



Social skills and problem behaviors as mediators of the relationship between behavioral self-regulation and academic achievement[☆]

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ARTICLE INFO

Article history:

Received 15 November 2012

Received in revised form 10 March 2014

Accepted 17 March 2014

Available online 3 April 2014

Keywords:

Self-regulation

Literacy

Math

Social skills

Problem behaviors

Preschool

ABSTRACT

Early behavioral self-regulation is an important predictor of the skills children need to be successful in school. However, little is known about the mechanism(s) through which self-regulation affects academic achievement. The current study investigates the possibility that two aspects of children's social functioning, social skills and problem behaviors, mediate the relationship between preschool self-regulation and literacy and math achievement. Additionally, we investigated whether the mediational processes differed for boys and girls. We expected that better self-regulation would help children to interact well with others (social skills) and minimize impulsive or aggressive (problem) behaviors. Positive interactions with others and few problem behaviors were expected to relate to gains in achievement as learning takes place within a social context. Preschool-aged children ($n = 118$) were tested with direct measures of self-regulation, literacy, and math. Teachers reported on children's social skills and problem behaviors. Using a structural equation modeling approach (SEM) for mediation analysis, social skills and problem behaviors were found to mediate the relationship between self-regulation and growth in literacy across the preschool year, but not math. Findings suggest that the mediational process was similar for boys and girls. These findings indicate that a child's social skills and problem behaviors are part of the mechanism through which behavioral self-regulation affects growth in literacy. Self-regulation may be important not just because of the way that it relates directly to academic achievement but also because of the ways in which it promotes or inhibits children's interactions with others.

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1. Introduction

More than 80% of American children participate in preschool in the year prior to kindergarten (Barnett et al., 2010) with these early schooling experiences usually designed with the goal of improving children's short- and long-term academic achievement (Bowman, Donovan, & Burns, 2000). Nonetheless, some research suggests that over half of children enter kindergarten without the social and academic skills needed for success (Rimm-Kaufman, Pianta, & Cox, 2000). Thus researchers and policy-makers are increasingly seeking to understand what preschool skills contribute to concurrent and later academic achievement. Current findings suggest

that, in addition to contextual factors associated with home and school (Bingham, 2007; Evans & Shaw, 2008), child behavioral skills account for a substantial portion of children's early academic achievement (Hindman, Skibbe, Miller, & Zimmerman, 2010). In particular, early self-regulation has been identified as a key predictor of both current and later academic achievement (Blair, 2002, 2003; Blair & Razza, 2007; Duncan et al., 2007; Matthews, Cameron Ponitz, & Morrison, 2009; McClelland, Acock, & Morrison, 2006; McClelland & Morrison, 2003; McClelland et al., 2007). For example, children with higher levels of self-regulation in kindergarten also have higher levels of academic achievement from kindergarten through sixth grade with the gap in achievement widening between kindergarten and second grade (McClelland et al., 2006).

However, little is known about the mechanisms through which early self-regulation predicts young children's emergent academic achievement. One potential mechanism may be through the child's social functioning (Eisenberg, Fabes, Guthrie, & Reiser, 2000). For instance, how well the child self-regulates may affect the ways in which children interact with peers and teachers in the classroom (Miller, Gouley, Seifer, Dickstein, & Shields, 2004), which in turn relates to academic gains (Hamre & Pianta, 2001). However, few studies to date have empirically evaluated social functioning

[☆] The authors gratefully acknowledge the support of grant R305A100566 from the U.S. Department of Education Institute of Education Sciences in the development of this article.

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as a possible mechanism underlying the relationship between self-regulation and academic achievement (Denham et al., 2012; Valiente et al., 2011; Valiente, Lemery-Chalfant, Swanson, & Reiser, 2008). Of those that have, most utilized teacher reports of self-regulation, social functioning, and/or academic achievement which may lead to less accurate results due to method bias (e.g., teachers rate high-achieving children as having high self-regulation, few problem behaviors, and/or high social skills, Carr & Kurtz, 1991). These studies also often consider several aspects of social functioning together, thus not allowing for the possibility that aspects of social functioning, such as social skills and problem behaviors, may mediate the relationship differently (Eisenberg, Valiente, & Eggum, 2010). Likewise, only one study to date has focused on preschool-aged children (Denham et al., 2012) and only in Head Start, despite the fact that preschool self-regulation has been implicated as an early marker for later academic achievement for children generally (Mischel et al., 2011). Understanding the process through which self-regulation is associated with academic achievement is critical if we are to support young children in their acquisition of these skills. The current study investigates, via a multi-method approach, the possibility that two aspects of children's social functioning, social skills and problem behaviors, mediate the relationship between self-regulation and children's academic achievement within the preschool setting.

1.1. Self-regulation

Self-regulation is a broad concept referring to the process whereby an individual deliberately utilizes his or her skills and attributes to create an overt response to the ongoing demands of the environment in a manner that is contextually appropriate (Aksan & Kochanska, 2004; Blair & Razza, 2007; Cameron Ponitz et al., 2008; Cole, Michel, & Teti, 1994; Kochanska, Coy, & Murray, 2001). In other words, to self-regulate, a child must utilize her cognition, motivation and emotions to create a response in line with contextual expectations. The current study focuses specifically on one aspect of self-regulation, behavioral self-regulation, which is the ability to integrate cognitive skills such as attention, working memory, and inhibition to select an appropriate overt behavior (McClelland et al., 2007). Although behavioral self-regulation does not capture the emotional aspects of self-regulation deemed relevant for learning (Cameron Ponitz et al., 2008; Valiente et al., 2011), it captures the child's ability to produce an appropriate behavioral action in response to the contextual demands of the environment. Behavioral self-regulation helps children to pay attention, remember instructions, and stay on task, all within the midst of environmental distractions (Blair, 2002; Cameron Ponitz et al., 2008; McClelland et al., 2007). Research on behavioral self-regulation suggests that, although the cognitive skills typically known as executive functioning (i.e., working memory, attention, and inhibition) are key components of self-regulation, behavioral self-regulation also involves integration of the individual executive functioning skills into a contextually appropriate overt response, and is therefore a broader concept than executive functioning (McClelland & Cameron, 2012; McClelland et al., 2007). For example, the ability to follow directions in the classroom presumably requires the integration of working memory to maintain the directions in memory as well as inhibition to hold back from engaging in an appealing alternative to teacher directions.

Strong behavioral self-regulation has been linked to better academic achievement for children in grade school (Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003; Howse, Lange, Farran, & Boyles, 2003), even for those at-risk for underachievement (Sektnan, McClelland, Acocck, & Morrison, 2010). In preschool, self-regulation is associated with higher literacy, vocabulary, and math outcomes as well as with greater gains in those academic

outcomes during the school year (McClelland et al., 2007). Early self-regulation may also have lasting effects on children's academic development, as previous findings suggest that aspects of behavioral self-regulation measured at age four predict academic achievement throughout primary school, as well as college (McClelland, Acocck, Piccinin, Rhea, & Stallings, 2013; Mischel et al., 2011). Taken together these studies indicate that self-regulation plays an important role in current and later academic achievement; however, past research offers limited insight into the underlying mechanisms that support this relationship.

1.2. The role of social functioning

Social functioning may represent one of the key mechanisms that underlie the relationship between self-regulation and academic achievement. Broadly, social functioning refers to the child's ability to appropriately interact in social situations and often includes children's levels of emotionality, empathy, prosocial behavior, conscience, social skills, and problem behaviors (Eisenberg, Pidada, & Liew, 2001). We focus on two important aspects of social functioning that have consistently been related to both self-regulation and academic achievement: social skills and problem behaviors. Theoretically, high levels of self-regulation should be associated with social functioning (Eisenberg, Sadovsky, & Spinrad, 2005; Eisenberg et al., 2010). Children who, for example, can attend to important interactional cues, and remember rules related to how they should engage in classroom social environments (e.g., take turns), while inhibiting an initially socially undesirable negative reaction or impulsive aggression are relatively more likely to behave appropriately in the classroom social context (Eisenberg et al., 2000). Interactions with peers and teachers make up an important part of the process by which children learn and construct knowledge (Bronfenbrenner & Morris, 2006; Hamre & Pianta, 2001; Vygotsky, 1977). Notably, better self-regulation appears to place children in a more advantageous position to engage in high-quality social interactions with teachers and peers which, in turn, results in learning and academic achievement.

Despite this, only recently has research begun to explicate on the possible mediation relationship between self-regulation, aspects of social functioning, and academic achievement (Eisenberg et al., 2005, 2010). Across two studies, Valiente et al. (2008, 2011) found that social functioning mediated the relationship between self-regulation and academic achievement in grade school, with evidence that these relationships hold over a span of several years. Additionally, a recent study by Denham et al. (2012) indicates that lower preschool executive function was bidirectionally related to aggression/negative emotionality, which, in turn, related to lower teacher-reported academic achievement in kindergarten.

Although past research involving child social functioning and its relation to other skills has often focused upon the collective role of both social skills and problem behaviors within social functioning (Valiente et al., 2011), recent work suggests that social skills and problem behaviors may have different roles in the relation between self-regulation and academic outcomes. Research utilizing principal components analyses indicates that social skills form a different component of social functioning than problem behaviors (Denham et al., 2012; Gresham & Elliott, 1990). Moreover, work by Denham et al. (2012) indicates that aggression/negative emotionality, mediated the pathway between preschool executive function and kindergarten achievement in a low-SES population, but not pro-social behaviors/social skills. This, along with theory (Eisenberg et al., 2010), suggests that the process linking self-regulation to academic achievement through social functioning may be different depending on the

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