Ville Kallinen, Kaisu Mononen, Minna Blomqvist, Marc Lochbaum & Niilo Konttinen

Motor Performance and Achievement Goal-Orientations among Finnish 10-Year-Old Children Involved with Cross-Country Skiing

Introduction

Finnish winter offers many great opportunities for sports activities that are not possible in some other countries. One of these activities is cross-country skiing. According to Finnish national survey, nearly 200 000 children take part in cross-country skiing in sports clubs or recreationally[1].

Fundamental movement skills (FMS) are an essential prerequisite for more sophisticated motor skills. FMS includes locomotor (e.g., running and hopping), manipulative object control (e.g., catching and throwing) and stability (e.g., balancing) skills. Proficiency in FMS helps maintain sports participation in children. Also, FMS competence is a contributor to social and cognitive development in children[2]. In Barnett's study, re-

searchers reported a positive relationship between motor skill proficiency and physical activity participation[3]. Previous studies also suggest that children with poor motor skill proficiency not just perceive themselves to be less competent in basic motor skills but also see themselves less competent in their physical abilities[4,5]. These lowered perceptions may lead to a decreased level of motivation which in turn can reduce activity in sports participation[6]. Also, research exists demonstrating that motor skill proficiency is a strong predictor of athletic success in childhood and adolescence[7].

In this study, the Körperkoordination Test Für Kinder (KTK) was used as an instrument to measure children's motor skill proficiency. Originally KTK was developed in Germany to test motor coordination of children for general, medical, psychiatric, social and health-related purposes. The test consists of four subtests: walking backward on a balance beam of different widths (WB), moving sideways on boxes (MS), hopping over an obstacle with one leg (HO) and jumping sideways over a small stick with both feet together (JS). Raw test scores from subtests can be transformed into motor quotients (MQ). MQ values are standardized by age and gender. Values are based on the performance of 1228 normally developing German children in 1974[8].

Achievement Goal Theory (AGT) [9] offers a helpful framework to study children's sports participation behavior. Recent meta-analytic reviews demonstrate the dominance of AGT in the literature[10,11]. AGT outlines two primary goal orientations: task (or mastery) and ego (or performance). Task-oriented athletes are motivated by developing competence or gaining a mastery of a task, whereas goal-oriented athletes' motivation stems from normative competence perceptions such as winning and outperforming others[12]. Over time, researchers developed two valid and reliable instruments to measure achievement goal orientations in sport: TEOSQ [13,14] and POSQ[15]. In Finland, the POSQ is the measure most used[16].

Another very popular framework to study children's sports participation behaviour is known as Self-Determination Theory (SDT). SDT originates from a humanistic perspective and highlights the importance of fulfilment of needs, self-actualization, and the realization of human potential. SDT distinguishes between two types of motivation: intrinsic and extrinsic. Intrinsically motivated person pursues an activity for the pure enjoyment of the task. An extrinsically motivated person's drive is

external rewards such as social acceptance and medals[17]. SDT introduces the concept of basic psychological needs as central to understanding elements necessary for high quality, autonomous motivation. SDT argues that there are essential human needs for autonomy, competence, and social relatedness which are thought to be required for developing internal motivation[18]. In this study, we focused on the children's self-rated perceived competence. Perceived competence is, for instance, affected by experiences of success or failure at different tasks or feedback from a coach.

The purpose of this study was to examine motor performance, perceived competence and achievement goal orientations of Finnish 10-year-old children who have participated in cross-country skiing activity in sports clubs or recreationally. Additionally, we wanted to examine potential relationships among motor performance, perceived competence and achievement goal orientations.

The research team specifically hypothesized the following. Firstly, we hypothesized that boys would be more ego-orientated than girls as meta-analytic data with the POSQ strongly supports gender differences though surprisingly research with the TEOSQ does not[19]. Secondly, we hypothesized that children who score higher on motor performance test would have higher perceived competence. Previous literature suggests that there is a positive relationship between self-rated perceived ability and motor proficiency[20]. Thirdly, we did not forward a firm hypothesis for a relationship between KTK and achievement goals. To best of our knowledge, this research setting is unique, and no previous research literature exists. From the approach-avoidance literature[21], it was reasonable to believe that higher levels of both task and ego goal orientations would be characteristic of the better KTK performers.

Methods

Participants of the study were 10-year-old children. The sample size was 792, including 401 girls and 391 boys. The research team recruited the children with the help of schools from seven different cities around Finland to ensure sood geographical representation of population. Cities were Jyväskylä, Tampere, Turku, Joensuu, Lohja, Mikkeli and Lahti. In

addition to the KTK, the participants completed the Finnish version of POSQ [22] to measure task and ego goal-orientations. The questionnaire contains 12 items, and it measures task and ego dimensions in the dichotomous approach. The two goal orientations measure how individuals evaluate their personal competence in achievement settings. Two 6-item scales measured task orientation (e.g., I reach a target I set for myself) and ego orientation (e.g., I show other people I am the best). Participants were asked to indicate when they feel most successful while doing sports with a 5-point Likert-scale (1= strongly disagree, 3= neutral, 5=strongly agree). Also, the children filled out modified version of perceived physical competence scale as the measure of perceived competence[23]. The questionnaire contains eight items. Participants were asked to indicate their abilities (e. g. I am fast) while doing sports with a 5-point Likert-scale (1= strongly disagree, 3= neutral, 5=strongly agree).

The research team collected data between autumn of 2015 and spring of 2016 from these children. At first, the research team contacted the school principals for permission to conduct the study in their school. With the help of schools, the research team was allowed to ask for informed consent for participation from the children's parents/guardians. The consent materials clearly articulated the aims and study protocol. After participants approved their involvement, the research team organized KTK test measurements with the help of teachers. The research team conducted all measurements at schools during the schoolday. The team had at least minimum of four people administrating measurements. First, children were given verbal instruction in the beginning of measurements. After instructions children were divided equally into smaller groups for every subtest. Children performed every subtest one by one under researchers' supervision. After children had completed all four subtests the research team assembled the results together. Average measurement session lasted around 45 minutes.

After KTK measurements the questionnaire was sent to families either by e-mail or paper post depending on how parents chose the questionnaire to be sent. Both versions of the questionnaire included a cover letter that told of the purpose of the study, instructions for completing the questionnaire, contact information and a possible stamped envelope for returning the questionnaire if chosen to be sent as a paper version. A reminder to answer the questionnaire was sent to those participants who

had not responded to the questionnaire within one month. Children completed the questionnaire at home with the help of parents.

Descriptive statistics were drawn to assess the characteristics of the participants. We tested our first hypothesis and other potential gender differences with independent t-tests on the achievement goal orientations, perceived competence, and KTK subtests. Finally, we examined both hypotheses two and three with MANOVA and considering the univariate F-tests ANOVA with Tukey's HSD follow-up tests when appropriate. Statistical analyses were conducted using SPSS version 24.0.

Results

Concerning hypothesis one, boys had significantly higher ego-orientation than girls (F= 3,229, p< 0,001). Significant (p< 0,05) gender differences did not exist in the task-orientation and perceived competence. For the KTK subtests, girls performed significantly better than boys in walking backward on a balance beam of different widths (F= 2,918, p< 0,001). No other gender differences resulted across the KTK subsets.

By their performance on the KTK, children were placed into five groups. Group 1 being worst performers and Group 5 being the best performers. The MANOVA was significant for KTK grouping (p< ,001) and gender (p< ,01). The interaction term (KTK grouping by gender) was not significant. Given the known gender differences in the ego-orientation, we focused only on the KTK group level statistics. For perceived competence, the univariate F-test revealed a significant and meaningful motor skill proficiency main effect (F= 36,538, p< 0,001, partial eta square= ,176). Examination of Table 1 demonstrates the top two KTK performing groups possessing greater perceived competence than the lower three performing groups. The goal orientation univariate F-tests (task orientation, F= 12,512, p< 0,001, partial eta square= ,068; ego orientation, F =12,242, < 0,001, partial eta square = ,067) were highly significant of moderate meaningfulness. The follow-up tests (see Table 1) for the task orientation indicated that the two highest performing KTK groups endorsed the task orientation more than the lower performing KTK groups. A similar pattern resulted for the ego-orientation across the five KTK groupings.

Table 1. Relationships among achievement goal orientations, perceived competence, and motor skill proficiency by KTK groupings. *. The mean difference is significant at the ,05 level. **. The mean difference is significant at the ,01 level. ***. The mean difference is significant at the ,001 level.

Ego	KTK Perfomance Groups	1	2	3	4	5
2,6508	1	-	n.s.	n.s.	***	**
2,7532	2		-	***	***	**
3,1757	3			-	**	n.s.
3,471	4				-	n.s.
3,6053	5					-
Task		1	2	3	4	5
4,0794	1	-	n.s.	n.s.	*	*
3,9768	2		-	***	***	***
4,2899	3			-	*	n.s.
4,458	4				-	
4,6316	5					-
PCM		1	2	3	4	5
3,5417	1	-	n.s.	***	***	***
3,6883	2		-	***	***	***
4,0634	3			-	***	**
4,4152	4				-	n.s.
4,4539	5					-

Discussion

Our purpose was to (uniquely) examine the relationships among motor skill abilities, achievement goal orientations, and perceived competence in children who indicated some level of participation in ski sports. Our aim was to best understand and produce new information that could help the development of ski sports in Finland. Based on our results, it appears that the children who performed best at the motor skills tasks had higher levels of all the motivation and competence variables. Thus, coaching and program development in ski sports should emphasize en-

vironment that supports both task and ego climate.

Given that our work was not experimental, a number of questions unanswered. For instance, we were not able to control for skiing exposure. Thus, the extent to which skiing improves motor skills is a vital future research question. Most likely, children participate in a variety of activities, which is desirable. Thus, these facts should be taken into account when interpreting these results. Longitudinal work with multiple time points of data collection seems best with the naturally occurring variations in children's sports participation being taken into account.

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