



## Gender processes in school functioning and the mediating role of cognitive self-regulation



Jamaal.S. Matthews<sup>a,\*</sup>, Loren M. Marulis<sup>b</sup>, Amanda P. Williford<sup>c</sup>

<sup>a</sup> Montclair State University, College of Education and Human Services, University Hall, Room 2112, 1 Normal Ave, Montclair, NJ 07043, USA

<sup>b</sup> CPEP, University of Michigan, University of Michigan, East Hall 1044F-530 Church St., Ann Arbor, MI 48109, USA

<sup>c</sup> CASTL, University of Virginia, 350 Old Ivy Way, Suite 100, Charlottesville, VA 22903, USA

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### ABSTRACT

The catalysts for gender discrepancies across developmental outcomes are widely debated. This study examines cognitive self-regulation (CSR) as a mechanism for understanding gender differences in scholastic performance—both subjective school functioning and objective standardized achievement. Utilizing a national sample from the NICHD SECCYD ( $n = 1364$ ), not only does CSR (i.e., attention and executive function) in 3rd grade mediate the relation between early mother–child interactions (at 54 months) and scholastic outcomes (in 5th grade), but it also predicts gender discrepancies favoring girls in grades, work persistence and socio-emotional development. Additional exploratory evidence suggests quality mother–child interactions may be more meaningful for girls' CSR; however, for boys, CSR is more predictive of school functioning. Both school functioning and standardized achievement were utilized in this study and highlight that gender differences in development and learning are nuanced and not readily discernible across all measures of scholastic performance. Implications for future research, intervention, and practice are discussed.

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Since the 1970s, U.S. national trends indicate that both girls and boys, ages thirteen and younger, are doing better than ever academically (NCES, 2013; Rampey, Dion, & Donahue, 2009). However, there is also evidence to suggest that girls in particular are excelling in grades, educational attainment, and socio-emotional development (Clark, Lee, Goodman, & Yacco, 2008; Duckworth & Seligman, 2006; Mead, 2006), while standardized measures of academic achievement reflect equivocal gender differences if any at all (Nowell & Hedges, 1998; Rampey et al., 2009). The catalysts for explaining these trends across gender are still debated. Cultural expectations, curricular development, changes in family-lifestyles, and technological advancements all likely play a role; however, human development research and early childhood care have turned a critical focus toward the importance of self-regulatory skills. Self-regulation and related aptitudes have become regarded as bedrock skills which early childhood programs strive to build and early elementary teachers use to evaluate school readiness (Blair, 2002).

Thus, the schooling and socialization of young children has begun to reflect our deepening knowledge of the relevance of self-regulation toward positive scholastic outcomes. These socialization experiences may have gendered implications in development. The first goal of the present paper is to corroborate previous work on the role cognitive

self-regulation (CSR) plays in child development, by examining it as a mediator in the link between early mother–child interactions and later school and academic outcomes. Second, this study assesses whether differences in how mothers interact with their sons versus their daughters during early childhood are related to gender differences in CSR during elementary school. Third, this study examines whether gender differences in CSR relate to gender differences across scholastic outcomes in late childhood (i.e., 5th grade). These questions are assessed across subjective school functioning outcomes as well as standardized measures of academic achievement, both in the 5th grade. We conceptualize school functioning as the academic (i.e., grades), social (i.e., social skillfulness) and behavioral factors (i.e., work persistence) that contribute to children's school success broadly (Coe & Dodge, 1988; Pierce, Hamm & Vandell, 1999). Alternatively, we define academic achievement as standardized objective measures of children's academic knowledge and performance capabilities in math and reading. An overarching goal of this study is to move beyond simply substantiating gender differences (i.e., mean-level differences) and toward a more comprehensive understanding of gendered processes in development.

*Cognitive self-regulation and gender as predictors of academic and social outcomes*

The predictive qualities of self-regulation for school and academic success are becoming increasingly clear (Blair & Diamond, 2008; Claessens, Duncan, & Engel, 2009; Duncan et al., 2007; Li-Grining,

\* Corresponding author.

E-mail addresses: Matthews@montclair.edu (J.S. Matthews), marulis@umich.edu (L.M. Marulis), williford@virginia.edu (A.P. Williford).

Votruba-Drzal, Maldonado-Carreño, & Haas, 2010; Normandeau & Guay, 1998). The heightened focus on self-regulation writ-large has become more nuanced within the study of child development, particularly as researchers examine the cognitive aspects of self-regulation. We discuss CSR as, “the regulation of attention and selective strategy use in the execution of cognitive tasks” (Blair, 2002, p. 112). This conceptualization subsumes both attention management and executive functioning in context (Blair, 2002; Morrison, Ponitz, & McClelland, 2009). Thus, CSR reflects a child’s ability to control, switch and direct attention (i.e., attention management) as well as govern cognitive processes in order to marshal or “execute” cognitive resources toward a goal (i.e., executive functioning). Duncan et al. (2007) found that after previous academic knowledge, CSR—specifically attention management—was the best predictor for math and reading achievement. Further, young children’s ability to plan, regulate problem-solving strategies, and manage their attention was associated with academic achievement, even after controlling for prior skills and intelligence (Normandeau & Guay, 1998).

Research demonstrates consistent gender differences in CSR favoring girls across a wide battery of assessments (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006; Li-Grining et al., 2010; Matthews, Ponitz, & Morrison, 2009; Stipek, Newton, & Chudgar, 2010; Vallotton & Ayoub, 2011). For example, one meta-analysis substantiates that girls surpass boys on various dimensions of attention management during ages three through thirteen (Else-Quest et al., 2006). In kindergarten, teacher ratings as well as a direct child assessment (i.e., *The Head-Toes-Knees-Shoulders* task; Ponitz et al., 2008) corroborate girls’ advantage in working-memory, attention, and inhibitory control (Matthews et al., 2009). Further, young boys lag behind girls on learning behaviors which include attention and language skills, among other behavioral components (Stipek et al., 2010; Vallotton & Ayoub, 2011). In line with the *Matthew Effect*, entering school with advanced CSR may give girls an advantage that extends beyond the mastery of classroom content and also has implications for the development of positive relationships with teachers, as well as increased instructional and emotional support from peers and teachers (Stipek et al., 2010). Thus, we can reasonably hypothesize that strong CSR may elicit contextual factors that make school a more comfortable and enriching experience for girls such that on average girls outperform boys in school functioning.

Although self-regulation is a consistent predictor of scholastic outcomes (Blair & Diamond, 2008; Claessens et al., 2009; Li-Grining et al., 2010), it remains unclear whether gender differences in self-regulation predict discrepancies in school functioning and standardized achievement between girls and boys. Research demonstrates that girls surpass boys on cognitive and behavioral self-regulation but not across standardized measures of academic achievement (Matthews et al., 2009). Specifically, self-regulation at the beginning of kindergarten predicted year-end as well as 1st grade academic achievement but did not predict gender differences in academic achievement at these time points. Matthews et al. (2009) speculated that gender differences in academic achievement may not appear until the later elementary grades (i.e., 3rd–5th grade) when academic rigor intensifies and may become more dependent upon self-regulatory skills, such as planning, problem solving and attention management. However, a second explanation for this unexpected finding may be the reliance on standardized measures of academic achievement versus more ecologically-valid assessments of school functioning (e.g., grades, teacher reports, school work habits), which likely better reflect the day-to-day demands of self-regulated learning (Duckworth & Seligman, 2006). The current study extends previous work by investigating how CSR may elucidate the role of gender in school functioning as well as academic achievement.

As a caveat, beyond CSR, behavioral regulation is also important for developmental and scholastic outcomes, as a part of early school success is associated with sitting still, being quiet, and following directions. Since behavioral regulation includes children’s ability to remember directives, as well as monitor, inhibit, and direct their behavior and

attention (Gathercole & Pickering, 2000; Rueda, Rothbart, McCandliss, Saccomanno, & Posner, 2005), executive functions and attention management are important for successfully regulating one’s behavior. However, behavioral regulation tends to focus on children’s overt behavioral control, which include gross motor responses and inhibitory control (Howse, Calkins, Anastopoulos, Keane, & Shelton, 2003). In the present study, we underscore CSR as related—but more specific than—behavioral regulation because simple overt behavioral compliance does not imply the cognitive engagement and strategic thinking necessary for optimal school success, particularly as children progress into later elementary grades. Hence this study focuses on cognitive control specifically, as opposed to broader behavioral control.

#### *The role of early mother–child interactions in developmental outcomes*

This study also intends to clarify whether early parent–child interactions predict gendered trends in cognitive and scholastic outcomes. There is abundant evidence that early child interactions with adult caregivers—particularly mothers—prior to school entry are associated with the development of CSR, socio-emotional competence, academic achievement, and general school readiness (Bernier, Carlson, & Whipple, 2010; Morrison, Rimm-Kaufman, & Pianta, 2003; NICHD ECCRN, 2008, 2005; Sheridan, Knoche, Edwards, Bovaird, & Kupzyk, 2010). Sociocultural theory (Vygotsky, 1978) and a meta-analysis (Karreman, van Tuijl, van Aken, & Deković, 2006) point to the importance of socialization on children’s social and cognitive development. Sociocultural theory suggests that children develop both socially and cognitively through social interactions with more advanced others (e.g., significant adults, or more capable peers). Further, children begin to actively internalize concepts and skills (including gender schemes) that are important to navigating their environment, gradually showing independent understanding and performance (Vygotsky, 1978). Thus, parents play a vital role in socializing their children through reciprocal social interactions.

In a study with mothers and their infants, maternal sensitivity, autonomy support, and scaffolding were positively related to the development of executive functioning in children (Bernier et al., 2010). Moreover, Morrison et al. (2003) found that the benefits of early maternal sensitivity, support and scaffolding for social and academic success persisted for 8 years, after controlling for maternal education and child IQ. Another study found that family environment quality—including early maternal sensitivity and stimulation—was positively related to attention regulation and memory (NICHD ECCRN, 2005). Although the relation between parent–child interactions and child cognitive, socio-emotional and achievement outcomes is clear, what remains relatively unclear is whether CSR is a mechanism through which maternal–child interactions and school outcomes are linked. We found only two studies that have implicated attention management and executive functioning as mediators between family characteristics (e.g., home quality, maternal sensitivity maternal stimulation) and children’s academic and social outcomes (NICHD ECCRN, 2003; Raver et al., 2011).

There is also limited evidence on whether differences in how mothers interact with boys versus girls are associated with gender differences in the development of CSR and scholastic outcomes. Research suggests that parents may socialize boys and girls differently, providing more positive and facilitative socialization for girls (Fivush, 1992; Leaper, Anderson, & Sanders, 1998) that could be related to girls’ advanced self-regulation. A meta-analysis of parent talk reveals that mothers talked more and used more supportive speech with their daughters than their sons (Leaper et al., 1998). Language skills, developed through parent–child talk, are positively associated with growth in self-regulation in toddlers, although this process seems to crystallize more quickly for girls compared to boys (Leaper et al., 1998; Vallotton & Ayoub, 2011). Contrary to this, some attribute gender differences in children’s behavior to biological underpinnings rather than parent socialization (Lytton & Romney, 1991). Accordingly, this study evaluates the role mother–child interactions play in the development of CSR as

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