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Original article

# Self-perceptions and social-emotional classroom engagement following structured physical activity among preschoolers: A feasibility study

Spyridoula Vazou<sup>a,\*</sup>, Constantine Mantis<sup>a</sup>, Gayle Luze<sup>b</sup>, Jacqueline S. Krogh<sup>b</sup><sup>a</sup> Department of Kinesiology, Iowa State University, Ames, IA 50011, USA<sup>b</sup> Department of Human Development and Family Studies, Iowa State University, Ames, IA 50011, USA

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## Abstract

**Background:** The well-rounded development of the child, including physical, cognitive, emotional, and social health, may be the most efficient route to well-being and academic success. The primary goal was to investigate the feasibility of implementing a 12-week structured program of physical activity (PA) incorporating cognitive, social, and emotional elements in preschool. Additionally, this study, using a within-subject design, examined the acute effects of a PA session on classroom engagement and changes on perceived competence and peer acceptance from the first to the last week of the program.

**Methods:** Twenty-seven preschoolers (mean age = 4.2 years) completed the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children before and after a twice-weekly PA program. Unobtrusive classroom observations were conducted for verbal, social, and affective engagement during the first and last week of the program, both following a structured PA session (experimental day) and on a day without PA (control day). Treatment fidelity was monitored to ensure that the intervention was delivered as designed.

**Results:** The children exhibited longer periods of verbal and social engagement during classroom periods that followed PA sessions than on non-PA days. Children also expressed more positive affect following PA sessions during the last week of the PA program. Despite high baseline scores, perceptions of general competence increased meaningfully ( $\eta^2 = 0.15$ ,  $p = 0.05$ ), driven by increases in perceptions of cognitive competence ( $\eta^2 = 0.15$ ,  $p = 0.06$ ).

**Conclusion:** This study demonstrates the feasibility of providing structured PA program to preschoolers. Moreover, these initial findings suggest that purposely designed, structured PA may help advance the social-emotional engagement and perceived competence of preschool children.

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**Keywords:** Intervention; Movement; Peer acceptance; Perceived competence

## 1. Introduction

Despite a widespread belief that young children are very physically active, research shows that young children in preschool environments mostly engage in sedentary activities,<sup>1</sup> even during unstructured free play and recess periods.<sup>2</sup> Recent guidelines recommend that preschool children should engage in at least 60 min of structured physical activity (PA) daily (e.g., activities that focus on fundamental motor skill development) and at least 60 min of unstructured PA (e.g., through play, usually in the outdoor playground area).<sup>3</sup> However, preschool children do not meet these guidelines<sup>4</sup> and opportunities for

physically active play led by the teacher (both outdoors and indoors) are limited.<sup>5</sup> In the US, standards that require daily PA in preschoolers exist only in few of the states.<sup>6</sup> National organizations<sup>3,7</sup> acknowledge that preschool programs provide opportunities for children to be physically active during the day. They also recommend possible actions for increasing the PA levels of preschool children, including structured PA. Programs that promote both structured and unstructured PA could contribute to increasing the PA levels of preschoolers according to a recent meta-analysis.<sup>8</sup> Structured PA programs can also stimulate the development of fundamental motor skills,<sup>3</sup> which may, in turn, lead to more competence<sup>9</sup> and higher engagement in PA later in life.<sup>10</sup> The relationship between PA and motor skill competence has been proposed to be reciprocal.<sup>11</sup> That is, children with higher levels of perceived and actual competence are more likely to engage in PAs, which, in turn, may lead to further skill development and increased perceived competence.<sup>10–12</sup>

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\* Corresponding author.

E-mail address: [svazou@iastate.edu](mailto:svazou@iastate.edu) (S. Vazou)

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Research has shown that the development of gross motor skills during preschool is associated with scholastic, social, and emotional development in the subsequent first year of school,<sup>13</sup> as well as with cognitive function later in life.<sup>14</sup> Diamond and Lee<sup>15</sup> also identified cognitively engaging, structured PA programs to be beneficial for the cognitive function of children during the preschool and school years. In addition, a burgeoning literature supports the notion that PA could serve as the basis of a holistic approach to child development by supporting perceptions of physical and social competence.<sup>16,17</sup> For example, participation in sport games has been found to be associated with fewer emotional and peer-relationship problems and more prosocial behaviors in 5-year-old children.<sup>18</sup> Physical play in the preschool classroom has also been found to be positively associated with the emotional competence of boys in the context of dyadic relationships with peers.<sup>19</sup> Harter<sup>20</sup> has considered the social environment to be very important in affecting feelings of competence and social acceptance. Moreover, perceived competence may affect motivation and behavior directly and to a greater extent than actual competence.<sup>20</sup>

A PA environment that encourages accomplishments and is socially supportive may foster the development of high-quality peer relationships and perceptions of physical and social competence.<sup>21–23</sup> Structured PA programs developed on the basis of motivation theories have successfully increased perceptions of physical competence among preschoolers.<sup>24,25</sup> However, the effects of structured PA on perceptions of cognitive competence and peer acceptance among preschool children have not been examined. A recent review on PA and psychosocial well-being in early childhood highlighted that intervention studies are absent and even the number of cross-sectional studies is limited.<sup>26</sup> Thus, the primary purpose of the present study was to assess changes in perceptions of physical competence, cognitive competence, and peer acceptance from the beginning to the end of a 12-week structured PA program among preschoolers.

The second purpose of this study was to evaluate the acute effects of structured PA on classroom engagement among preschoolers. The preschool years, when children are introduced to a school-like environment, are recognized for their crucial role in laying the foundation for school success. Child development experts emphasize that, to optimize academic outcomes, the education system should nurture the social, emotional, physical, and cognitive abilities of children.<sup>27,28</sup> Students do not learn passively or in isolation but rather in synergy with educators and peers. The experiences that students derive from their classroom interactions determine their level of engagement and motivation.<sup>29</sup> These experiences are shaped by such factors as learning to regulate emotions, problem-solve, value contributions to the group, and communicate with teachers and peers. Collectively, these cognitive, social, and emotional skills help students thrive within a positive school environment that facilitates their comprehension of concepts, enhances their effort, fosters their overall growth, and, ultimately, promotes academic achievement.<sup>30</sup> Early social competence skills in the classroom have been associated with multiple outcomes across all major domains, including education, employment, and psychological well-being 20 years later.<sup>31</sup> A recent meta analysis showed that

school-based interventions resulted in meaningful improvements (effect size = 0.57, 95%CI from 0.48 to 0.67) in social and emotional skills, in addition to significant gains in attitudes, school conduct, and academic performance.<sup>32</sup>

Experts assert that PA environments provide multiple opportunities for the development of social and emotional skills.<sup>11</sup> However, supporting evidence focuses on adolescents.<sup>33–36</sup> There is presently no evidence on the effects of PA programs on the social and emotional skills of preschoolers. Thus, the present study was based on the idea that exposure to structured PA, specifically targeting cognitive, social, and emotional elements, may have a positive immediate effect on classroom engagement.

To summarize, the overall goal of this study was to investigate the feasibility of implementing a 12-week structured PA program incorporating cognitive, social, and emotional elements in preschool. Two specific purposes were included under this general goal. The first purpose was to assess the changes in perceived physical competence, cognitive competence, and peer acceptance from the beginning to the end of the PA intervention. The second purpose was to examine the effects of a 30-min period of structured PA on the classroom engagement of preschoolers during the ensuing classroom period. To this end, classroom engagement was compared between a day with PA and a day without PA, both at the beginning and at the end of the 12-week PA intervention. We predicted that preschoolers would manifest higher levels of classroom engagement after PA and this benefit would be stronger at the end of the implementation period.

## 2. Materials and methods

### 2.1. Participants

The study was conducted at one early childhood center, located within a 1-mile radius from a midsize Midwestern city in the US. The early childhood center has two preschool classes for 3–5-year-old children. Twenty-seven preschoolers from these two classes (11 boys, 16 girls, aged  $4.2 \pm 0.64$  years, 80% of enrolled children) participated with signed parental consent. Fifty-two percent of students were Caucasian, 40.5% were Asian, and 7.5% were African-American.

### 2.2. Design and treatments

The study used a within-subject design, with classes serving as their own controls. The study was approved by the Iowa State University Institutional Review Board. Prior to the study, permission was granted by the director of the early childhood center and the teachers. A 12-week structured PA curriculum was provided to all students. The PA sessions did not replace recess or any other regularly scheduled activities.

Perceptions of competence and peer acceptance were assessed individually, using pictorial self-report scales, before and after the implementation period. Furthermore, observations were conducted in a way that allowed the examination of both the longitudinal effect of the intervention and the acute effect of a PA sessions. Specifically, to examine the longitudinal effect of the intervention, observations of classroom behavior (from an adjacent observation room) were conducted during the first and last week of the 12-week implementation period at the same

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