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Promoting Preschoolers Actual and Perceived Motor Competence During Recess: A Need-Supportive Motor Skill Intervention

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Promoting Preschoolers Actual and Perceived Motor Competence During Recess: A Need-Supportive Motor Skill Intervention

Abstract

Using the self-determination theory (SDT) to create a need-supportive teaching environment to promote children's learning, this study aimed to implement a need-supportive, structured fundamental motor skills (FMS)-based intervention during preschoolers' 30-minute recess (2 lesson plans; 6 lessons/week for four weeks), and to examine intervention effects on preschoolers' FMS and perceived competence. Twenty-four preschoolers (*M*age = 4.80, *SD* = 0.32; 54% girls) were randomly assigned to intervention (*N* = 13) and control (*N* = 11) groups. Pre- and post-assessments measured actual FMS and perceived competence. A repeated measure MANOVA showed significant improvements between the groups over time in FMS and perceived competence ($p < 0.05$, Wilk's $\Lambda = 0.62$, partial $\eta^2 = 0.38$). A follow-up univariate test showed significant group × time differences in locomotor skills, ball skills, and total motor competence ($p < 0.05$). Cohen's d results indicated medium to large effect size for the intervention group's FMS and perceived competence, from pre and post intervention (*d*s 0.56–1.11). No significant improvements in FMS and perceived competence were observed in the control group. These findings indicate that the intervention can be used to enhance preschoolers' FMS and perceived competence, which subsequently affect their physical activity and health status.

Promoting Preschoolers' Actual and Perceived Motor Competence during Recess: A Need-Supportive Motor Skill Intervention

Introduction

Since the mid 1970's, the prevalence of obesity and overweight among children (i.e., ages 2–19) has increased. Childhood overweight has increased from 9.2% to 16.1% and childhood obesity has more than tripled from 5.5% to 19.3% as of 2017–2018 (Fryar et al., 2020). Regular physical activity (PA) can have substantial health benefits for individuals of all ages. For preschool aged children between the ages of three to five, it is recommended that they be physically active daily for at least three hours a day doing activities of various intensities (i.e., light, moderate, vigorous). Regular participation in PA can improve weight status, and therefore, it is important to find ways to encourage children to move and participate in PA (U.S. Department of Health and Human Services, 2018). Studies have shown that teachers, peers, and the school environment can influence preschoolers' play and PA involvement (Gehris et al., 2014; Lee et al., 2022; McClintic & Petty, 2015; Ward et al., 2017). Therefore, providing learning environments about movement, PA, and other healthy habits during school times can prepare preschoolers for living healthier lifestyles. Specifically, teaching children fundamental motor skills (FMS) gives them an opportunity to develop a repertoire of basic to advanced movements for participation in various PA and sports (Lee et al., 2020a).

FMS generally refers to gross motor skills, divided into locomotor and ball skills (Webster & Ulrich, 2017). *Locomotor skills* move the body through space in a coordinated manner and includes movements such as running and hopping. *Ball skills* are the ability to manage a ball in a specific movement pattern and includes catching a ball with two hands or dribbling a ball with one hand. Essentially, it is assumed that FMS are foundational movements or the "building blocks" needed in exercises and many types of sports. For example, knowing how to catch a ball with two hands can provide children with the basic knowledge and skill to catch in other, more complex situations such as during basketball or football (Zhang et al., 2020).

Structured physical activities can offer children opportunities to acquire various FMS and encourage regular participation in PA, while unstructured free play may only provide PA engagements (Lee et al., 2020b). Studies exploring FMS among preschoolers have utilized lesson plans, programs, or interventions with structured activities and games designed for preschoolers' PA engagement and FMS acquisition in center-based daycare facilities (Jones et al., 2016; Palmer et al., 2017; Roach & Keats, 2018).

Interventions for FMS Acquisition

Over the past few years, various motor skill interventions such as *Jump Start* (Jones et al., 2016), *SKIP* (Roach & Keats, 2018), *CHAMP* (Palmer et al., 2019), *MAP* (Palmer et al., 2020), and exergaming (Gao et al., 2019) have been implemented to promote preschoolers' FMS development. These programs and interventions vary in their theoretical underpinning, but the most widely used theory is achievement goal theory (AGT; Nicholls, 1984). The achievement goal orientations have also been used to describe the motivational climate whereby task (mastery) or ego (performance) characteristics are prevalent in an instructional environment (Ames & Archer, 1988; Lochbaum et al., 2016). The mastery motivational climate (e.g.,

increasing autonomy) shows effectiveness for preschoolers to learn motor skills (Johnson et al., 2019; Logan et al., 2013; Palmer et al., 2020; Robinson & Goodway, 2009). These studies have demonstrated its benefit for enhancing preschoolers FMS; however, they have mainly focused on manipulating the perception of autonomy without inclusion of other psychological needs such as competence and relatedness, which are essential for motivation to persist in activities (Deci & Ryan, 1985).

Self-Determination Theory

The self-determination theory (SDT; Deci & Ryan, 1985) posits that autonomy, competence, and relatedness are universal, basic psychological needs (BPNs) essential for optimal psychological growth and well-being (Deci & Ryan, 2000; Ryan & Deci, 2017). Autonomy is the need to feel that actions, behaviors, and decisions originate from oneself and are congruent with one's true inner self. Competence is the need for successful demonstration of abilities and skills. Relatedness is the need to feel connected to others and that one belongs. The extent to which the three needs are satisfied determines quality of motivation (i.e., amotivation, extrinsic motivation, intrinsic motivation) and subsequent psychological outcomes. Studies have shown that when these three needs are fulfilled, they can enhance children's effort, enjoyment, and persistence in PE and sports settings (Jõesaar et al., 2011; Leptokaridou et al., 2015). On the contrary, when individuals perceive their needs to be thwarted, they experience less intrinsic motivation to participate in activities and poorer well-being (Deci & Ryan, 2000; Ryan & Deci, 2017). Social contexts that aim to enhance the perception and fulfillment of these three needs are known as need-supportive environments (Lee, et al., 2020a; Washburn et al., 2016).

SDT Strategies in PA Settings

Researchers have implemented SDT interventions in various PA settings (e.g., group fitness, PE, remote/online) using need-supportive strategies to enhance participants perceptions of autonomy, competence, and relatedness, and thus fulfill their basic psychological needs (Edmunds, et al., 2008; Kim et al., 2022; Sánchez-Oliva et al., 2017). Autonomy support can be promoted by providing choices for participants to select an activity that suits their fitness level. PA leaders can use non-coercive language (e.g., let's try instead of we need to) to invite participants to engage in activities. Competence can be enhanced by communicating clear instructions and outcomes for activities and providing positive and instructional feedback. Relatedness is fostered when the PA leader or teacher shows genuine interest in students and learns and addresses participants by their name. Relatedness is also enhanced when participants cooperate on activities.

As an example of promoting the need-supportive climates in PA settings guided by SDT, Sánchez-Oliva and colleagues (2017) trained PE teachers to deliver a ten-session intervention to enhance children's motivation and intention to be physically active. At the end of the intervention, the intervention groups autonomy need satisfaction and their intention to be physically active improved compared to the control group. The BRAVO! intervention was also designed and delivered using need-supportive strategies to promote PA and healthier eating among obese children (Kim et al., 2022). The intervention was 12 weeks in duration and included bi-weekly exercise sessions and a weekly nutrition education session. The post-intervention results showed that the intervention group improved in their PA level and their psychological well-being. The results of these interventions support the use of SDT as a viable framework in PA settings. However, a review that evaluated several cross-sectional and

intervention studies concluded that most studies have recruited older children and adolescents, so there is a need for examining SDT in children under the age of ten years (Vasconcellos et al., 2020).

Interventions for Perceived Competence

Within the FMS development literature, the construct of perceived competence, or how an individual views their abilities and skills, has also been investigated (Logan et al., 2013; Robinson et al., 2009; Valentini & Rudisill, 2004). According to Stodden et al. (2008), perceived competence plays a key role in motor skill acquisition during early childhood. Young children's aggrandized view of their skills drives them to try and practice skills. In middle childhood, cognitive growth allows children to perceive themselves more accurately. Perceived competence has also been investigated in AGT-based interventions (Robinson et al., 2009; Logan et al. 2013) in low autonomy, high autonomy, and mastery motivational climates. Previous studies have shown that preschoolers who participated in high autonomy and mastery motivational climate interventions reported increases in their perceived competence, while those who participate in low autonomy climates reported no change at the end of the interventions (Robinson et al. 2009; Logan et al., 2013). As with previous AGT-based interventions, these studies have primarily focused on manipulating the perception of autonomy, while not considering other psychological needs.

Past researchers have investigated preschoolers FMS and perceived competence from an AGT perspective, which has primarily focused on intervention strategies to enhance perception of autonomy. Additionally, studies using SDT have been implemented among older children and adolescents. Hence, there is a need for implementing SDT based interventions among preschoolers. To the authors knowledge, only one SDT based intervention has been implemented to promote children's FMS and perceived competence. Lee et al.'s (2020a) study provided empirical evidence showing an effective SDT based need-supportive FMS intervention on actual motor competence and PA among school-aged children (i.e., 5–8 years of age). Based on the promising results of Lee et al.'s (2020a) study among school-age children, we examined if the SDT based need-supportive FMS intervention (e.g., competence support, autonomy support, and relatedness support) would be efficacious to develop actual and perceived motor competence in preschoolers (i.e., 3–5 years of age). Therefore, the major purpose of this study was to examine the effects of an SDT-guided FMS intervention on preschoolers' FMS and perceived competence. It was hypothesized that the FMS intervention guided by SDT will significantly improve FMS and perceived competence in preschoolers.

This study's significance lies in introducing the SDT as a framework for FMS interventions in preschool-aged children. Given that FMS acquisition and perceived competence in early childhood play an essential role in promoting regular PA engagement, it would be imperative to investigate the effectiveness of SDT based interventions on the preschools' FMS and perceived competence.

Method

Participants and Procedures

A convenience sample of twenty-four preschool-aged children (*M*age = 4.80, *SD* = 0.32; 54.2% girls) recruited from one early childhood center managed by the university system in the southwestern United States participated in this study. Two classrooms were randomly selected as

the intervention (*N* = 13) and control groups (*N* = 11) through a coin flip. The daycare center has a diverse race/ethnicity of preschoolers. The two classrooms had similar age range groups (4–5 years old) and active/recess routines (i.e., 2.5 hours of outdoor play). The university's Institutional Review Board (IRB) reviewed and approved the study. Informed parental consent was obtained prior to the data collection. This study did not conduct a power analysis to estimate sample size because of the nature of the exploratory study with a convenience sampling.

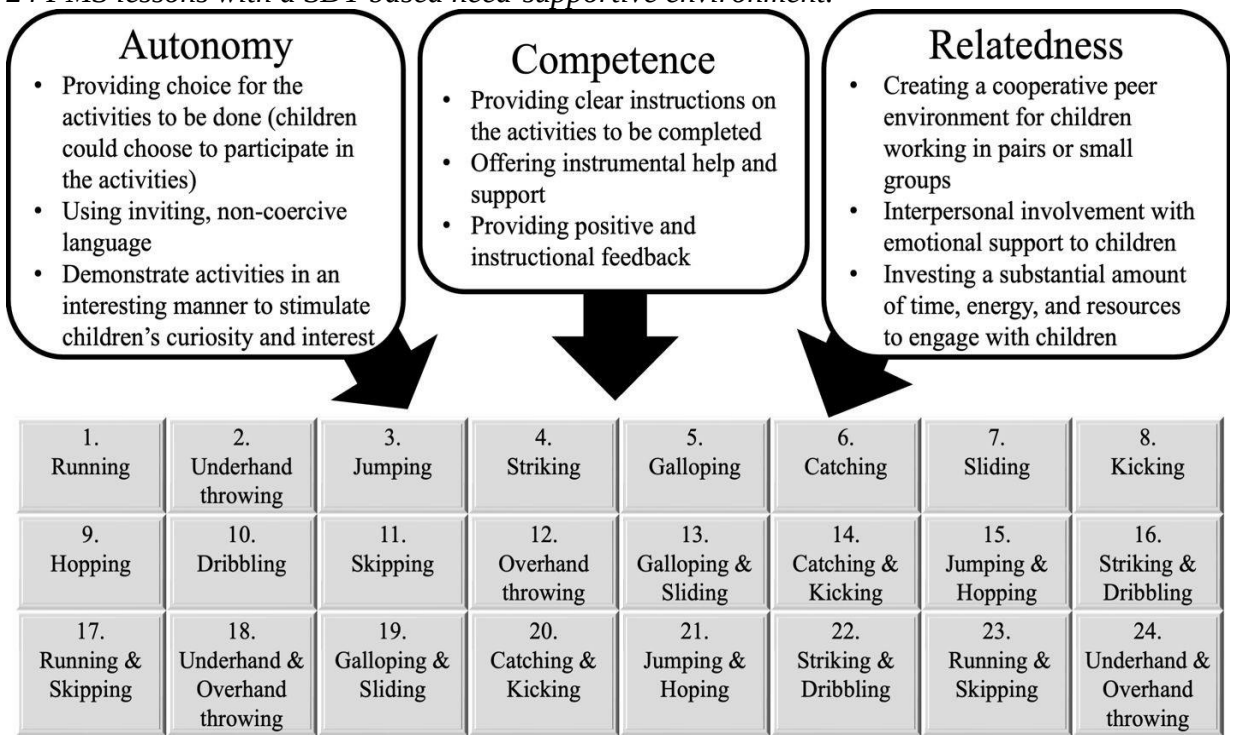
Intervention Preparation and Training

The 24 FMS-based lesson plans were adapted and modified from a previously validated FMS intervention among K–2nd grade children (See Figure 1; Lee et al., 2020a). Three professionals, who have more than five years of teaching experience in physical education (PE), read through the lesson plans and provided constructive feedback to redesign the programs to be developmentally appropriate for preschoolers. Daycare center teachers, who have more than 20 years of teaching experience in preschools, offered feedback on the lesson plans and discussed how to efficiently deliver the FMS-based lessons with need-supportive strategies for preschoolers.

The research team held weekly meetings for three months (4 sessions/per month × 3 months = 12 sessions) to practice observing and scoring preschoolers' FMS and perceived competence. During these sessions, graduate and undergraduate research assistants participated in pilot tests about preschoolers' actual and perceived motor competences. These procedures provided our research team to understand the project process and improve inter-rater reliability on the measures.

Figure 1.

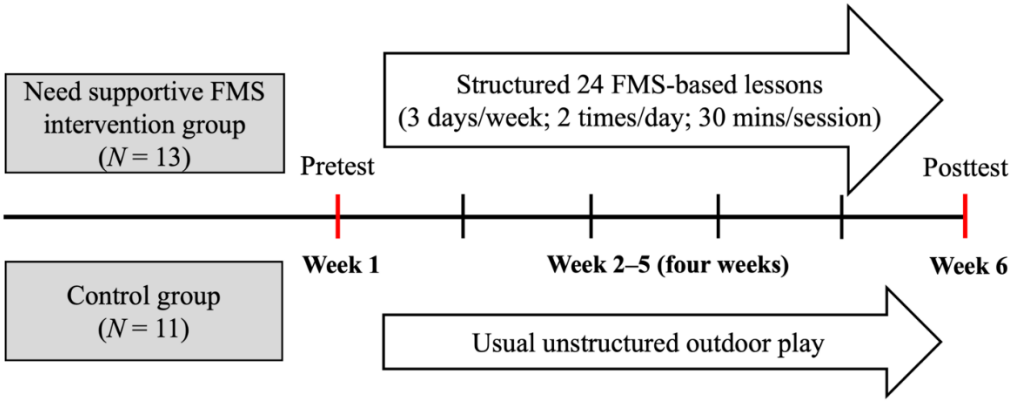
24 FMS lessons with a SDT based need-supportive environment.



Need-Supportive FMS Intervention

The intervention began in the middle of the fall semester of 2019 (see Figure 2) with the recommendations from preschool teachers and the center director. Two different FMS-based lessons were taught three days a week (2 times/per day × 3 days = 6 lessons) for four weeks (6 lessons/per week × 4 weeks = 24 lessons). The lessons were implemented into two recess times at the center in morning (10:45–11:15 AM) and afternoon sessions (2:45–3:15 PM), which were recommended by the center's administrator. The lessons were taught outdoors and indoors according to weather conditions. Preschoolers in the control group regularly participated in unstructured free play (without instructions).

Figure 2.
Procedures of the intervention study.



Twenty-four FMS-based lessons were designed to instruct preschoolers' FMS through developmentally age-appropriate physical activities and games with need-supportive strategies. The FMS taught were locomotor skills (i.e., running, horizontal jumping, galloping, sliding, hopping, skipping) and ball skills (i.e., underhand throwing, overhand throwing, one-hand striking, two-hand striking, two-hand catching, kicking, dribbling). The first 12 lessons focused on individual skills such as running or two-hand catching and lessons 13–24 combined two locomotor skills (e.g., galloping and sliding) and two ball skills (e.g., catching and kicking). Therefore, the intervention children received instruction and practiced each of the skills on three separate occasions during the intervention. Two trained doctoral students and undergraduate research assistants with experience in teaching PE led the sessions. Each lesson was 30 minutes in duration and included: a) three to five-minute warm-up and introduction; b) 20-minute of instruction, FMS-based activities, and games; and c) three to five-minute stretching, cool-down, and closing segments. The children received a total of 720 minutes of instructional time.

The research team focused on promoting supportive environments for preschoolers to engage in the activities by creating a need-supportive climate (e.g., autonomy support, competence support, and relatedness support). For instance, as autonomy support, the instructors demonstrated each of the activities and skills to foster children's interest and provided a few options on how it could be executed (e.g., increasing or decreasing distances). Additionally, the instructors applied non-coercive language ("Can we try...?" "Can you show…?") to invite children to participate in the activities. To increase competence support, preschoolers were given specific instructions (e.g., verbal, demonstration) on how to do the activities and were provided immediate positive feedback ("Good job on…!") and instructional feedback (Let's try using our arms more) on their

performance. Additionally, the instructors offered help to children who had difficulty performing the skills by showing them how to position their body or limbs to execute a movement. Lastly, to foster relatedness support, children worked in pairs or small groups at they learned FMS. For example, when the children learned underhand throwing, they partnered up with a peer to throw to ball too. The children also participated in group sports such as soccer or basketball. In addition, we spent time in center to create rapport with children and included group activities in each FMS lesson to promote relatedness support.

Intervention fidelity was monitored by the first and second authors (A.W., & J.L.). After each session, both authors wrote personal reflections and discussed the lesson components (i.e., warm-up/introduction, activities/games, stretching, closing), need-supportive strategies, and their implementation. This dialogue encouraged each author to identify the lesson components and strategies that were the easiest and most challenging to implement. The reflective practice prepared the authors to improve their teaching and implement the strategies in lessons.

Measures

Pre- and post-tests were conducted before and after the intervention. Each child's FMS was assessed by two research assistants and under the supervision of a school staff member to prepare for any emergency situations. Following the one-on-one format, perceived competence was administered in a resource room.

Anthropometric Assessment. Height and weight were collected for each child using a Health-o-Meter 500 KL digital physician height/weight scale (Pelstar, LLC, Countryside, IL, USA). The children were assessed one by one in small groups by two research assistants while being supervision by a member of the school staff. Body mass index (BMI) was calculated for each child using the following formula: weight [kg]/height^2[m^2].

Fundamental Motor Skills. The TGMD–3 (Ulrich, 2019) was used to measure preschoolers' FMS. This test was developed to measure FMS in children ages three to 10 as a criterion referenced testing system. The test contains two subscales–locomotor and ball skills. The locomotor skills include six skills: running, galloping, hopping, skipping, horizontal jumping, and sliding (total score ranges from 0 to 46). The ball skills include seven skills: overhand and underhand throwing, one-hand and two-hand striking, dribbling, catching, and kicking (total score ranges from 0 to 54). Each skill was demonstrated by a research assistant and the children were instructed to demonstrate it twice. The skills had three to five different criteria that must be met to fulfill successful execution of the skill. If the child performs the specific criteria required for the skill, a score of 1 is given. If a child fails to perform the criteria required for the skill, a score of 0 is given. Scores are summed for each skill as the skill score, and then summed to provide raw locomotor and ball skills scores. The inter-rater reliability was adequate between the two raters for locomotor skills (α = .97, 95% CI [.95, .98]) and ball skills (α = .98, 95% CI [.96, .99]), respectively. Previous research has demonstrated a high internal consistency for locomotor skills (α = 0.97), ball skills (α = 0.97), and total motor skills (α = 0.98) among preschoolers (Webster & Ulrich, 2017).

Perceived Competence. The physical competence subscale of the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children was used to measure perceived competence (Harter & Pike, 1984). Six physical domains (i.e., swinging, climbing, tying shoelaces, skipping, running, hopping) were measured with six items. Each item was presented to preschoolers as two pictures. The pictures are based on sex-specific scales for boys and girls. One picture showed a child that demonstrated competence in the skill and a second

picture showed a child that did not demonstrate competence in the skill. Below each picture were small and large circles that indicated if the child was a little bit like the child in the picture (small circle) or a lot like the child in the picture (large circle). Each item is rated on a four-point Likert scale where one is low competence and four is high competence. First, the preschooler was asked to identify and point to which picture was more like them for a skill (i.e., competent, incompetent). Afterward, each child was asked if they were a little or a lot like the child they had identified with. Each child was measured one by one by two research assistants under the supervision of a school staff member in a resource room. This subscale was developed for use with young children and demonstrates acceptable internal consistency (α = 0.66; Harter & Pike, 1984).

Data Analysis

Before conducting data analysis, we screened normal distribution of the study variables, and results indicated all dependent measures were normally distributed (skewness and kurtosis between ±2). Two steps were then used to conduct the data analyses using SPSS 28.0 (SPSS Inc., Chicago, IL, USA). First, independent-sample t-tests were performed to identify any group differences in the pretest. Second, a 2 (time) × 2 (group) repeated measures multivariate analysis of variance (MANOVA) was used to investigate the effects of the need-supportive FMS intervention program on actual motor competence and perceived competence among preschoolers, and a further univariate analysis was performed to explore group differences. Cohen's *d* test was performed to examine effect sizes between times (pretest vs. posttest) on the dependent variables (> 0.2 = small, > 0.5 = medium, and > 0.8 large: Cohen, 1988). *p*-value (< 0.05) was used to denote a statistically significant difference among variables.

Results

Descriptive Statistics Between Groups On The Pretests

From the pretest (see Table 1), no significant differences were found between the intervention and the control group for age (t = 0.31; p = 0.77), height (t = -2.04; p = 0.06), weight (t = -1.19; p = 0.25), BMI (t = -0.06; p = 0.95), locomotor skills (t = 0.20; p = 0.84), ball skills (t = -0.11; p = 0.92); total motor skills (t = 0.05; p = 0.96), and perceived competence (t = -0.97; p = 0.34).

Table1.
Descriptive Statistics for Pre-Assessments Between Groups (*N* = 24)

Variables	Need-supportive FMS intervention group (*N* = 13)	Control group (*N* = 11)	Group difference, *t*(*p*)
Age, M (SD)	4.82 (0.28)	4.78 (0.38)	0.31 (0.77)
Sex (female/male), *N*	8/5	5/6	-
Anthropometry			
Height (cm), *M*(*SD*)	105.36 (3.16)	108.75 (4.90)	-2.04 (0.06)
Weight (kg), *M*(*SD*)	18.09 (1.45)	19.36 (3.51)	-1.19 (0.25)
BMI (kg/m2), *M*(*SD*)	16.31 (1.14)	16.35 (2.63)	-0.06 (0.95)
FMS			
Locomotor skills, *M*(*SD*)	28.96 (5.94)	28.40 (7.39)	0.20 (0.84)
Ball skills, *M*(*SD*)	28.30 (4.61)	28.59 (8.31)	-0.11 (0.92)
Total motor skills, *M*(*SD*)	57.26 (9.71)	57.00 (15.28)	.05 (0.96)
Perceived competence, *M*(*SD*)	3.07 (0.42)	3.24 (0.40)	-0.97 (0.34)

Note. *M* = mean; *SD* = standard deviation

Repeated Measures Multivariate Analysis of Variance

Table 2 shows the means, standard deviations, and effect sizes (*d*) for the pre- and post-test scores on actual FMS competence and perceived competence by group. The repeated measures MANOVA results indicated significant improvements in actual FMS competence (i.e., locomotor skills, ball skills, total motor skills) and perceived competence between the groups (need-supportive FMS intervention group vs. control group) over time [$F(3, 20) = 4.11$, $p < 0.05$, Wilk's $\Lambda = 0.62$]. The follow-up univariate tests further revealed the significant differences by group and time in locomotor skills [$F(1, 22) = 13.12$, $p < 0.01$], ball skills [$F(1, 22) = 5.10$, $p < 0.05$], total motor skills [$F(1, 22) = 10.20$, $p < 0.01$], but not in perceived competence [$F(1, 22) = 1.53$, $p > 0.05$].

Table 2.
Descriptive Analyses of FMS and PC Between Time (pretest vs. posttest) and Group (N = 24)

Variable & Time	Need-supportive FMS intervention group (*N* = 13)		Control group (*N* = 11)	
	M (SD)	***d***	***M (SD)***	***d***
Locomotor skills (range 0–46)				
Pre	28.96 (5.94)	0.66	28.40 (7.39)	0.07
Post	32.85 (5.89)		27.90 (6.16)	
Ball skills (range 0–54)				
Pre	28.30 (4.61)	1.11	28.59 (8.31)	0.08
Post	33.27 (5.31)		29.18 (5.24)	
Total motor skills (range 0–100)				
Pre	57.26 (9.71)	0.91	57.00 (15.28)	0.01
Post	66.12 (9.79)		57.09 (9.55)	
Perceived competence (range 1–4)				
Pre	3.07 (0.42)	0.56	3.24 (0.40)	0.03
Post	3.31 (0.43)		3.23 (0.36)	

Note. *M* = mean; *SD* = standard deviation; PC = perceived competence*; d* = Cohen's *d*.

Cohen's *d* results indicated statistically significant improvements, with a medium to large effect size (range *d*s 0.56–1.11), for the intervention group's locomotor skills (*M*pre = 28.96 vs. *M*post = 32.85, *d* = 0.66), ball skills (*M*pre = 28.30 vs. *M*post = 33.27, *d* = 1.11), total motor skills (*M*pre = 57.26 vs. *M*post = 66.12, *d* = 0.91), and perceived competence (*M*pre = 3.07 vs. *M*post = 3.31, *d* = 0.56); yet, the control group did not demonstrate any notable changes between pre- and post-tests in FMS and perceived competence (ranges *d*s 0.01–0.08; see Table).

Discussion

The main purpose of this study was to implement and examine the effects of a four-week need-supportive FMS intervention during recess on preschoolers' FMS and perceived competence. To our knowledge, this is the first study that has included the SDT as the guiding theory to develop a motor skill intervention for preschoolers.

Influences of the Need-Supportive FMS Intervention on FMS

The need-supportive FMS intervention improved preschoolers FMS competence over a four-week period. The intervention was composed of 24 lesson plans with activities developed and aimed to improve children's FMS. Our results corroborate with previous FMS interventions that improved children's FMS over several weeks (Palmer et al., 2019, Robinson & Goodway, 2009) in comparison to children who did not receive the interventions. In Palmer et al.'s (2019) study, children who participated in the CHAMP intervention scored higher on locomotor, ball, and total motor skills compared to the control group. Interestingly, both groups showed significant improvement in their locomotor, ball, and total motor skills over time, but the intervention group improved at a significantly greater rate. In Robinson and Goodway (2009) children who practiced object control skills in low autonomy and mastery motivational climate interventions had significantly greater improvements in their scores than a comparison group. Further analysis showed that both the low autonomy and mastery motivational climate groups had significant improvements from pretest to retention test, but no differences were seen in the comparison group from pretest to retention test. Collectively, previous studies suggest that children may improve their FMS by participating in their school's regular outdoor free play time or by receiving high quality instruction by their instructors. However, when children participate in interventions with developmentally appropriate FMS activities taught in an autonomy supportive environment, they can significantly improve their FMS rapidly and there can be sustainable learning effects.

The current study expands the motor development literature by introducing a new theoretical approach for FMS interventions. SDT has been used to create interventions in the exercise and physical education settings to enhance participants perceptions of the three basic psychological needs (Edmunds et al., 2008; Sánchez-Oliva et al., 2017). It is a viable approach to enhance elementary age children's FMS development (Lee et al., 2020a) and the results of this study suggest it can positively impact preschoolers FMS development too. This is a key finding since development of FMS during early childhood is critical to engagement in PA, which subsequently can affect obesity risk (Stodden et al., 2008). Identifying techniques and strategies on how to best instruct and engage preschoolers to learn FMS is necessary to enhance their physical health. Furthermore, interventions grounded in theory are effective at promoting health behaviors (Glanz & Bishop, 2010; Lippke & Ziegelmann, 2008) and should be used to guide program development and behavior change.

Influences of the Need-Supportive FMS Intervention on Children's Perceived Competence

The intervention group significantly improved in their perceived competence compared to the control group by the end of the intervention. The moderate effect size suggests that the need-supportive FMS intervention was effective at enhancing children's perceived competence. These results are similar from previous interventions (Logan et al., 2013; Robinson et al., 2009). Robinson et al. (2009) implemented a nine-week mastery motivational climate intervention and the children who received the intervention scored significantly higher in perceived competence at the end of the intervention than children who participated in a low autonomy or comparison groups. Logan et al. (2013) also reported significant improvements in preschoolers perceived competence at the end of their nine-week mastery motivational climate intervention compared to a low autonomy group. Climates that enhance participant perception of autonomy invite participants to think, make decisions, and act in accordance with their authentic self. Participants select activities

or tasks for their current skill levels. Furthermore, when participants experience autonomy, competence, relatedness it impacts the effort they put forth in various activities (Leptokaridou et al., 2015).

Our results differ from these studies in that both studies included low autonomy groups that demonstrated significant improvements in their FMS, but not significantly higher scores in their perceived competence. The current study compared the intervention group to a control group that engaged in unstructured free play that did not experience any improvement in their perceived competence. Taken together, these studies suggest that while instruction is beneficial for FMS development, a high autonomy climate is important for the development of psychosocial aspects such as perceived competence. According to the Ryan and Deci (2017), satisfaction of one's competence is enhanced when autonomy is also fulfilled.

It is also important to note children's perception of competence in early childhood. During the early years, children lack the cognitive capacity to accurately perceive themselves, and may in turn, have an aggrandized view of their skills (Harter & Pike, 1984). Empirical research has shown that during early childhood, children have a heightened perception of their competence (True et al., 2017), and as children grow, it tends to decrease. Research has shown that a moderate relationship exists between actual FMS and perceived competence in early childhood (Robinson, 2011). As children grow, this correlation increases and becomes stronger (True et al., 2017) as children develop the cognitive skills to accurately view their skills. Therefore, a high perception of competence can be instrumental to acquiring FMS in early childhood.

The findings of this study have practical implications for teachers and parents of preschool-aged children. Teachers can be trained in SDT based need-supportive strategies to enhance students' motivation and engagement in activities. Children spend their school day with their teacher, and the teacher can directly influence the motivation of their students. Second, training teachers to teach FMS can be an effective strategy for preschoolers FMS learning. A recent systematic review reported that teacher-led interventions were effective at improving children's locomotor and ball skills (Van Capelle et al., 2017). Third, because parents are the significant social agents creating motivational environments for children to develop motor skills, parents should be included in intervention delivery (Brian et al., 2022). Educating parents on the importance of early childhood motor skill development is an avenue that can contribute to their children's establishing and maintaining regular PA.

Limitations

Several limitations exist in this study. First, the sample size was relatively small with 24 children participating in this study and only 13 children receiving the intervention at an early childhood center due to the limited accessibility to preschool centers in this area. Future researchers can implement the intervention among a larger sample of preschoolers with less involvement in outside activities. Second, we could not measure the preschoolers' PA through objective accelerometers to examine changes in PA due to planning constraints and practical limits. Measuring PA could have given researchers great insight into the effectiveness of this intervention at enhancing PA levels; thus, future research is needed to measure preschoolers' PA using objective measures (e.g., accelerometers). Third, future research is warranted to investigate the effectiveness of the classroom teacher instructing the structured lesson plans during recess time because children spend considerable time with their teachers and peers at preschools. Teachers serve as role models for preschoolers, and preschoolers are motivated to be physically active if the teachers exercise with them (Gehris et al., 2014).

Conclusions

In summary, this study implemented an SDT based need-supportive intervention during recess to enhance preschoolers FMS and perceived competence. The early years of life are an important developmental stage for learning motor skills because they can influence physical activity participation and obesity risk (Stodden et al., 2008). The current research developed and tested the SDT based need-supportive intervention among preschoolers, which adds to the literature that introduces a novel approach among other theory-driven interventions. Considering rates of overweight and obesity among young children (Fryar et al., 2020), it is critical to identify and develop interventions and programs grounded in empirically supported theories to promote the development of health and well-being of children.

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