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## Relationship between motor skills, participation in leisure activities and quality of life of children with Developmental Coordination Disorder: Temporal aspects



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### ABSTRACT

The study examined the relationship between motor skills, participation in leisure activities and quality of life (QOL), within a temporal context (school year vs. summer vacation and school days vs. weekends). Parents of 22 children with Developmental Coordination Disorder (DCD) and of 55 typically developing children, aged 6–11, filled out two questionnaires relating to their children's participation in leisure activities (vigorous, moderate and sedentary) and QOL. The Movement Assessment Battery for Children-2 (MABC-2) was administered to their children. Results showed that among the children with DCD, balance scores positively correlated with participation in sedentary activities, and in both groups both balance and aiming and catching were related to the physical and school aspects of QOL. Furthermore, participation in vigorous activities in the summer was positively correlated with social and school QOL. In contrast, among typically developing children, participation in vigorous activities during the school year was negatively correlated with school QOL. Finally, in both groups, participation in sedentary activities during school days was negatively correlated with school QOL. These results suggest that the parents' perceptions of their children's QOL may be related to the level of activeness of the leisure activities but also to temporal aspects. Therefore, it is important that therapists and educators consider the temporal aspects, when consulting with parents and their children regarding participation in leisure activities.

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## 1. Introduction

Children participate in various occupational areas such as self-care, play, education and leisure, within different contexts (e.g. physical, social, and temporal; American Occupational Therapy Association [AOTA], 2008). Participation has been found

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to be vital for children's social and academic development as well as for their sense of competence and self-identity (Cairney, Hay, Veldhuizen, Missiuna, & Faught, 2010). Therefore, it is considered one of the most important outcome measures of health intervention (Weintraub, Rot, Shoshani, Pe'er, & Weintraub, 2011). Children's participation is most successful and meaningful when there is a balance between the 'just right challenge', the required skills and body functions to perform the activities, a supportive environment and a sense of satisfaction (Law, Baum, & Dunn, 2005). Participation in activities is commonly evaluated using various measures such as duration, diversity, independence level, enjoyment and satisfaction (Bart, Rosenberg, Erez, & Jarus, 2009).

Leisure is one of the important occupational areas in which children participate. Studies have shown that children spend 30% of their day in leisure activities (Jarus, Anaby, Bart, Engel-Yeger, & Law, 2010). These activities are defined as non-obligatory, intrinsically motivating and performed during discretionary time (AOTA, 2008). Participation in leisure activities may vary according to the type of activities and the level of physical activeness the activity requires, i.e. vigorous, moderate or sedentary (Lifshitz et al., 2011; Ziviani, Scott, & Wadley, 2004). Vigorous-level activities (that entail high levels of activeness) may include ball games or swimming, which require gross motor skills such as balance and coordination (Kioumourtzoglou, Derri, Tzetzis, & Theodorakis, 1998). Moderate-level activities, such as art work or playing musical instruments, require mostly fine motor skills. Sedentary activities, such as playing on the computer or watching television, require little physical exercise and are normally performed while sitting. These activities may vary with respect to the type of motor skills they entail, mostly fine-motor skills (Biddle, Marshall, Gorely, & Cameron, 2009).

Children's participation in everyday activities is thought to be related to their motor competence (Polatajko & Mandich, 2004; Summers, Larkin, & Dewey, 2008). Yet, studies examining the relationship between motor abilities and participation in leisure activities are limited (Engel-Yeger & Kasis, 2010). These studies focused mostly on children with Developmental Coordination Disorder (DCD), a developmental deficit in motor coordination. Individuals with DCD may be impaired predominantly in gross motor skills, in fine motor skills, or in both. DCD affects 5–6% of school aged children (American Psychiatric Association [APA], 2013).

The difficulties of children with DCD often evoke a negative cycle. The motor impairments may affect their physical health, and cause secondary emotional and psycho-social problems (Engel-Yeger & Kasis, 2010; Mandich, Polatajko, & Rodger, 2003). These impairments may also limit their performance in different occupational areas such as activities of daily living (ADL), play, leisure and academic skills (Cermak & Larkin, 2002; Dunford, Missiuna, Street, & Sibert, 2005). This, in turn, may result in further delay in acquisition of new skills. Engel-Yeger and Kasis (2010) found that 5–9-year-old children with DCD showed less preference to participate in leisure activities (requiring various levels of activeness) compared to typical children. The authors also reported a moderately significant correlation between the children's motor skills and their preference to participate in leisure activities. Yet, they did not examine this relationship in children without DCD. Similarly, Cairney et al. (2005) showed that children in Grades 4–8, with probable DCD (pDCD) participated less frequently in sports and in other physical play activities. In a later 3-year longitudinal study, Cairney et al. (2010) followed 2083 children (ages 9.11–11.11 years), of which 111 were with pDCD. The children with pDCD reported participating less in organized and free-play activities compared to their typically developing peers. These differences persisted over time.

The limited performance and participation in daily activities may affect the quality of life (QOL) of children with DCD. Individuals' participation in activities is believed to influence their QOL. Quality of life relates to individuals' dynamic appraisal of their life satisfaction, hope, self-concept and well-being, in relation to their goals, expectations, culture, values and beliefs (Skevington, Lofty, & O'Connell, 2004; World Health Organization Quality of Life Group [WHOQOL] Group, 1995). It reflects their functional and health status, independence level and ability to participate in meaningful, motivating and empowering occupations (Christiansen, Baum, & Bass-Haugen, 2005; Eiser & Morse, 2001). QOL may be measured by objective factors or subjective perspectives (Cummins, 2005). Subjective QOL may be obtained from the individuals themselves or from proxies. Often parents serve as the proxies (Connolly & Johnson, 1999; Weintraub et al., 2011), since they have been found to be sensitive to their children's perception of their well-being and provide reliable data (Morrow, Quine, Heaton, & Craig, 2010).

Only a few studies examined the QOL of children with DCD (Zwicker, Harris, & Klassen, 2012). A review of the literature indicated that even fewer studies have explored the relationship between their QOL and participation in leisure activities, in general, and specifically within a temporal context. As early as preschool years, children with DCD have been found to experience less pleasure and satisfaction from daily functions (Bart et al., 2009). As they grow older, Flapper and Schoemaker (2008, 2013) found that school-aged children with co-occurrence of attention deficits, DCD and with specific language impairment-DCD as well as their parents, perceived the motor, autonomic, cognitive, psychosocial and overall QOL of the children to be significantly lower than perceived by their typical peers and their parents. Similar results were noted by Wang, Wang, & Mao-Hsiung (2012), who studied the perceptions of parents of children with DCD and of typically developing children, regarding their children's and their own QOL. They found that the children with DCD and their parents had significantly lower psychosocial QOL, compared to typically developing children and their parents.

From the review above it is clear that the studies examining the underlying assumption of the bio-psychosocial model with respect to children with DCD are limited. The few studies that did examine this issue (e.g. Cairney et al., 2010) did not differentiate between the children's motor deficits (i.e. fine or gross motor), nor did they examine the relationship between the child's specific motor skills and participation in leisure activities, requiring varying levels of activeness (i.e. sedentary, moderate or vigorous). Finally, they did not relate to the temporal aspect of participation (i.e. during the school year or school days versus the summer or weekends). Tucker and Gilliland (2007), based on an extensive review, noted that the season of

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