibility of choosing what they wanted to accomplish as a group at the end of the program. A series of twelve to fifteen goals were chosen before the program, and the group instructor focused on three to four goals every three sessions of the program. Each group had its own instructor and one or two assistants. An example of a session in Program A and B is described in Table 1. Every session started with a warm–up activity and was followed by a series of activities that aimed at improving children's goals.

Statistical analyses

Paired samples *t*-tests were conducted to detect differences between the pre- and post-test for all assessments (total scores and categories, if any). Paired samples *t*-tests were conducted separately for Program A and Program B. The *Cohen's d* estimated effect size analysis (for paired data) was calculated[19] to determine the practical significance of the results, where a *d*-value of $>.3$ indicates a small effect size, $>.5$ a moderate effect size and $>.8$ shows a large effect size.

Results

Program A

Table 2 shows the descriptive and analysis data for Program A. From a child perspective, there were no differences

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