



Parents' math–gender stereotypes, children's self-perception of ability, and children's appraisal of parents' evaluations in 6-year-olds



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ABSTRACT

This study investigated for the first time the relations between parents' math–gender stereotypes, parents' evaluations of children's math ability, children's math ability self-perception, and children's appraisal of parents' evaluations, addressing 253 Italian children as young as 6 years of age, their mothers, fathers, and teachers. Novel results revealed the specific role of mothers' math–gender stereotypes in relation to daughters, but not sons: Mothers' math–gender stereotypes predicted girls' math self-perception which, in turn, predicted girls' appraisal of both mothers' and fathers' evaluations of their ability. Importantly, children's appraisal of parents' evaluations was related more strongly with their own self-perception of ability than to parents' actual evaluations, thus supporting the projected appraisal versus the reflected appraisal model of the development of self-perception.

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1. Introduction

The expectancy-value theory (EVT) of academic motivation (Eccles[Parsons], Adler, & Kaczala, 1982; Jacobs, Davis-Kean, Bleeker, Eccles, & Malanchuk, 2005) points at parents as a major environmental influence on the development of children's self-perception of ability in different academic domains. According to Eccles' model, in domains commonly stereotyped as masculine or feminine (such as math, language, sports, and social abilities), parents' stereotypical beliefs about males' and females' differential abilities interact with children's individual characteristics (e.g., temperament, personality traits, talents, gender, etc.) in shaping parents' beliefs about their children's ability. In turn, parents' beliefs affect children's self-perception of ability, and this effect is expected to be mediated, at least in part, by children's subjective perception of parents' beliefs (for reviews, see Eccles, 2011; Wigfield & Eccles, 2000). Although an impressive body of research has provided support for the EVT, most of the studies conducted thus far have addressed the relations between parents' stereotypes and children's beliefs from late childhood through adolescence and adulthood (e.g., Jacobs, 1991; Jacobs & Eccles, 1992; for a review, see Gunderson, Ramirez, Levine, & Beilock, 2012), whereas limited data are available on younger

children. This gap in the literature is unfortunate, given that children rely on their parents as a major source of knowledge about their academic competence, especially in the very first elementary grades (Nicholls, 1978; Spinath & Spinath, 2005). Aiming at filling this gap, the present study investigated for the first time relations between parents' stereotypical beliefs about boys' and girls' ability in math (i.e., math–gender stereotypes), parents' evaluations of their children's math ability, and first-grade boys' and girls' self-perception of math ability. Moreover, partially different from the predictions of EVT, another important goal of the present study was to test the hypothesis that children's self-perception of ability may actually not derive from their appraisal of parents' evaluations. This hypothesis is based on the fact that young children's accuracy in estimating other people's evaluations is still limited, and children—more than adults—tend to believe that the way in which other people view them corresponds to their own self-views (e.g., Epley, Morewedge, & Keysar, 2004). Therefore, the current study provided a specific test of whether 6-year-old children's appraisal of parents' evaluations, rather than reflecting an accurate perception of parents' evaluations, represents a projection of children's own perception of ability, as predicted by the projected appraisal model of the development of self-knowledge (Felson, 1993; Ichiyama, 1993; Kenny & DePaulo, 1993; see Tice & Wallace, 2003, for a review).

In the next session we will first review previous research on the development of children's self-perception of ability in the earliest elementary grades, and the effects of parents on children's self-perception. Subsequently, we will discuss the role of children's appraisal of parents' evaluations on self-perception, and will contrast

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predictions coming from the reflected appraisal and the projected appraisal model (Tice & Wallace, 2003). Then, we will conclude the introduction by setting out the goals and hypotheses of the present study.

1.1. The development of children's self-perception of ability

Classical theorizing about the development of self-concept posited that young children have quite undifferentiated perceptions of competence in different ability domains, as the acquisition of a multifaceted, accurate appraisal of one's relative strengths and weaknesses is achieved gradually from late infancy through adulthood (e.g., Harter, 1983; Shavelson, Hubner, & Stanton, 1976). According to most authors, children lack the cognitive competencies to distinguish between actual and desired attributes, to formulate self-descriptions in sufficiently abstract terms, and to accurately interpret objective feedback, or engage in realistic comparisons with others (e.g., Harter, 1983, 2006). Moreover, in preschool years and in the first elementary grades children are actually frequently praised for their behaviors regardless of their objective attainments (Stipek & Mac Iver, 1989), thus resulting in inaccurate and unrealistically optimistic self-perception of ability at least until pre-adolescence (Bouffard, Markovits, Vezeau, Boisvert, & Dumas, 1998).

These assumptions, however, have been subsequently called into question. Some researchers have proposed that early cognitive development (e.g., in autobiographical memory) enables even very young children to make evaluative self-descriptions and allow them to differentiate their self-perception of ability across multiple domains (e.g., Eder & Mangelsdorf, 1997; Marsh, Craven, & Debus, 1998; Stipek, Gralinski, & Kopp, 1990). Marsh et al. (1998) have gathered evidence that even preschoolers are able to provide meaningful descriptions of their ability both in academic and non-academic areas. With increasing age and cognitive development, self-perception becomes more accurate indeed. Overoptimistic illusion of competence declines until at least early adolescence (Marsh et al., 1998), although for most individuals this bias persists to some extent through adulthood (Mezulis, Abramson, Hyde, & Hankin, 2004). Subjective views of one's ability also become more strongly correlated with external indicators of performance, and areas of self-concept that were only moderately distinct in infancy and childhood become increasingly separated by early adolescence (Marsh & Ayotte, 2003). However, some areas of self-concept that become even more differentiated with age (e.g., academic vs. non-academic) are already quite differentiated in young children, whereas areas that are less differentiated in the youngest are also interrelated in older children and adults (i.e., differential distinctiveness effect; Marsh & Ayotte, 2003). Empirical evidence supports this contention by showing that young children's perception of academic ability in math and language is already differentiated as early as 4- to 5 years of age (Marsh et al., 1998; Marsh, Ellis, & Craven, 2002). Moreover first-grade children, although having generally positive views about their abilities, systematically differentiate their self-perception in the domains of math, language, music, and sports (Eccles, Wigfield, Harold, & Blumenfeld, 1993).

Taken together, these findings suggest that children achieve sufficiently specific self-perception of ability in distinct academic domains well before they get acquainted with formal school evaluation. Considering that the salience of tests, grades, and competition at school is limited until the middle elementary grades (Wigfield & Eccles, 2002), it has been argued that teachers' ratings, comparisons with peers, and intra-individual comparisons among one's own achievements across different domains are less influential in young children's development of early self-perception of ability than when children grow older (Masten, Juvonen, & Spatzier, 2009; Spinath & Spinath, 2005). At the same time, influential theoretical models, such

as the EVT, have pointed at the family environment as a crucial source of information for young children to develop their early self-perception of academic abilities in the earliest school years (Eccles[Parsons] et al., 1982; see Wigfield & Eccles, 2000, for a review).

1.2. Parents' influence and children's self-perception of math ability

Consistent with the predictions of the EVT, the positive association between parents' evaluation of their children's academic skills and offspring's perception of such abilities has received strong empirical support in the last three decades (e.g., Alexander, Entwisle, Blyth, & McAdoo, 1988; Eccles[Parsons] et al., 1982; Gniewosz, Eccles, & Noack, 2012; Simpkins, Fredricks, & Eccles, 2015). Importantly, parents' evaluations have been found to mediate the association between performance-related indicators (such as teacher's ratings) and children's self-perception of ability (e.g., Frome & Eccles, 1998; Tiedemann, 2000), and especially in the very first elementary grades children have been found to be sensitive to information conveyed by parents (Fredricks & Eccles, 2002; Herbert & Stipek, 2005; Spinath & Spinath, 2005).

One of the main tenets of the EVT is that crucial sources of information for young children to develop their subjective perception of ability in different academic domains are not only parents' perception of their children's strengths and weaknesses, but also parents' stereotypic beliefs about males' and females' characteristics as a group, such as gender stereotypes about boys' and girls' ability in math (Eccles[Parsons] et al., 1982; Jacobs & Bleeker, 2004). As a matter of fact, even though parental views about their children's ability are based on external indicators such as grades, from kindergarten through elementary and middle school, parents systematically tend to perceive their sons as more competent than their daughters in math, regardless of their actual math grades (e.g., Frome & Eccles, 1998; Rätty & Kasanen, 2013; Yee & Eccles, 1988). The extent of this evaluative bias appears to be directly related to the extent to which parents endorse traditional gender stereotypes about males' and females' ability in math (see Gunderson et al., 2012, for a review). In turn, parents' biased evaluations affect children's self-perception of math ability, and even their current math grades (Jacobs, 1991; Jacobs & Eccles, 1992; Tiedemann, 2000). However, no study to date has investigated the role of parents' gender stereotypes at the critical moment of transition into primary school, i.e., when children are confronted for the first time with formal teaching and systematic evaluation of their math ability. One of the goals of the present work was to fill this gap.

Another important issue that deserves attention concerns the unique relations between the mother's and father's gender stereotypes—as well as their child-specific beliefs—and the child's self-perception of ability. Even though the EVT does not predict specific effects for mothers' or fathers' beliefs, previous studies suggest that mothers'—but not fathers'—gender stereotypes contribute uniquely to their child-specific evaluations, as well as to their causal attributions for the child's success or failure in math (Frome & Eccles, 1998; Yee & Eccles, 1988). Importantly, relations between fathers' and children's beliefs have been demonstrated only when the contribution of each parent was analyzed separately (e.g., Frome & Eccles, 1998; Jacobs & Eccles, 1992). For example, McGrath and Repetti (2000) found that both mothers' and fathers' satisfaction with their 9-year-old daughters' attainments were related to girls' self-perception of math ability. However, when the contributions of both parents were examined simultaneously, mothers' satisfaction with the child's grades uniquely predicted girls' self-perception, whereas the influence of fathers fell short of significance. Therefore, it is hoped that research and data analysis focus on the joint contribution of both parents, especially with children younger than 9.

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