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Title: A comparison of play characteristics of children with Developmental Coordination Disorders (DCD) versus typical children.

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Abstract

Children diagnosed with DCD (Developmental Coordination Disorder) encounter great difficulties with motor coordination due to motor deficits (i.e. sensoro-motor and perceptual-motor). These deficits have a crucial and deleterious impact on the everyday behavior of children with DCD when compared to children with Typical Development (TD).

Even though the importance of children's play has been well established in previous research, there is very little research relating to play in children with DCD.

There is lack of credible and thorough research investigating play characteristics of children with DCD. These would include the characteristics of the child, the play environment and the interaction of the child with this environment. To this author's knowledge, there is no previously published research that investigated the play characteristics of children with DCD. Furthermore, there are no objective, valid and reliable tools to assess the characteristics and play preferences of young children with DCD. In order to answer the need for a measurement tool, the "My Child's Play", or MCP (Schneider and Rosenblum, In process) and "Play Preference Questionnaire", or PPQ (Rosenblum and Schneider, In process) were developed.

The purpose of this research is to assess differences in play characteristics of children with DCD (the study group) and typical children without DCD (control group) using questionnaires handed to the parents. While doing so, the secondary purpose is to establish the internal consistency and discriminate validity of the MCP and PPQ questionnaires.

The research hypotheses were:

A. Hypotheses based on the MCP:

- 1) There will be no significant differences between study and control populations in the play opportunities offered by the environment.
- 2) There will be significant differences between study and control populations in the level of executive functions.
- 3) There will be significant differences between study and control populations in the level of inter-personal interaction during play.
- 4) There will be significant differences between study and control populations in the choices and preferences of play.

B. Hypotheses based on the PPQ:

- 1) Percentage of play activity requiring motor skills will be lower in the study group
- 2) There will be significant psycho-social play difference in between the study and control populations.

C. The internal consistency of each of the tool's items will be higher than 0.70 (Cronbach alpha).

Study population: The sample comprised of 64 children, ages 4-6 years old. The study group included 30 children diagnosed with DCD while the control group was comprised of 34 TD children. All of the subjects were diagnosed by qualified and trained professionals. The two study groups were matched by age, gender, parent education and type of residential community (city, small town etc.). All participants in the study were native Israelis, spoke Hebrew, attended the public school system in central Israel and had normal cognitive function. Children with the following were excluded: taking regular medication, had physical disabilities, neurological disease, musculoskeletal disease, significant vision or hearing impairment.

Materials and Tools:

A) To assess compatibility with study population:

- 1) A demographical questionnaire.
- 2) ChAS-P -Children Activity Scale for Parents (Rosenblum, 2006).
- 3) MABC- Movement Assessment Battery test for Children (Henderson & Sugden, 1992)

B) To assess the participants in the study:

- 1) My Child's Play (Schneider and Rosenblum, under development) to assess play characteristics.
- 2) Play Preferences Questionnaire (Schneider and Rosenblum, under development) to assess play preferences.

Procedure: After receiving the approval from the Ethics Committee of Haifa University and from the “Helsinki” committee of Clalit health services, subjects were chosen by the convenient sample. Potential participants were asked six questions regarding the child's health and one question regarding the involvement of play in the child's life. Then, those who met the criteria underwent MABC and ChAS-P assessments. Children who had an overall score lower than 9 on the MABC and higher than 3.83 on the ChAS-P were deemed eligible to be included in the research and were assessed by the tools mentioned above.

Data analysis: Internal consistency was tested using Cronbach's alpha Coefficient. The differences between the population's characteristics (as shown by MCP and PPQ) were tested using MANOVA for multiple variables. Differences in the overall score of the PPQ were compared using a T-test.

Results: Study results show that the internal consistency reliability of the MCP and PPQ was found to be good ($\alpha = .60- 0.95$). The study's hypothesis regarding the environment allowing the same play opportunities for both groups was not confirmed. There was a statistically significant difference between the groups regarding the opportunities offered by the environment. However, the actual difference between the mean and standard deviation between the groups was minimal,

which implies that the both groups received relatively similar play opportunities from the environment.

The hypotheses regarding levels of interpersonal interaction during play, executive function during play and play preferences were fully confirmed. It was found that children with DCD had significant lower results in all these fields compared to the control.

Differences in motor skills and psycho-social skills, as assessed by the PPQ, were also significant.

Children with DCD were less sociable and preferred participating in a smaller variety of play activities. These differences were evident both in gross and fine motor activity.

Conclusions: The results of this research enhance current accepted principles about the differences of play characteristics of children with DCD, when compared to typical children. As evident from this research, children with DCD have unique play characteristics which manifest by statistically significant lower levels of play performances. Understanding these characteristics may help to continue progressing the assessment and treatment interventions for children with DCD. Furthermore, this research emphasizes the importance of the MCP and PPQ as tools for testing play characteristics. These tools were found to be standard, reliable and valid for the assessment of play characteristics of children with DCD.