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The effect of an integrated perceived competence and motor intervention in children with developmental coordination disorder

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ABSTRACT

Background and aims: Children with DCD have lower self-perceptions and are less physically active than typically developing children. The aim of this quasi-experimental study was to investigate whether an integrated perceived competence and motor intervention affects DCD children's motor performance, self-perceptions, and physical activity compared with a motor intervention only.

Methods and procedures: The intervention group consisted of 20 children and the care-as-usual group consisted of 11 children, all aged 7–10 years. The perceived competence component of the intervention focused primarily on providing positive, specific, and progress feedback to enhance self-perceptions. We assessed children at baseline, after 12 treatment sessions (trial end-point), and at 3-month follow-up.

Outcomes and results: Mixed linear models revealed no differences between the intervention and the care-as-usual group on any of the outcome measures. Children improved their motor performance and increased their perceived athletic competence, global self-esteem, and perceived motor competence after 12 treatment sessions. This improvement was maintained at 3-month follow-up. Motor task values and physical activity remained unchanged for all children.

Conclusions and implications: A perceived competence and motor intervention is as effective as care-as-usual in children with DCD. Future research should focus on improving physical activity in children with DCD.

What this paper adds: This is the first study that has investigated the effect of an integrated perceived competence and motor intervention (intervention group) on motor performance, self-perceptions, and physical activity compared with a motor intervention (care-as-usual

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group) in children with DCD. We made the perceived competence component explicit by providing positive, specific, and progress feedback to enhance children's self-perceptions. Also, this is one of the first studies that has investigated the effect after both 12 treatment sessions (trial end-point) and after 3 months of no intervention (3-month follow-up). We found no differences between the intervention and the care-as-usual group, but children improved their motor performance and increased (most) of their self-perceptions after 12 treatment sessions, while physical activity remained the same. The improvement was still present at the 3-month follow-up. We also benchmarked our results about self-perceptions and physical activity to a group of typically developing children. Self-perceptions in children with DCD had improved to the level of typically developing children after 12 treatment sessions, but their physical activity levels remained significantly lower. This result was the same at the 3-month follow-up, except for perceived athletic competence, which was lower in children with DCD at the 3-month follow-up. In accordance with previous intervention studies that have investigated children with DCD, we found large intra-group variability in the change in motor performance and self-perceptions in children with DCD. We argue that we need to better understand why some children with DCD improve and others do not after a motor intervention.

1. Introduction

Children with developmental coordination disorder (DCD) have trouble mastering and performing motor activities. This impairment significantly interferes with activities in daily life and/or academic achievement and is not due to a general medical condition (American Psychiatric Association [DSM-V], 2013). The prevalence of DCD is estimated at around 5–6% in school-aged children, where boys are overrepresented compared with girls (Blank, Smits-Engelsman, Polatajko, & Wilson, 2012). Also, large differences in motor problems exist. Some children with DCD experience fine motor problems, while other children experience gross motor problems (e.g., Noordstar et al., 2014; Vaivre-Douret et al., 2011). Children with DCD participate less in motor activities in daily life (e.g., physical activity) than typically developing children (Cairney et al., 2005; Cairney, Hay, Veldhuizen, Missiuna, & Faught, 2010; Noordstar et al., 2014).

Children with DCD are often referred to a pediatric physical or occupational therapist to learn to master motor activities (e.g., riding a bike, skipping rope). The motor interventions used can generally be divided into process-oriented interventions and task-oriented interventions (Zwicker, Missiuna, Harris, & Boyd, 2012). Process-oriented motor interventions focus on improving the underlying motor processes and body functions in order to master motor activities, while task-oriented motor interventions focus on the specific motor activity the child experiences problems in (Smits-Engelsman et al., 2013). There is little evidence that process-oriented motor interventions improve motor performance, but the results of the task-oriented motor interventions are encouraging (e.g., Miller, Polatajko, Missiuna, Mandich, & Mcnab, 2001; Smits-Engelsman et al., 2013; Thornton et al., 2016). In the Netherlands, more traditional pediatric physical and occupational therapy (i.e., care-as-usual) combines underlying process-oriented approaches with direct skill training (e.g., task-oriented approach) (Smits-Engelsman et al., 2013).

Children need an extensive number of (gross) motor activities to participate in physical activity. Motor interventions focus mainly on mastering these motor activities (*can do*), but it is unclear whether any improvement in motor activities results in more participation in physical activity (*does do*). Participation in physical activity can be defined as the frequency of attendance in physical activities (Imms et al., 2015). Motivation theorists argue that competence beliefs and task values influence motivation for achievement behavior (i.e., physical activity) (e.g., Eccles et al., 1983; Harter, 1981). Stodden et al. (2008) proposed a conceptual model in which competence beliefs (e.g., perceived athletic competence) mediate the relationship between motor performance and physical activity. Perceived athletic competence is described as the way children perceive their sports ability and athletic performance (Harter, 1982). Children with higher levels of motor performance and perceived athletic competence are likely to be more involved in physical activity (Stodden et al., 2008).

Children with DCD have a lower perceived athletic competence than typically developing children at 7 years old (e.g., Poulsen, Ziviani, & Cuskelly, 2008). Cairney et al. (2005) argued that differences in physical activity between children with DCD and their typically developing peers are mainly due to the difference in perceived athletic competence. The authors argued that perceived athletic competence should be a target for interventions in children with DCD to increase physical activity. However, to date, we have found no studies that investigated the effect of an intervention that aimed to increase perceived athletic competence and master new motor activities to increase physical activity in children with DCD.

Feedback has a powerful influence on learning (e.g., motor performance), competence beliefs (e.g., perceived athletic competence), and achievement behavior (e.g., physical activity) (Duijnhouwer, 2010; Hattie & Timperly, 2007). Feedback is commonly conceptualized as ". . . information provided by an external agent regarding some aspect(s) of the learner's task performance, intended to modify the learner's cognition, motivation, and/or behavior for the purpose of improving performance." (Duijnhouwer, 2010, p. 16). However, there are multiple types of feedback, and effect sizes show considerable variability (Hattie, 2012). Feedback is most effective when it is specific, goal-related, and not too elaborated (Hattie &