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PhD Thesis:

**Perceived Parental Self-Efficacy and Adolescents' Self-Efficacy
during the Transition to Middle School**

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CHAPTER I

General Introduction

General Introduction

The transition from elementary to middle school represents an important challenge for students, whose lives undergo several changes in different areas of development. In fact, with the passage to middle school, for the first time students can exercise their autonomy as they navigate an environment that is less attentive to their individual needs unlike in the elementary school (Smetana, 1988). This school transition is generally associated with changes that can affect the students' academic adjustment.

Specifically, a first difference between elementary and middle school is in the educational programs, which become more complex and require higher academic goals than those of elementary school. The number of subjects to handle also goes up.

A next change concerns students' relationship with their teachers, which in elementary school was informal and focused on individual progress, whereas in middle school becomes more formal and detached, characterized by normative valuation criteria.

A further challenge is in terms of learning. Students must now master new concepts that are more sophisticated and complex.

In addition, with the transition to middle school students are exposed to new classmates and are faced with the loss of some friendships previously cultivated during their elementary school years.

Therefore, the passage to middle school represents a great challenge for both students and parents. Students must cope with all the changes described above, and parents must exercise an important role in supporting their children in successfully managing the new challenges and new academic goals (Hoover-Dempsey et al., 1992; Hoover-Dempsey et al., 2001; Bogenschneider, 1997).

In this regard, some scholars (Eccles & Midgley, 1989; Eccles, Midgley, & Adler, 1984) have highlighted the importance of parents' and adolescents' self-efficacy beliefs during this transitional period, suggesting that high perceived parental efficacy in their ability to positively affect their children's academic development, and high perceived students' efficacy in their ability to plan and

organize their academic activities, predict higher levels of academic adjustment and achievement. However, few studies (Bandura, Barbaranelli, Caprara & Pastorelli, 1996; Ardel & Eccles, 2001) have analyzed how parental academic self-efficacy can support their children's sense of efficacy, necessary for developmental success during this school transition.

Accordingly, the overall aim of this dissertation was to analyze the relations among parental self-efficacy in the scholastic domain, children's academic self-efficacy beliefs and academic functioning during the transition to middle school.

Specifically, the first aim of the present dissertation was to investigate the psychometric characteristics of both Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Perceived Efficacy for Self-Regulated Learning during the transition from elementary to middle school.

The second aim was to identify the normative developmental trajectory of Perceived Parental Self-Efficacy in School-Related Performance, and its relations to concurrent and later students' academic achievement (at the end of middle school).

Finally, the third aim was to investigate, during the transition to middle school, the longitudinal bidirectional associations between Perceived Parental Self-Efficacy and Adolescents' Perceived Efficacy for Self-Regulated Learning, and their associations with adolescents' academic achievement.

In this introductory chapter the theoretical framework of the Social Cognitive Theory and an outline of the dissertation will be presented.

Social Cognitive Theory and Self Efficacy Beliefs

The Social Cognitive Theory adopts an agentic perspective on self-development, change and adjustment (Bandura, 1986; 2001; Caprara & Cervone, 2000), emphasizing the active role of individuals, who are able to agentially select and modify their environments in order to determine a positive course for their lives. In this perspective the concept of Self-Efficacy is central. It is defined

by Bandura (1997) as follows: “*Perceived self-efficacy refers to beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments.... Such beliefs influence the course of action people choose to pursue, how much effort they put forth in given endeavors, how long they will persevere in the face of obstacles and failures, their resilience to adversity, whether their thought patterns are self-hindering or self-aiding, how much stress and depression they experience in coping with taxing environmental demands, and the level of accomplishments they realize.*” (p. 3).

Self-efficacy beliefs are considered key factors of human agency and operate within an interdependent causal structure that involves triadic mutual influences among internal personal factors (cognitive, affective and biological events), behavior and environment (Bandura, 1986, 1989). Accordingly, these interacting factors account for the active role individuals may have in controlling their own life on the basis of cognitive self-regulation and reflective thinking (Bandura, 1991; Bandura, 2000; Pastorelli et al., 2001).

As stated by Bandura (2000), personal self-efficacy beliefs are stronger predictors of motivations and actions, than the real abilities of individuals. In fact, personal self-efficacy beliefs influence cognitive, affective and motivational processes (Bandura, 1997). Therefore, Self-efficacy beliefs operate as factors that regulate and motivate the use of cognitive, social and behavioral skills, thereby influencing the motivation and aspirations and related outcomes (Bandura, 1977; Bandura, 1997).

Self-Efficacy beliefs may be developed from four principal sources (Bandura, 1986, 1997; Bandura, 2000): (1) *Enactive Mastering Experiences*. These are the most important sources of self-efficacy because they reveal whether a person is able to act to achieve certain goals (Bandura, 2000). In fact, experiences of success contribute to increase personal efficacy; conversely, experiences of failure undermine the sense of efficacy. (2) *Vicarious Experiences*. People evaluate their sense of efficacy based on the performance of similar others’. Vicarious experience is mediated by modeling, that is considered an effective tool to promote self-efficacy beliefs (Bandura, 2000). (3) *Verbal*

Persuasion. Persuasive communication is another source of personal sense of efficacy, strengthening the conviction that one has the skills necessary to achieve personal goals (Bandura, 2000). While, verbal persuasion may not be enough to determine an increase in the self-efficacy beliefs, if the positive message is realistic, it can help to support self-change. (4) *Physiological reactions.* Finally, people judge their abilities on the basis of somatic information related to physiological and emotional systems.

Self-Efficacy beliefs are also the product of different sources of information such as family, peers and school (Bandura, 2000). Specifically, *family* play a special role in mediating the relationship between the child/the adolescent and the environment, gradually creating opportunities for effective actions through mastering experiences. *Peers* are another important source of information on personal efficacy, as they are an important part of children's lives. The peer group acts through the possibility of experiencing new relationships that could increase and validate one's sense of personal efficacy. Finally, *school* is another source of self-efficacy beliefs. In the scholastic context, teachers actively contribute to children's intellectual development and sense of efficacy by assessing their performance and helping them to develop behavioral self-regulation skills.

There are many constructs associated with but distinct from self-efficacy beliefs. Firstly, self-efficacy differs from the *self-concept*, which corresponds to a global self-judgment. Self-concept refers to a global image, making it difficult to incorporate self-efficacy beliefs, because the latter change based on activities and the environment (Pajares & Miller, 1994). In addition, *self-esteem* is often confused with self-efficacy. However, self-esteem concerns personal value judgments while self-efficacy refers to capacity judgments (Bandura, 1997). Finally, perceived self-efficacy differs from *locus of control*, that is concerned with whether one's fate is determined by personal or external factors. Compared to locus of control, self-efficacy beliefs are stronger predictors of human behaviors, as they correspond to the beliefs that one can produce certain performances, whereas locus of control corresponds to the beliefs about whether these performances will affect specific results (Bandura, 1991b; Bandura, 1997).

Genzano Longitudinal Study

The participants were a sample of parents and their children, part of an ongoing Italian longitudinal project conducted by Caprara, Pastorelli, and their colleagues, focused on personal and contextual determinants of social adjustment from childhood to young adulthood.

The longitudinal design followed a staggered, multiple cohort design of children attending 3rd grade in an elementary school of Genzano (Rome) at the time of the first assessment. Cohort 1 began during the 1989-90 academic year, cohort 2 during the 1990-91 academic year, cohort 3 during the 1991-92 academic year, and cohort 4 during the 1993-94 academic year.

About 400 participants were assessed annually till early adolescence (subsequent assessments were biannual during adolescence and young adulthood).

Participants were originally drawn from two public middle schools in a community located near Rome that represent a socioeconomic microcosm of the larger Italian society, composed of families of skilled workers, farmers, professionals, local merchants, and service staff.

For the present dissertation, as outlined in Table 1, we used three cohorts of parents and their children assessed longitudinally when the children were 12, 13 and 14 years old, i.e. during the transition to middle school. In particular, our studies involved three cohorts of parents and their children attending the first year of middle school (when the children are 12 years old) during the 1994-95 (cohort 1), 1995-96 (cohort 2), and 1996-97 (cohort 3) academic year at the first time point, and reassessed at one-year intervals when the children were 13 and 14 years old.

Table 1. Longitudinal Design of the Dissertation

	Time 1	Time 2	Time 3
<i>Child's Age</i>	<i>Age 12</i>	<i>Age 13</i>	<i>Age 14</i>
Cohort 1	1994	1995	1996
Cohort 2	1995	1996	1997
Cohort 3	1996	1997	1998

Outline of the Dissertation

The chapters present empirical findings from the Genzano longitudinal sample previously described.

Chapter II aimed to evaluate the dimensionality of the PPSE_School (Perceived Parental Self-Efficacy in School-Related Performance) and CPESR_Learning (Children Perceived Efficacy for Self-Regulated Learning) scales in an Italian sample of parents and children at the age of 12, through Confirmatory Factor Analyses. Then, we tested in the case of PPSE School the factor invariance for mothers and fathers (for PPSE_School), and for both scales the factor invariance for boys and girls concurrently and across time (T1: child's age 12; T2: child's age 13; T3: child's age 14). Finally, we further examined the construct validity of the scales by evaluating their associations with children's academic functioning outcomes.

Chapter III, aimed to first analyzed the normative developmental course of PPSE_School using latent growth curve analyses during the transition to middle school (from 12 to 14 years of age from Time 1 to Time 3). Then, we investigated the associations between the developmental course of PPSE_School and students' academic achievement (Time 3), controlling for the initial levels of students' academic achievement (Time 1), family socio-economic status and child gender.

Chapter IV aimed to investigate the longitudinal bidirectional associations between PPSE_School and CPESR_Learning (from 12 to 14 years of age from Time 1 to Time 3). In

particular, Autoregressive Cross-Lagged Models were used to examine relationship between PPSE School and PESR Learning over time, considering family socio-economic status and the initial levels of students' academic achievement (age 12) as predictor variables, and the students' later academic achievement (age 14) as an outcome variable. Finally, we investigated the possible moderation effect of the child's gender by multiple-grouping analyses, imposing equal unstandardized paths across gender.

Finally, in **Chapter V**, we presented the general conclusions of this dissertation and the theoretical and empirical contribution of the combined results of the three studies.

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CHAPTER II

Measuring Perceived Parental and Adolescents' Self- Efficacy in School Domain

STUDY 1

Measuring Perceived Parental and Adolescents' Self-Efficacy in School Domain

Abstract

The present study investigated the factorial structure of the Perceived Parental Self-Efficacy in School-Related Performance scale (PPSE School) and the Children Perceived Efficacy for Self-Regulated Learning scale (CPESR Learning) in the Italian context, with a sample of 430 adolescents ($M_{\text{age}} = 12$; 232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%), using longitudinal data derived from the Genzano Longitudinal study which focused on personal and contextual determinants of social adjustment from childhood to young adulthood. In particular, in study (1A) the factorial structure of the PPSE School scale was examined. Confirmatory factor models were used to test the mono-factorial model, invariance across parents' gender (between mothers and fathers), and invariance across child's gender (between parents of males and parents of females). In study (1B) the internal factorial structure of the CPESR Learning Scale was examined and confirmatory factor models were used to test the mono-factorial structure and gender scale invariance. Lastly, in study (1C) the temporal invariance of both parental and children's scales was tested through confirmatory factor models on three different time points, one year apart ($T1 = \text{age } 12$; $T2 = \text{age } 13$; $T3 = \text{age } 14$). In addition, cross-sectional and longitudinal correlation analyses between PPSE School, CPESR Learning, and indicators of children's academic performance and aspirations were also conducted in order to further test the construct validity of the two scales.

In general, results supported the mono-factorial structures for both the PPSE School and CPESR Learning scales. This factorial structure was invariant across groups of parents and children. Furthermore, PPSE School and CPESR Learning were significantly associated with indicators of children's academic performance and personal/parental academic aspirations.

Keywords: parental self-efficacy, academic self-efficacy, developmental transition, pre-

adolescence, confirmatory factor analysis, scholastic achievement, Italy.

1. Introduction

According to the Social Cognitive Theory (Bandura, 2000), self-efficacy beliefs refer to people's beliefs about their ability to organize and execute the sequence of actions necessary to achieve personal standards and goals. As a central aspect of human agency, Self-Efficacy plays an important role in individuals' self-development and adjustment. In particular, human agency includes belief systems and self-regulatory capabilities of individuals to act actively and intentionally in the context in which they are involved (Bandura, 2001).

In the context of adolescent development, empirical evidences are convergent in highlighting the importance of parental and adolescents' self-efficacy in individual adaptation (Bandura, 1997; Coleman & Karraker, 1998; Pastorelli & Gerbino, 2001).

In particular, during the transition to adolescence, self-efficacy plays a key role for both parents and children: on the one hand, parents have to cope with new challenges that require a constant negotiation of their parental role; on the other hand, adolescents are engaged in many changes in their biological, social and psychological systems, and are also exposed to new experiences outside the home (Steinberg & Morris, 2001).

In our study, we focused on Parental Self Efficacy and Adolescents' Self Efficacy in the scholastic domain during the transition to adolescence, as it is a critical transitional period for both parents and children. It is during this period that parents and their children must cope with the changes in self-efficacy beliefs when confronted with "stringent academic demands for children" associated with the transition from elementary to junior high/middle school.

Accordingly, a vast body of research highlights the association between parental self-efficacy beliefs and children's adaptive developmental outcomes (Bandura, 1997; Gross et al., 1995; Coleman & Karraker, 1998, 2000, 2003; Jones & Prinz, 2005). However, less studies have considered the measurement of Parental Self-Efficacy in the school domain during the developmental transition to adolescence (Bandura, 1990; Pastorelli & Gerbino, 2001).

Differently, children and adolescents' Self-Efficacy beliefs in the scholastic domain has been examined in previous studies (Bandura, 1990; Usher & Pajares, 2008; Choi, Fuqua, and Griffin, 2001; Miller, Coombs, and Fuqua, 1999). However, with the exception of the Usher and Pajares study (2008), the test factorial invariance for boys and girl and across time represent an advancement in the metric of this scale.

Based on these premises, the overall aim of the present study is to evaluate the psychometric properties of the Perceived Parental Self-Efficacy Scale in\ School-Related Performance and Adolescents' Self-Efficacy Scale for Self-Regulated Learning, and to examine their relationship with children's and parents' academic aspirations and adolescents' academic achievement.

1.2 Perceived Parental Self-Efficacy Beliefs

Parental self-efficacy constitutes a special aspect of the parental beliefs system, based on parents' beliefs in their capability to promote their children's development. The construct of parental self-efficacy has been defined by Bandura (1997) as the beliefs that parents hold in their own caregiving capabilities as well as in managing the expanded familial demands. The role of parental self-efficacy is relevant during the transition to adolescence, where adolescents must manage pervasive changes in different spheres of their lives, and parents and children must renegotiate their relationship (Steinberg & Morris, 2001).

The theoretical and empirical literature focusing on parental self-efficacy beliefs has examined their association with parenting strategies and parental competences. Compared to parents with low efficacy, parents with high self-efficacy beliefs are more inclined to use positive parenting strategies, such as reasoning and monitoring (Coleman & Karraker, 2003).

In addition, other studies (Coleman & Karraker, 1998) have identified parental self-efficacy as a mediator of the effects of individual parental characteristics (e.g. temperament, depression physical health) and environmental factors (e.g. low socioeconomic status, social support) on the quality of parenting (Cutrona and Troutman, 1986; Donovan and Levitt, 1985). Specifically, it has

been shown that parental self-efficacy explains the relationship between various predictor variables and parents' behavioral competence (Coleman & Karraker, 1998). In general, high levels of parental self-efficacy have been found to be associated with parents' ability to provide a stimulating environment for their children (Donovan & Levitt, 1985; Donovan, Levitt and Walsh, 1997; Unger and Wandersman, 1985), and with parents' ability to encourage their children to initiate beneficial activities conducive to their adaptation (Eccles et al., 1993; Gross, Fogg and Tucker, 1995; Teti and Gelfand, 1991).

Furthermore, parental self-efficacy has been found to negatively correlate with parental depression (Cutrona and Troutman, 1986; Teti and Gelfand, 1991) and children's behavioral problems.

Regarding children's development, parental self-efficacy beliefs contribute to children's developmental trajectories in the areas of academic achievement, social relations, emotional adjustment and career choice. As evidenced by Bandura, Barbaranelli, Caprara, & Pastorelli (1996; 2001), and by Bandura, Caprara, Barbaranelli, Regalia, Scabini (2011), parental self-efficacy concurs to build children's sense of efficacy and aspirations, and to create the internal and external conditions to cultivate their potentialities.

Finally, pertaining to the interests of the present study, empirical evidences support the association between perceived parental self-efficacy and some indicators of academic achievement, such as academic grades, adolescents' academic self-efficacy beliefs (Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider, 1997; Ardel & Eccles, 2001), and parental academic aspirations (Bandura, Barbaranelli, Caprara and Pastorelli, 1996).

Summarizing, parental self-efficacy plays an important role in both children and parents' adjustment as it is related to parenting competencies, children's psycho-social adaptation, and parental psychological functioning (Jones & Prinz, 2005). Parental self-efficacy can be considered as an antecedent variable, in particular regarding parenting skills and strategies; as a consequence variable, because it can be influenced by socio-demographic and personality variables; as a mediator

variable, especially in the relationship between environmental conditions and parenting strategies; and as a transactional variable in the sense that parental self-efficacy can influence parenting strategies, thereby affecting children's outcomes that in turn can affect the level of self-efficacy experienced by parents (Jones & Prinz, 2005).

In our study, we chose to consider PPSE in relation to the academic domain, given the relevance of the school context in children's development, and the fact that the school system offers several opportunities to develop personal and relational skills (Pastorelli et al., 2001).

1.2.1. The Assessment of Perceived Parental Self-Efficacy Beliefs in School-Related Performance

As sustained by Bandura (2006), perceived self-efficacy refers to people's beliefs about their ability to produce certain results (Bandura, 1997), with individuals differing in the levels and in the areas where they experience self-efficacy. Self-efficacy therefore does not correspond to a general trait but is related to specific domains of activities. Accordingly, the measures of self-efficacy beliefs should refer to specific domains of functioning (Bandura, 2006). In this regard, Bandura suggested that *“self-efficacy scales must be tailored to activity domain and assess the multifaceted ways in which efficacy beliefs operate within the selected domain”* (Bandura, 2006, pp. 307-308). Consequently, self-efficacy scales should measure beliefs corresponding to various levels of challenge in achieving success in a specific domain of interest (Bandura, 2006).

According to Coleman & Karraker (2000), in the literature it is possible to highlight three dominant approaches to the assessment of self-efficacy beliefs. The first approach is defined as “specified-tasks”: it focuses on parental beliefs about ability related to specific tasks in different categories of parenting, such as discipline (Ballenski & Cook, 1982; Teti & Gelfand, 1991). The second approach is defined as “domain-specific”: it concerns the assessment of specific tasks in the domain of parenting (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Caprara, Regalia, Scabini, Barbaranelli, Bandura, 2004). The third approach is defined as “domain-general”: it is characterized

by the distinction between the different general domains of self-efficacy. Generally, the domain-general approach is the dominant approach in the assessment of parental self-efficacy (e.g., “*Parenting Sense of Competence Scale*”, Johnston & Mash, 1989; the “*Parenting Self-Agency Measure*”, Dumka, Stoerzinger, Jackson, & Roosa, 1996). Nevertheless, Bandura (1989) suggested using domain-specific measures related to specific domains of activities, even if the use of this kind of measures is still limited (e.g., “*Toddler Care Questionnaire*”, Gross & Rocissano, 1988; and the “*Maternal Self-Efficacy Scale*”, Teti & Gelfand, 1991), especially in the field of developmental transition to adolescence.

In this section, we review those studies that have focused their attention to the dimension of parental efficacy connected to school related performances.

Bandura (1990) was the first to develop a multi-dimensional scale to assess parental self-efficacy related to different domains of parental functioning, including the scholastic domain. The original scale is composed of 51 items distributed in 9 dimensions: 1) *Efficacy to Influence School-Related Performance* (sample item e.g. “Get your children to work hard at their schoolwork”); 2) *Efficacy to Influence Leisure-Time Activities* (sample item e.g. “Find time for leisure activities with your children”); 3) *Efficacy in Setting Limits, Monitoring Activities, and Influencing Peer Affiliations* (sample item e.g. “Keep track of what your children are doing when they are outside the home”); 4) *Efficacy to exercise control over high-risk behavior* (sample items e.g. “Prevent your children from becoming involved in drugs or alcohol”); 5) *Efficacy to Influence the School System* (sample item e.g. “Make your children’s school a better place for them to learn”); 6) *Efficacy to Enlist Community Resources for School Development* (sample item e.g. “Get businesses involved in working with schools”); 7) *Efficacy to Influence School Resources* (sample item e.g. “Help your children’s school get the educational materials and equipment they need”); 8) *Self-Efficacy to control distressing rumination* (sample item e.g. “Stop yourself from worrying about things”); 9) *Resiliency of Self-Efficacy* (sample item e.g. “Get yourself to keep trying when things are going really badly”). Part of this multidimensional scale has been validated in the Italian context by Pastorelli and Gerbino (2001),

on a sample of 689 parents of children attending middle school, and 308 parents of children attending high school. They used 28 items distributed in the following three dimensions:

- 1) *Perceived Parental Self-Efficacy in Influencing School-Related Performance*, that measured parents' judgement of their personal efficacy in promoting their children's interest in learning activities, in motivating them for academic pursuits, and in assisting them with their school homework (sample item e.g. "How much can you do to help your child to work hard at his/her homework?").
- 2) *Perceived Parental Self-Efficacy to Influence Leisure-Time Activities*, that measured parents' judgement of their personal efficacy in finding time to spend with their own children in leisure activities (sample item e.g. "How much can you do to spend time with your children and their friends?").
- 3) *Perceived Parental Self-Efficacy to exercise control over high-risk behavior*, that measured parents' judgement of their personal efficacy in preventing their children from getting involved in risky activities (sample item e.g. "How much can you do to prevent your children from doing things you do?").

Specifically, regarding the *Perceived Parental Self-Efficacy in Influencing School-Related Performance*, the examination of its factorial structure confirmed the mono-dimensionality of the scale in both parents of children attending middle school and high school (the extracted factor explained 48,7% and 55,7% of the total variance for the first and the second groups respectively). The scale also showed high reliability in both groups (.90 and .92, respectively). Finally, the analysis of variance (ANOVA) revealed significant gender differences between mothers and fathers. In particular, mothers feel more capable of promoting their children's learning and participating in their school life than fathers.

Furthermore, in a study conducted on a sample of 390 parents of children from elementary school, Hoover-Dempsey et al. (1992) developed a Parental Efficacy Scale in the domain of parent-school relations. They developed a 12-item Parent Perceptions of Parent Efficacy Scale to assess

parental self-efficacy in influencing children's school outcomes and learning activities (sample item e.g. "I know how to help my child do well in school"). The scale has high construct validity and, of interest to the present study, correlation analysis revealed that parental self-efficacy is significantly associated with indicators of parental-school involvement such as more hours spent on classroom volunteering and children educational activities, and less number of telephone calls with the teacher. Parents' efficacy scores did not reveal significant differences between mothers and fathers, nor were they related to family income, marital status and parent's occupation.

In another study, Coleman & Karraker (2000) developed the Self-Efficacy for Parenting Task Index (SEPTI) consisting of 36 items distributed in 5 scales. These were: a) parental academic efficacy in facilitating children's achievement in school (ACHIEVEMENT); b) supporting children's need for recreation, including socializing with peers (RECREATION); c) provision of structure and discipline (DISCIPLINE); d) provision of emotional nurturance (NURTURANCE); e) maintenance of children's physical health (HEALTH)]. In a sample of 145 mothers of school children aged between 5 and 12 years, results evidenced a sufficient magnitude of the Cronbach's alpha coefficients for each of the subscales (ACHIEVEMENT = .74; RECREATION = .82; DISCIPLINE = .86; NURTURANCE = .77; HEALTH = .73). These five categories of parental self-efficacy accounted for 51,9% of the total variance.

1.3. Adolescents' Perceived Self-Efficacy Beliefs in the Scholastic Domain

Perceived self-efficacy in the scholastic domain is defined as the students' beliefs in their ability to study different subject matters, to structure environments conducive to learning, and to plan and organize academic activities (Bandura, 1993)

According to Bandura (2001), adolescence represents an important developmental phase for individuals' future adjustment, where the sense of self-efficacy develops to exercise control over events, and during which the school system offers the opportunities to develop personal and relational -skills (Pastorelli et al., 2001).

In the context of learning, self-efficacy acts by orienting students' choices of the activities to undertake, and interest, persistence, and efforts to achieve academic goals (Schunk & Usher, 2011). Compared to students with low self-efficacy beliefs, students with high self-efficacy beliefs work harder and persist in difficult situations, thereby achieving higher levels of academic performance (Pajares & Schunk, 2001).

Research on academic self-efficacy is consistent in highlighting its effect on different aspects of academic performance, such as academic motivations, learning and academic achievement (Pajares, 1995; Schunk, 1995). In particular, self-efficacy beliefs contribute to learning experiences both directly by developing the sense of cognitive efficacy, and indirectly through the increase of personal academic aspirations and academic standards (Zimmerman, Bandura & Martinez-Pons, 1992; Zimmerman & Bandura, 1994; Bandura, Barbaranelli, Caprara & Pastorelli, 1996).

A relevant aspect based on self-efficacy beliefs is self-regulation, which in learning context refers to students' thoughts and behaviors that orient the achievement of learning goals and the use of specific strategies to achieve the academic success (Schunk & Zimmerman, 2003).

Following the social-cognitive approach, Zimmerman (1989) proposed a cycle model of learning self-regulation based on the triadic reciprocal interactions among personal, environmental and behavioral determinants (Bandura, 1977). Specifically, the cycle model of self-regulation consists of three phases: the *forethought* phase, which refers to the processes that precede performance; the *performance* phase, which refers to the processes that occur during learning; and the *self-reflection* phase, which occurs at the end of the performance.

Zimmerman (1989) further identified the main self-regulatory processes that are involved in the phases of the model: behavioral self-regulation (students' proactive use of self-evaluation strategy), environmental self-regulation (the use of strategy to manipulate the learning environment), and covert self-regulation (meta-cognitive processes which affect other personal processes).

In addition, Zimmerman (1989) suggested that maintaining high self-efficacy helps to motivate students to learn and promote their self-regulated learning (Zimmerman & Cleary, 2009).

In this regard, psychological research has produced a large body of studies focused on students' self-efficacy and self-regulated learning. For example, Pintrich & De Groot (1990) found positive associations among self-efficacy, self-regulation, and the use of cognitive strategies; and Bouffard-Bouchard (1990) highlighted that the use of different strategies in solving problems is associated with high self-efficacy beliefs. Relich, Debus, Walker (1986), and Zimmerman & Bandura (1994) have also found that self-efficacy affects the academic achievement both directly and indirectly through its influence on academic goals. In general, a large body of evidence suggests that students' self-efficacy predicts high academic results, both directly and indirectly increasing flexibility in the application of specific learning strategies (Bouffard-Bouchard, 1990; Zimmerman, Bandura & Martinez-Pons, 1992; Zimmerman & Bandura, 1994).

Regarding self-efficacy beliefs for self-regulated learning, a construct that our study is interested in, a set of empirical evidence has been produced. Among these, Bandura, Barbaranelli, Caprara and Pastorelli (1996) examined the role of self-efficacy in academic functioning amongst a sample of 279 Italian students from middle school, and their parents. The results of the study showed positive significant associations between Perceived Efficacy for Self-Regulated Learning and students' Prosocial Behavior, Peer Acceptance, and Academic Achievement.

In another study, Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli and Bandura (2008) analyzed the developmental growth trajectory of Perceived Efficacy for Self-Regulated Learning in a sample of 412 Italian students, assessed longitudinally from 12 to 18 years old. The authors also examined the association between Perceived Efficacy for Self-Regulated Learning and student academic achievement measured at the end of junior and senior high school. The results of the study showed a linear decrease in self-efficacy beliefs from early to late adolescence, and suggested positive associations between Perceived Efficacy for Self-Regulated Learning and students' Academic Achievement.

Other studies conducted by Caprara, Vecchione, Alessandri, Gerbino & Barbaranelli (2011), and by Di Giunta, Alessandri, Gerbino, Kanacri, Zuffianò & Caprara (2013), have demonstrated that

the dimension of academic self-efficacy in adolescents (composed of self-efficacy for self-regulated learning and self-efficacy for academic achievement) significantly predicts junior and senior high school grades.

1.3.1 The Assessment of Perceived Efficacy Beliefs for Self-Regulated Learning

In this section, we will briefly review research that has significantly contributed to the definition and the measurement of Perceived Efficacy for Self-Regulated Learning.

Zimmerman and Martinez-Pons (1986; 1988) were the first to develop a scale for the assessment of perceived efficacy for self-regulated learning. Specifically, they analyzed results from structured interviews with high school students, that revealed the use of various self-regulatory learning strategies, such as planning and organizing academic activities, structuring a productive learning environment, and participating in class. Based on this set of strategies, they developed the Self-Efficacy for Self-Regulated Learning Scale (Zimmerman, Bandura, & Martinez-Pons, 1992), in which students rated their sense of efficacy on 11 tasks (e.g., "Finish homework assignments by deadlines"), on a seven-point Likert scale (from 1 = not well at all; to 7 = very well).

This set of strategies in turn became the basis for the Children Perceived Self-Efficacy (CPSE) scale developed by Bandura (1990; 2006), that measures different domains particularly relevant during late childhood and adolescence, including the school domain. The scale is composed of 37 items distributed in 7 domains of functioning: 1) *Self-efficacy for academic achievement*, that assesses students' beliefs in their capability to master different subject matters (sample item e.g. "Learn science"); 2) *Self-efficacy for self-regulated learning*, that assesses students' beliefs in their capability to structure environments conducive to learning and to plan and organize academic activities (sample item e.g. "Remember well information presented in class and textbooks"); 3) *Self-efficacy for leisure and extracurricular activities*, that assesses students' beliefs in their capability to carry out recreational and student group activities (8 sample item e.g. "Learn sports skills well"); 4) *Self-Regulatory efficacy* that assesses children beliefs in their capability to resist peer pressure to be

involved in risk activities (sample item e.g. “Resist peer pressure to smoke cigarettes”); 5) *Perceived Social Self-Efficacy*, that assesses children’s beliefs in their capability to initiate and maintain social relationships and to manage interpersonal conflicts (sample item e.g. “Carry on conversations with others”); 6) *Self-assertive efficacy*, that assesses children’s beliefs in their capabilities to voice their opinions, to stand up to mistreatment, and to refuse unreasonable request (sample item e.g. “Express my opinions when other classmates disagree with me”); 7) *Perceived self-efficacy to meet others’ expectations*, that assesses children’s beliefs in their capabilities to fulfill what their parents, teachers, and peers expect of them, and to live up to what they expect of themselves (sample item e.g. “Live up to what my parents expect of me”). This multidimensional scale has also been validated by Bandura et al., (1996) in the Italian context.

Specifically, Bandura, Barbaranelli, Caprara, & Pastorelli, (1996) examined the factorial structure of the Children’s Perceived Self-Efficacy Scales in a sample of 279 Italian children ranging in age from 11 to 14 years. Principal component factor analysis revealed the following three factors: 1) *Academic self-efficacy*, that included all the items referring to perceived capability to plan and organize academic activities, to master academic subjects, and to fulfill personal, parental, and teacher academic expectations; 2) *Perceived social efficacy*, that included all the items referring to perceived capability for peer relationships, for self-assertiveness, and for leisure time group activities; 3) *Self-regulatory efficacy*, that included all the items referring to perceived capability to resist peer pressure to involve in risk activities. Results of the study also suggested that high academic self-efficacy is positively associated with high academic aspirations, prosocial behavior, scholastic achievement and peer acceptance.

Furthermore, a cross-national study was conducted by Pastorelli, Caprara, Barbaranelli, Rola, Rozsa and Bandura (2001) to investigate the replicability and generalizability of the three reduced dimensions of the Children Perceived Self-Efficacy scales found in previous studies (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996) in Italy, Hungary and Poland. The full sample was composed of 1180 children ranging in age from 10 to 15 years (822 children from Italy; 219 children

from Hungary; 143 children from Poland). The findings of the study provided support for the replicability and generalizability of children's academic self-efficacy and children's social self-efficacy, but not for their self-regulatory efficacy, whose the structure was different in Hungarian children. The results of the study also revealed that in all three countries girls have higher academic self-efficacy than boys.

Another relatively recent contribution is the validation study conducted by Usher & Pajares (2008), on a sample of 3760 students from grades 4 to 10, using a set of 11 items from the Perceived Efficacy for Self-Regulated Learning scale (Bandura, 1990;2006; Pastorelli et al., 2001). The results of the study demonstrated the mono-dimensionality of the Perceived Efficacy for Self-Regulated Learning scale, and measurement invariance of the scale across gender and school levels.

In this regard, literature suggests other evidence (Choi, Fuqua, and Griffin, 2001; Miller, Coombs, and Fuqua, 1999; Caprara et al., 2008) that revealed similar results supporting a unidimensional factorial structure of items that measure adolescence self-efficacy for self-regulated learning.

1.4. The present study

Considering the lack of studies on parental self-efficacy in the school context during adolescence (e.g.: Ardelt & Eccles, 2001; Bandura, Barbaranelli, Caprara & Pastorelli, 1996; Pastorelli & Gerbino, 2001), and considering that previous studies which focused on the validation of Perceived Efficacy for Self-regulated Learning generally did not use accurate tests of mean differences between groups (such as multiple-group structural equation models), the overall aim of the present study is to evaluate the psychometric properties of the Perceived Parental Self-Efficacy Scale in School-Related Performance scale (PPSE_School; Bandura, 1990; Pastorelli & Gerbino, 2001), and Perceived Efficacy for Self-Regulated Learning scale (PESR_Learning; Bandura, 1990; Bandura et al., 1996; Pastorelli et al., 2001), using an Italian sample of parents and their children aged from 12 to 14 years, and then to examine their relations with a variety of measures associated with the adolescents' academic functioning.

Perceived Parental Self-Efficacy in School-Related Performance constitutes a domain of the Multidimensional Parental Perceived Self-Efficacy (MPPSE) scales developed by Bandura (1990) to measure different domains relevant to parents' role during adolescence.

In the present study, a set of seven-item was considered to represent parental perception of self-efficacy in influence School-Related Performance.

Perceived Efficacy for Self-Regulated Learning constitutes a domain of the Children Perceived Self-Efficacy (CPSE) scale developed by Bandura (1990) to measure different domains relevant to children's life during adolescence.

In the present study, a set of 11 items was considered to represent children's efficacy in structuring environments conducive to learning, and in planning and organizing academic activities.

2. Study 1A

2.1 Specific aims

As indicated, the specific aims of this study are: **(a)** to examine at confirmative level (CFAs) the mono-dimensionality of the PPSE_School scale; and **(b)** to analyze the structure invariance of the PPSE_School scale across the gender of parent (fathers and mothers) and across the children's gender (parents of males and females).

2.2 Hypotheses

(a) Regarding the first aim, we expect to confirm the mono-factorial structure of the PPSE_School scale in our sample, based on previous psychometric studies in which the mono-dimensionality of the PPSE_School was found in parents of adolescents (Bandura, 1990; Pastorelli & Gerbino, 2001).

(b) Regarding the second aim, based on previous studies, due to a gap in the literature on the measurement invariance of PPSE_School across mothers and fathers, we cannot advance strict hypothesis. As for invariance across the child's gender, considering the lack of studies on the measurement of PPSE_School separately by child gender, we expect that the invariance tests should be supported.

2.3 Method

2.3.1 Participants and Procedure

The participants in this study were 424 parents (100 fathers, 24%; 324 mothers, 76%) from a longitudinal research program focused on personal and contextual determinants of social adjustment from childhood to young adulthood.

The occupational socioeconomic distribution of the families matched the Italian national profile (*ISTAT*, 1995). In the sample 41,1% were homemakers, 9,3% were in professional or managerial ranks, 33,7% were merchants or employees in various types of businesses, 4,2% were skilled workers, 10% were unskilled workers, 1,7% were retired. The composition of the family also matched national data with regard to type of families and the number of children. The sample was mainly composed of intact families (91%) with 9% of single-parent homes (i.e., separated or divorced).

The longitudinal project followed a staggered, multiple cohort design, with three cohorts of parents and their children assessed initially when children's age was 12 years old (in 1994, 1995 and 1996), and reassessed yearly when the children were 13 and 14 years old. The data collections' schema differentiated by cohort is reported in Table 1.

Cohort effects were tested by comparing the mean levels of the main variables at similar ages. Specifically, univariate analysis of variance (ANOVA) demonstrated no significant differences among the cohorts in terms of parents' gender, adolescents' gender, parents' education and occupation, and in perceived parental self-efficacy in school-related performance. Therefore, the data from the three cohorts were combined. Regarding the parents, Cohort 1 started with 121 subjects at T1 and ended with 91 participants at T3; Cohort 2 started with 142 parents at T1 and ended with 119 participants at T3; Cohort 3 started with 161 parents at T1 and ended with 103 participants at T3.

From T1 to T3, the study was presented to parents, teachers, and children as a project designed to better understand child and adolescent development. With the consent by the school council and parents and the children's assent, three female experimenters administered the measures to

participants during specially scheduled sessions in a school. Mothers and fathers completed the questionnaire at the children's school while in a group setting (five to seven people at a time).

During the entire research project, researchers offered explanations as needed and confidentiality was guaranteed for all participants.

Attrition

The parents' participation rate remained high across time.

Specifically, it was 74% from T1 to T3 (the sample size over time is reported in Table 2).

The attrition rate was principally due to two main reasons: unavailability of the subjects to participate in the later data collections in the ongoing longitudinal study or their relocation away from the Genzano area. The analysis of variance reported that the missing participants at T3 did not significantly differ from their counterparts in Socio-Economic Status [$F(1,395) = 3.008, p = 0.08$] and in Perceived Parental Self-Efficacy School-Related Performance [Time 1: $F(1,422) = 0.633, p = 0.42$; Time 2: $F(1,378) = 0.62$].

Table 1
Data collection schema differentiated by cohort

	Cohort 1 (years)	Cohort 2 (years)	Cohort 3 (years)
1994	12		
1995	13	12	
1996	14	13	12
1997		14	13
1998			14

Table 2
Descriptive statistics of the measures and sample size

Children's Age	Parents Report (% mothers)
12	424 (76%) PPSE_School
13	380 (78%) PPSE_School
14	313 (76%) PPSE_School

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance.

2.3.2 Measures

2.3.2.1 Children's Gender. Children's gender was coded 1 for boys and 2 for girls.

2.3.2.2 Parents' Gender. Parents' gender was coded 1 for fathers and 2 for mothers.

2.3.2.3 Perceived Parental Self-Efficacy in School-Related Performance – PPSE-School

(Bandura, 1990; Pastorelli & Gerbino, 2001).

This is a seven-item scale selected from the multidimensional scale of perceived parenting efficacy (Bandura, 1990). The items encompass a diverse set of activities parents have to manage in promoting their child's academic development. The PPSE measures parents' judgement of their personal efficacy to promote their child's interest in, and evaluation of education, to motivate them for academic pursuits, assist them with their school homework (sample item e.g. "How much can you do to help your child to work hard at his/her homework?). Mothers (76%) and fathers (24%) belonging to all three cohorts rated their sense of efficacy on a 5-point Likert scale (from 1= not well at all, to 5= very well).

Cronbach's alpha reliability coefficient was .87.

2.3.3 Data analytic approach

In order to assess the psychometric properties of the PPSE School-Related Performance, we preliminary tested the mono-factorial structure of the scales at T1 by using a Confirmatory Factor Analysis (CFA). Parameters were estimated by maximum likelihood (ML) using the Mplus 7.0 program (Muthén & Muthén, 1998-2007) in the full sample, and then, multigroup confirmatory factor analysis (MGCFA) was performed to test the measurement invariance of the scale across parents' gender and children's gender.

We adopted a model-fitting process based on the review by Vandenberg and Lance (2000), as well as suggestions of others (e.g., Vecchione et al., 2012; Caprara et al., 2008; Little, 1997), in order to test for (a) configural, (b) metric and (c) scalar invariance of the scales, that respectively evaluated (a) the invariance of the latent factor across groups (configural invariance: the same pattern of free-

factor loadings is specified across groups); (b) if the items are the same across groups (metric invariance: the same factor loadings for items are specified across groups); and (c) the invariance of the items' mean values across groups (scalar invariance: the same intercepts of the items' regressions on the latent variables are specified across groups). Full metric invariance occurs when there is not significant difference in the χ^2 value between unconstrained (configural invariance) and constrained (metric invariance) models (Muthén & Muthén, 1998-2007), while scalar invariance occurs when there is not significant difference in the χ^2 value between metric invariance and scalar invariance models (Muthén & Muthén, 1998-2007). Each form of invariance was nested in the previous model and the inspection of modification indices (MIs) was used to identify the noninvariant items and to refine the structural models (Steenkamp & Baumgartner, 1998). The logic is that invariance restrictions may hold for some but not all manifest measures across populations, and relaxing invariance constraints where they did not hold controls for partial measurement inequivalence (Vandenberg & Lance, 2000).

We performed Chi-square difference tests to compare nested models (Kline, 1998). The focus was geared toward fit model indices that were less sensitive to sample size given that obtaining a non-significant chi-square becomes increasingly unlikely with large sample sizes (Kline, 1998).

For each model, the following parameters are reported and used to evaluate the model's goodness of fit: Chi-square Goodness of Fit (χ^2); degrees of freedom (df), Comparative Fit Index (CFI), Root-Mean-square Error of Approximation (RMSEA), Standardized Root-Mean-square Residual (SRMR). CFI values greater than .90 have been accepted (Kelloway, 1998; Kline, 1998), as well as RMSEA values lower than .07 (Browne & Cudeck, 1993), and SRMR values lower than .08 (Kelloway, 1998). Data were analyzed using Mplus 7.0 (Muthén & Muthén, 1998–2007).

2.4 Results

Descriptive statistics

Means, standard deviations (SD), range (minimum and maximum), skewness and kurtosis were calculated for each of the 7 items of PPSE in School-Related Performance Scale (Table 3).

Values less than 2 for univariate skewness and less than 5 for univariate kurtosis were used as criteria for evaluating univariate normality (Curran, West, & Finch, 1996). Results showed satisfactory values for both skewness and kurtosis. In particular, skewness ranged from -.41 to -.81 and kurtosis ranged from -.59 to .40.

TABLE 3
Descriptives statistics for the 7 items of PPSE School- Related Performance Scale

Item (How much can you do to: ...)	Mean	SD	Range (min-max)	Skewness	Kurtosis
1. Get your children to see school as valuable	3.8	.98	1 - 5	-.60	-.34
2. Help your children with their school-work	3.6	.99	1 - 5	-.55	-.26
3. Get your children to work hard at their school-work	4.1	.82	1 - 5	-.76	.25
4. Get your children to stay out of trouble at school	3.8	.89	1 - 5	-.62	.01
5. Help your children get good grades at school	3.6	.96	1 - 5	-.41	-.35
6. Get your children to enjoy school	3.7	1.0	1 - 5	-.45	-.59
7. Show your children that working hard at school influences later success	4.1	.83	1 - 5	-.81	.40

Note. PPSE School-Related Performance = Perceived Parental Self-Efficacy in School-Related Performance

Confirmatory Factor Analysis

Based on theoretical assumptions, we tested a mono-factorial structure model with the 7 items loading on a single latent factor. This model fit the data well: $\chi^2(14) = 126.56$, $p < .001$; CFI = .91; RMSEA = 0.138 (0.116 – 0.160); SRMR = 0.047. Standardized loadings are reported in Table 4.

TABLE 4
Factor loadings for one-factor solution of PPSE School- Related Performance Scale

Item (How much can you do to: ...)	1 Factor
1. Get your children to see school as valuable	.691
2. Help your children with their school-work	.542
3. Get your children to work hard at their school-work	.754
4. Get your children to stay out of trouble at school	.710
5. Help your children get good grades at school	.770
6. Get your children to enjoy school	.764
7. Show your children that working hard at school influences later success	.696

Multi-group factor analysis (MGFA): Parents' Gender Invariance

As reported in Table 5, CFAs confirmed that the mono-factorial hypothesized structure presented an adequate fit within both the mothers' and fathers' samples (Table 5).

The configural model fitted the data, $\chi^2 (28) = 155.25$, $p < .01$, CFI = 0.90, RMSEA = 0.14 (.12, .16), SRMR = 0.05. Metric and Scalar Invariance were totally supported, by constraining all the factor loadings [$\chi^2 (34) = 160.05$, $p < .01$, CFI = 0.90, RMSEA = 0.13 (.11, .15), SRMR = 0.06; D $\chi^2 (6) = 4.79$, $p = .57$] and all the intercepts [$\chi^2 (41) = 163.27$, $p < .01$, CFI = 0.90, RMSEA = 0.11 (.10, .13), SRMR = 0.07; D $\chi^2 (7) = 3.22$, $p = .86$] across mothers and fathers. This result suggests that the construct underlying PPSE School-Related Performance is measured in a similar manner amongst both mothers and fathers.

TABLE 5
Test of measurement fathers/mothers invariance of PPSE School-Related Performance scale

	χ^2	df	CFI	SRMR	RMSEA	Model Comparison	χ^2_{diff}	Δdf	$\Delta \chi^2$
Fathers (n=100)	53,422	14	0.862	0.068	0.168 (0.122, 0.217)				
Mothers (n= 324)	101,833	14	0.915	0.047	0.139 (0.114, 0.165)				
Model 1. Configural Invariance	155,255	28	0.904	0.053	0.146 (0.124, 0.169)				
Model 2. Metric Invariance	160,051	34	0.905	0.068	0.132 (0.112, 0.153)	2 vs. 1	4,79	6	ns (0,57)
Model 3. Scalar Invariance	163.274	41	0.907	0.070	0.119 (0.100, 0.138)	3 vs. 2	3,22	7	ns (0,86)

Notes: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation.
p <= 0.01

Multi-group factor analysis (MGFA): Adolescents' Gender Invariance

As reported in Table 6, CFAs confirmed that the mono-factorial hypothesized structure presented an adequate fit within both boys' and girls' samples (Table 6).

The configural model fitted the data, $\chi^2 (28) = 145.64$, $p < .01$, CFI = 0.91, RMSEA = 0.14 (.11, .16), SRMR = 0.05. Metric and Scalar Invariance were fully supported, by constraining all the factor loadings [$\chi^2 (34) = 149.92$, $p < .01$, CFI = 0.91, RMSEA = 0.12 (.10, .14), SRMR = 0.06; D $\chi^2 (6) = 4.27$, $p = .64$] and all the intercepts [$\chi^2 (41) = 161.38$, $p < .01$, CFI = 0.90, RMSEA = 0.11 (.09, .13), SRMR = 0.07; D $\chi^2 (7) = 11.46$, $p = .11$] across boys and girls. This result suggests that the construct underlying PPSE School-Related Performance is measured in a similar way across both groups.

TABLE 6
Test of measurement child gender invariance of PPSE School-Related Performance scale

	χ^2	df	CFI	SRMR	RMSEA	Model Comparison	χ^2_{diff}	Δdf	$\Delta \chi^2$
Boys (n=227)	75,997	14	0.911	0.054	0.140 (0.110, 0.171)				
Girls (n= 197)	69,650	14	0.910	0.049	0.142 (0.110, 0.176)				
Model 1. Configural Invariance	145,647	28	0.910	0.052	0.141 (0.119, 0.164)				
Model 2. Metric Invariance	149.922	34	0.912	0.065	0.127 (0.106, 0.148)	2 vs. 1	4,27	6	ns (0,64)
Model 3. Scalar Invariance	161.385	41	0.908	0.074	0.118 (0.099, 0.137)	3 vs. 2	11,46	7	ns (0,11)

Notes: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation.
 $p \leq 0.01$

3. Study 1B

3.1 Specific aims

The specific aims of this study are: **(a)** to examine at confirmative level (CFAs) the mono-dimensionality of the PESR_Learning scale; and **(b)** to analyze the structure invariance of the PESR_Learning scale across children's gender (boys and girls).

3.2 Hypotheses

(a) Regarding the first aim, we expect to confirm the mono-factorial structure of the PESR_Learning scale in our sample, based on previous psychometric studies in which the mono-dimensionality of the Perceived Efficacy for Self-Regulated Learning was founded in adolescents' (Bandura, 1990; Usher & Pajares, 2008; Choi, Fuqua, and Griffin, 2001; Miller, Coombs, and Fuqua, 1999).

(b) Regarding the second aim, it is possible to hypothesize that some items are not invariant across children's gender, based on previous studies (Pastorelli, Caprara, Barbaranelli, Rola, Rozsa, Bandura, 2001; Caprara, Regalia, Scabini, Barbaranelli, Bandura, 2004) supporting higher levels of academic self-efficacy in girls than boys, and supporting greater use of learning strategies in girls than boys (Zimmerman & Martinez-Pons, 1990).

3.3 Method

3.3.1 Participants and Procedure

The participants in this study were 430 adolescents (232 boys, 54%; 198 girls, 46%) from the longitudinal research program focused on personal and contextual determinants of social adjustment from childhood and to adulthood already described above (Study 1A). Children were recruited from schools in Genzano, located near Rome, Italy.

Adolescent participants attended 6th grade of junior high school at age 12, 7th grade at age 13, and 8th grade at age 14.

Occupational socioeconomic distribution of the adolescents' families matched the Italian national profile (see paragraph 2.3.1 “Study 1A”).

Cohort effects were tested by comparing the mean levels of the main variables at the same age. In particular, univariate analysis of variance (ANOVA) demonstrated no significant differences among the cohorts in terms of adolescents' gender, parents' gender, parents' education and occupation, except for adolescents' efficacy for self-regulated learning at age 13 [$F(2,416) = 4.584$, $p=.01$]. However, although statistically significant, Cohen's d measure of effect size indicated that the cohort differences at this time point were very small in size (i.e., $d < .33$). Therefore, the data from the three cohorts were combined. Regarding the adolescents, Cohort 1 started with 124 subjects at T1 and ended with 110 participants at T3; Cohort 2 started with 144 adolescents at T1 and ended with 137 participants at T3; Cohort 3 started with 162 adolescents at T1 and ended with 145 participants at T3.

Attrition

The adolescents' participation rate remained high across time.

Specifically, it was 91% from T1 to T3 (the sample size over time is reported in Table 7).

The analysis of variance implemented in the children's sample showed that the missing participants at T3 did not significantly differ from their counterparts in Perceived Efficacy For Self-Regulated Learning [Time 1: $F(1,427) = .377$, $p = 0.54$; Time 2: $F(1,417) = .028$, $p = 0.86$]. However,

we found a significant difference between remaining participants and missing participants in Socio-Economic Status [$F(1,395) = 8.95, p < 0.01$] with higher average level of Socio-Economic Status in missing participants.

Table 7

Descriptive statistics of the measures and Sample size

Age	Adolescents Report (% boys)
12	430 (54%) PESR_Learning
13	419(54%) PESR_Learning
14	392(54%) PESR_Learning

Note: PESR_Learning = Perceived Efficacy for Self-Regulated Learning

3.3.2 Measures

3.3.2.1 Children's Gender. Children's gender was coded 1 for boys and 2 for girls.

3.3.2.2 Perceived Efficacy for Self-Regulated Learning – PESR-Learning (Bandura, 1990; Bandura et al., 1996; Pastorelli et al., 2001).

Adolescents' beliefs in their efficacy were measured on a 11-item scale (Bandura, 1990; Bandura et al., 1996; Pastorelli et al., 2001), that assessed their efficacy in structuring environments conducive to learning and in planning and organizing academic activities (sample item e.g. "How well can you study when there are other interesting things to do?"). Preadolescents rated on a 5-point Likert scale (from 1= not well at all, to 5= very well), their perceived capability to manage one's learning and academic activities.

Cronbach's alpha reliability coefficient was .85.

3.3.3 Data analytic approach

In order to assess the psychometric properties of the PESR Learning, we used the same analytic approach already described above in Study 1A (see paragraph 2.3.3).

3.4 Results

Descriptive statistics

Means, standard deviations (SD), range (minimum and maximum), skewness and kurtosis were calculated for each of the 11 items of the PESR Learning Scale (Table 8).

Values less than 2 for univariate skewness and 5 for univariate kurtosis were used as criteria for evaluating univariate normality (Curran, West, & Finch, 1996). Results showed satisfactory values for both skewness and kurtosis. Specifically, skewness ranged from -1.7 to -.19 and kurtosis ranged from -1.4 to 3.0.

Note. PESR Learning = Adolescents' Perceived Efficacy for Self-Regulated Learning

TABLE 8
Descriptives statistics for the 11 items of PESR Learning

Item (How well can you: ...)	Mean	SD	Range (min-max)	Skewness	Kurtosis
1. Finish homework assignments by deadlines	4.1	1.0	1 - 5	-1.2	.90
2. Study when there are other interesting things to do	3.6	1.1	1 - 5	-.68	-.75
3. Concentrate on school subjects	3.5	1.1	1 - 5	-.54	-1.0
4. Take class notes of class instruction	3.2	1.3	1 - 5	-.19	-1.4
5. Use the library to get information for class assignments	4.6	.88	1 - 5	-1.7	3.0
6. Organize your school work	4.0	.92	1 - 5	-1.3	1.3
7. Plan your school work	3.9	1.0	1 - 5	-1.1	.44
8. Remember information presented in class and textbooks	4.0	.98	1 - 5	-1.3	1.1
9. Arrange a place to study without distractions	3.9	1.1	1 - 5	-1.0	-.15
10. Motivate yourself to do school work	4.0	.95	1 - 5	-1.3	1.6
11. Participate to class discussions	3.9	1.1	1 - 5	-1.0	-.19

Confirmatory Factor Analysis

Based on theoretical assumption we tested a mono-factorial structure model with the 7 items loading on a single latent factor. This model fit the data well: $\chi^2(44) = 112.04$, $p < .001$; CFI = .94; RMSEA = 0.060 (0.046 – 0.074); SRMR = 0.039. Standardized loadings are reported in Table 9.

TABLE 9
Factor loadings for one-factor solution of PESR Learning Scale

Item (How well can you: ...)	1 Factor
1. Finish homework assignments by deadlines	.493
2. Study when there are other interesting things to do	.555
3. Concentrate on school subjects	.612
4. Take class notes of class instruction	.522
5. Use the library to get information for class assignments	.491
6. Organize your school work	.672
7. Plan your school work	.721
8. Remember information presented in class and textbooks	.507
9. Arrange a place to study without distractions	.536
10. Motivate yourself to do school work	.726
11. Participate to class discussions	.452

Multi-group factor analysis (MGFA): Adolescents' Gender Invariance

As reported in Table 9, CFAs confirmed that the mono-factorial hypothesized structure presented an adequate fit within both boys' and girls' samples (Table 10).

The configural model fitted the data, $\chi^2 (88) = 177.84$, $p < .01$, CFI = 0.92, RMSEA = 0.06 (.05, .08), SRMR = 0.04. Metric invariance was fully supported by constraining all the factor loadings [$\chi^2 (98) = 183.72$, $p < .01$, CFI = 0.93, RMSEA = 0.06 (.04, .07), SRMR = 0.05; D $\chi^2 (10) = 5.87$, $p = .08$] across boys and girls. Scalar invariance was partially supported by constraining all the intercepts across time except for the items 4 ("How well can you take class notes of class instruction"; boys intercept = 3.04, girls intercept = 1.37), and 8 ("How well can you remember information presented in class and textbooks") [$\chi^2 (107) = 203.31$, $p < .01$, CFI = 0.92, RMSEA = 0.06 (.05, .07), SRMR = 0.07; D $\chi^2 (9) = 19.64$, $p = .02$; boys intercept = 4.17, girls intercept = 1.03], which they were not invariant. This result suggests that the construct underlying PESR Learning is measured in a similar way across both groups.

TABLE 10
Test of measurement gender invariance of PESR Learning Scale

	χ^2	df	CFI	SRMR	RMSEA	Model Comparison	χ^2_{diff}	Δdf	$\Delta\chi^2$
Boys (n=232)	99,129	44	0.914	0.050	0.073 (0.054, 0.093)				
Girls (n= 198)	78.718	44	0.941	0.047	0.063 (0.040, 0.085)				
Model 1. Configural Invariance	177.846	88	0.927	0.049	0.069 (0.054, 0.083)				
Model 2. Metric Invariance	183.721	98	0.930	0.057	0.064 (0.049, 0.078)	2 vs. 1	5,87	10	ns (0,82)
Model 3. Scalar Invariance	220.669	109	0.909	0.074	0.069 (0.056, 0.082)	3 vs. 2	36,94	11	$p<.001$
Model 4. Scalar Partial ^a Invariance	203.310	107	0.922	0.070	0.065 (0.051, 0.078)	4 vs. 2	19,64	9	ns (0,02)

Notes: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation. Superscript a indicate the intercept that was relaxed to differ across groups: intercept item 4 and 8
p <= 0.01

4. Study 1C

4.1 Specific aims

From early adolescence to adolescence, children and their parents must cope with the transition from elementary to junior middle school. Considering that this transition can cause changes in self-efficacy beliefs, and considering the relevant impact of parents' and adolescents' self-efficacy beliefs on a variety of indicators of academic functioning, the specific aims of this study are: **(a)** to analyze the longitudinal invariance of the PPSE_School scale on three different time points one year apart (T1 = children's age 12; T2 = children's age 13; T3 = children's age 14); **(b)** to analyze the longitudinal invariance of the PESR_Learning scale on three different time points one year apart (T1 = children's age 12; T2 = children's age 13; T3 = children's age 14); and **(c)** to examine the construct validity of the PPSE_School and PESR Learning scales, analyzing their cross-sectional and longitudinal relations with several indicators of adolescents' academic functioning (parental academic aspirations, adolescents' academic aspirations, adolescents' academic achievement).

4.2 Hypotheses

(a) Regarding the first aim, we expect that longitudinal invariance tests would be supported, based on a previous study (Pastorelli & Gerbino, 2001) that has validated the mono-factorial structure of PPSE_School in two samples of parents differed in child's age (one with the children attending middle school; the other with children attending high school).

(b) Regarding the third aim, based on a previous study (Usher & Pajares, 2008) supporting the invariance of the mono-dimensional structure of PESR_Learning scale across school levels, we expect that the longitudinal invariance tests would be supported.

(c) Regarding the third aim, we expect to find positive associations between PPSE_School and adolescents' academic achievement, parental academic aspirations, and adolescents' Efficacy for Self-Regulated Learning, based on previous studies demonstrating positive associations between Perceived Parental Self-Efficacy and children's academic achievement (Hoover-Dempsey, Bassler,

& Brissie; 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider, 1997; Ardel & Eccles, 2001), parental academic aspirations (Bandura, Barbaranelli, Caprara and Pastorelli, 1996) and adolescents' Academic Self-Efficacy (Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Ardel & Eccles, 2001).

Furthermore, based on previous studies evidencing positive associations between Academic Self-Efficacy and children's academic achievement (Zimmerman, Bandura & Martinez-Pons, 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli & Bandura; 2008) and personal academic aspirations (Zimmerman, Bandura & Martinez-Pons, 1992; Zimmerman & Bandura, 1994; Bandura, Barbaranelli, Caprara & Pastorelli, 1996), we expect to find positive associations between PESR_Learning and adolescents' academic achievement and personal academic aspirations.

4.3 Method

4.3.1 Participants and Procedure

The participants in this study were 430 adolescents (232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%), from a longitudinal research program focused on personal and contextual determinants of social adjustment from childhood to young adulthood, already described in Studies 1A-B.

4.3.2 Measures

4.3.2.1. Children's Gender. Children's gender was coded 1 for boys and 2 for girls.

4.3.2.2. Parents' Gender. Parents' gender was coded 1 for fathers and 2 for mothers.

4.3.2.3. Perceived Parental Self-Efficacy in School-Related Performance – PPSE-School.

(Bandura, 1990; Pastorelli & Gerbino, 2001). See paragraph 2.3.2.3 (Study 1A).

Cronbach's alpha reliability coefficients were .87 (T1), .88 (T2), and .91 (T3) respectively.

4.3.2.4 Perceived Efficacy for Self-Regulated Learning – PESR-Learning.

(Bandura, 1990; Bandura et al., 1996; Pastorelli et al., 2001). See paragraph 3.3.2.2 (Study 1B).

Cronbach's alpha reliability coefficients were .85 (T1), .85 (T2), and .87 (T3) respectively.

4.3.2.5 Parental Academic Aspirations - A set of two items was administered to measure mothers' and fathers' educational aspirations for their children at age 12 (e.g., “What level of education do you wish your son/daughter will reach?”; “What level of education do you think your son/daughter will really reach?”). Parents rated the level of academic performance expectations they had for their children on a six-point Likert scale (the educational level ranged from completing middle school to graduating from college).

Pearson correlation coefficient between these two items was .662** ($p < .01$).

4.3.2.6 Adolescents' Academic Aspirations – A set of two items was administered to measure Personal Academic Aspirations at age 12 (e.g., “What level of education do you wish you will reach?”; “What level of education do you think you will really reach?”). Adolescents rated the

level of academic performance expectations they had for themselves and the educational level they expected to complete on a six-point Likert scale (the educational level ranged from completing middle school to graduating from college).

Pearson correlation coefficient between these two items was .766** ($p < .01$).

4.3.2.7 Academic Achievement

The grading system of the Italian middle school (as well as primary school), at the time of our study, was based on a systematic teacher evaluation of student learning using oral and written classwork and homework, as well as attitudes and behavior. Each classroom teacher of different subjects gave each student an overall grade of “excellent”, “very good”, “good”, or “adequate/sufficient” or “not adequate/insufficient”, generally twice a year, at mid-term and at the end of school year. The grade on each subject had to be approved by the Class Council composed of all the teachers of the class. We collected this official school record (belonging to the Italian educational system) for each participating student in four main subject matters (Mathematics, Language, History and English) at the end of the academic term and coded the grades on a scale of 1 (insufficient) to five (excellent).

Cronbach's alpha reliability coefficient was .93 (age 12).

4.3.4 Data analytic approach

In order to examine the longitudinal invariance of the PPSE School and PESR Learning scales, we used the same analytic approach already described above, in Study 1A (see paragraph 2.3.3).

Finally, in order to examine the construct validity of the scales, we performed correlation analyses with the parents' ratings of academic aspirations for their children, with the youths' self-ratings of academic aspirations, the teachers' rating of academic achievement, and among PPSE School-Related Performance and Adolescents' PESR Learning across time.

Data was analyzed using SPSS (Version 18, SPSS Inc., Chicago, IL) and Mplus 7.0 (Muthén & Muthén, 1998–2007).

4.4 Results

Longitudinal Invariance of PPSE School

As reported in Table 11, CFAs confirmed that the mono-factorial hypothesized structure presented an adequate fit in all the three Time Points (Table 11).

The configural model fitted the data, $\chi^2 (165) = 486.87$, $p < .01$, CFI = 0.92, RMSEA = 0.06 (.06, .07), SRMR = 0.04. Metric and Scalar invariance were fully supported, by constraining all the factor loadings [$\chi^2 (179) = 505.92$, $p < .01$, CFI = 0.92, RMSEA = 0.06 (.05, .07), SRMR = 0.05; $\chi^2 (14) = 19.04$, $p = .16$] and all the intercepts [$\chi^2 (193) = 533.10$, $p < .01$, CFI = 0.92, RMSEA = 0.06 (.05, .07), SRMR = 0.06; $\chi^2 (14) = 27.18$, $p = .02$] across time. This result suggests that the construct underlying PPSE School-Related Performance is measured across ages in a similar manner.

TABLE 11
Test of longitudinal measurement invariance of PPSE School-Related Performance scale

	χ^2	df	CFI	SRMR	RMSEA	Model Comparison	χ^2_{diff}	Δdf	$\Delta\chi^2$
T1 Age 12 (n=424)	126,567	14	0.914	0.047	0.138 (0.116, 0.160)				
T2 Age 13 (n= 380)	116,380	14	0.919	0.046	0.139 (0.116, 0.162)				
T13 Age 14 (n= 313)	93,501	14	0.937	0.040	0.134 (0.109, 0.161)				
Model 1. Configural Invariance	486,877	165	0.926	0.049	0.068 (0.061, 0.074)				
Model 2. Metric Invariance	505,920	179	0.925	0.058	0.065 (0.059, 0.072)	2 vs. 1	19,04	14	ns (0,16)
Model 3. Scalar Invariance	533.106	193	0.922	0.068	0.064 (0.058, 0.071)	3 vs. 2	27,18	14	ns (0,02)

Notes: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation.
 $p \leq 0.01$

Longitudinal Invariance of PESR Learning

As reported in Table 12, CFAs confirmed that the mono-factorial hypothesized structure presented an adequate fit in all the three Time Points (Table 12).

The configural model fitted the data, $\chi^2 (459) = 765.08$, $p < .01$, CFI = 0.93, RMSEA = 0.03 (.03, .04), SRMR = 0.04. Metric invariance was fully supported by constraining all the factor loadings [$\chi^2 (481) = 797.53$, $p < .01$, CFI = 0.93, RMSEA = 0.03 (.03, .04), SRMR = 0.05; D $\chi^2 (22) = 32.45$, $p = .07$] across time. Scalar invariance was partially supported by constraining all the intercepts across time except the Time 3 intercept of item 2 (“How well can you study when there are other interesting things to do”; T1 item intercept = 3.65; T2 item intercept = 3.65; T3 item intercept = 3.49), and the Time 1 intercept of item 10 (“How well can you motivate yourself to do school work”); T1 item intercept = 4.06; T2 item intercept = 3.96; T3 item intercept = 3.96) [$\chi^2 (501) = 828.81$, $p < .01$, CFI = 0.93, RMSEA = 0.03 (.03, .04), SRMR = 0.06; D $\chi^2 (20) = 31.28$, $p = .05$], which were not invariant. This result suggests that the construct underlying PPSE School-Related Performance, is measured in a similar way at different ages.

TABLE 12
Test of longitudinal measurement invariance of PESR Learning Scale

	χ^2	df	CFI	SRMR	RMSEA	Model Comparison	χ^2_{diff}	Δdf	$\Delta \chi^2$
T1 Age 12 (n=430)	112,049	44	0.944	0.039	0.060 (0.046, 0.074)				
T2 Age 13 (n= 419)	113,999	44	0.945	0.037	0.062 (0.048, 0.076)				
T13 Age 14 (n= 392)	111,446	44	0.954	0.035	0.063 (0.048, 0.077)				
Model 1. Configural Invariance	765,085	459	0.937	0.041	0.039 (0.034, 0.044)				
Model 2. Metric Invariance	797,532	481	0.935	0.054	0.039 (0.034, 0.044)	2 vs. 1	32,45	22	ns (0,07)
Model 3. Scalar Invariance	847,038	503	0.930	0.060	0.040 (0.035, 0.044)	3 vs. 2	49,50	22	$p < .001$
Model 4. Scalar Partial _a Invariance	828,81	501	0.933	0.059	0.039 (0.034, 0.044)	4 vs. 2	31,28	20	ns (0,05)

Notes: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation. Superscript a indicate the intercept that was relaxed to differ the Time 1 item 10 and Time 3 item 2.

$p \leq 0.01$

Correlation analysis on the full sample

Correlation analysis implemented on the full sample (see Table 13) showed a non-significant association between PPSE School-Related Performance and Adolescents' PESR Learning ($r = .05$; $p > .05$). However, we found positive associations between PPSE School-Related Performance and Parental Academic Aspirations ($r = .19^{**}$, $p < .01$), Adolescent's Academic Aspirations ($r = .12^*$, $p < .05$), and Adolescents' Academic Achievement ($r = .17^*$, $p < .05$). This result suggests that parents who are higher in PPSE School-Related Performance also have higher Academic Aspirations for their children, and their children score higher on Adolescents' Academic Aspirations and Academic Achievement. Furthermore, adolescents' PESR Learning was also positively associated with Parental Academic Aspirations ($r = .27^{**}$, $p < .01$), Adolescents' Academic Aspirations ($r = .29^{**}$, $p < .01$), and Academic Achievement ($r = .34^{**}$, $p < .01$).

TABLE 13
Descriptive Statistics and Correlations among Study Variables Full Sample

	(1)	(2)	(3)	(4)	(5)	M	SD
PPSE-School Age 12 (1)	-					3.85	.69
PESR-Learning Age 12 (2)	.05	-				3.91	.66
Parental Academic Aspirations Age 12 (3)	.19**	.27**	-			4.29	1.48
Children Academic Aspirations Age 12 (4)	.12*	.29**	.51**	-		4.43	1.58
Academic Achievement Age 12 (5)	.17*	.34**	.53**	.33**	-	3.25	.85

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

Correlation analysis separated for mothers and father

Correlation analysis implemented separately for the fathers' and mothers' samples (see Tables 14-15) showed, for both fathers and mothers, positive associations between PPSE School-Related Performance and Parental Academic Aspirations ($r = .36^{**}$, $p < .01$; $r = .15^*$, $p < .05$; for fathers and mothers respectively), and Adolescents' Academic Achievement ($r = .29^{**}$, $p < .01$; $r = .14^*$, $p < .05$; for fathers and mothers respectively), while only a positive association between Maternal PSE

School-Related Performance and Adolescents' Personal Academic Aspirations ($r = .13^*$, $p < .05$; for the mothers sample) was found. Furthermore, PESR Learning was also positively associated for both fathers and mothers with Parental Academic Aspirations ($r = .22^{**}$, $p < .01$; $r = .28^{**}$, $p < .01$; for fathers and mothers respectively), Personal Academic Aspirations ($r = .25^{**}$, $p < .01$; $r = .30^{**}$, $p < .01$; for mothers and fathers respectively), and Adolescents' Academic Achievement ($r = .35^{**}$, $p < .01$; $r = .34^{**}$, $p < .01$; for father and mothers respectively).

TABLE 14
Descriptive Statistics and Correlations among Study Variables Fathers Sample

	(1)	(2)	(3)	(4)	(5)	M	SD
PPSE-School Age 12 (1)	-					3.88	.66
PESR-Learning Age 12 (2)	.17	-				3.95	.68
Parental Academic Aspirations Age 12 (3)	.36**	.22*	-			4.54	1.43
Children Academic Aspirations Age 12 (4)	.09	.25**	.50**	-		4.48	1.57
Academic Achievement Age 12 (5)	.29**	.35**	.50**	.39**	-	3.30	.80

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

TABLE 15
Descriptive Statistics and Correlations among Study Variables Mothers Sample

	(1)	(2)	(3)	(4)	(5)	M	SD
PPSE-School Age 12 (1)	-					3.85	.70
PESR-Learning Age 12 (2)	.02	-				3.91	.66
Parental Academic Aspirations Age 12 (3)	.15**	.28**	-			4.29	1.49
Children Academic Aspirations Age 12 (4)	.13*	.30**	.51**	-		4.43	1.58
Academic Achievement Age 12 (5)	.14*	.34**	.54**	.32**	-	3.25	.87

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

Correlation analysis separated for boys and girls

Correlation analysis implemented separately for boys and girls (see Tables 16-17) showed, only for boys, positive associations between PPSE School-Related Performance and Parental Academic Aspirations ($r = .29^{**}$, $p < .01$; $r = .07$, $p > .05$; for boys and girls respectively), Personal Academic Aspirations ($r = .15^*$, $p < .05$; $r = .06$, $p > .05$; for boys and girls respectively) and Adolescents' Academic Achievement ($r = .21^{**}$, $p < .01$; $r = .11$, $p > .05$; for boys and girls respectively). PESR Learning was positively associated for both boys and girls with Parental Academic Aspirations ($r = .30^{**}$, $p < .01$; $r = .22^{**}$, $p < .01$; for boys and girls respectively), Personal Academic Aspirations ($r = .34^{**}$, $p < .01$; $r = .20^{**}$, $p < .01$; for boys and girls respectively), and Adolescents' Academic Achievement ($r = .34^{**}$, $p < .01$; $r = .34$, $p < .01$; for boys and girls respectively).

TABLE 16
Descriptive Statistics and Correlations among Study Variables Boys Sample

	(1)	(2)	(3)	(4)	(5)	M	SD
PPSE-School Age 12 (1)	-					3.80	.68
PESR-Learning Age 12 (2)	.06	-				3.84	.67
Parental Academic Aspirations Age 12 (3)	.29**	.30**	-			4.23	1.45
Children Academic Aspirations Age 12 (4)	.15*	.34**	.50**	-		4.33	1.67
Academic Achievement Age 12 (5)	.21**	.34**	.58**	.39**	-	3.21	.85

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

TABLE 17
Descriptive Statistics and Correlations among Study Variables Girls Sample

	(1)	(2)	(3)	(4)	(5)	M	SD
PPSE-School Age 12 (1)	-					3.90	.70
PESR-Learning Age 12 (2)	.02	-				3.98	.65
Parental Academic Aspirations Age 12 (3)	.07	.22**	-			4.36	1.52
Children Academic Aspirations Age 12 (4)	.06	.20**	.51**	-		4.55	1.45
Academic Achievement Age 12 (5)	.11	.34**	.48**	.25**	-	3.29	.86

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

Cross-Sectional and Longitudinal Correlations between PPSE School-Related

Performance and PESR Learning

Correlations between PPSE School-Related Performance from Time 1 to Time 3, ranging from .43** to .52**, with the strongest correlation between T1 and T2 measures of PPSE School-Related Performance.

The correlations were also significant between Adolescents' Efficacy for Self-Regulated Learning from Time 1 to Time 3, ranging from .52** to .61**.

Finally, correlations between Parental Self-Efficacy in School-Related Performance and Adolescents' Efficacy for Self-Regulated Learning assessed across time tended to be positive, with the highest significant correlation of .27** at T3 (see Table 18).

TABLE 18
Cross-Sectional and Longitudinal Correlations among PPSE-School and PESR-Learning

	(1)	(2)	(3)	(4)	(5)	(6)
PPSE-School Age 12 (1)	-					
PPSE-School Age 13 (2)	.52**	-				
PPSE-School Age 14 (3)	.45**	.43**	-			
PESR-Learning Age 12 (4)	.05	.11*	.18**	-		
PESR-Learning Age 13 (5)	.11*	.15**	.26**	.56**	-	
PESR-Learning Age 14 (6)	.09	.12*	.27**	.52**	.61**	-

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescence Perceive Efficacy Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

5. Discussion and Conclusions

The aims of the study were to analyze the psychometric properties of the Perceived Parental Self-Efficacy in School-Related Performance scale (Bandura, 1990; Pastorelli & Gerbino, 2001), and the Perceived Efficacy for Self-Regulated Learning scale (Bandura, 1990; Pastorelli et al., 2001) in the Italian context from early adolescence to adolescence, considering gender and longitudinal invariances, and to further examine the construct validity of the both scales with several indicators of children's academic adjustment: Adolescents' and Parents' Academic Aspirations and Adolescents' Academic Achievement.

Firstly (**Study 1A**), we assessed the mono-dimensional factorial structure of the 7-item Perceived Parental Self-Efficacy in School-Related Performance scale and its measurement invariance across parents' gender (fathers and mothers), and children's gender (parents of boys and parents of girls). Our findings confirmed the mono-factorial hypothesized model (Bandura, 1990; Pastorelli & Gerbino, 2001; Bandura, 2006). Moreover, with respect to the invariance of the PPSE_School across fathers and mothers and across children's gender, our results support the mono-dimensionality of the scale, demonstrating that the 7 items of the scale measure a common factor. Specifically, metric and scalar invariances were fully supported, suggesting that the construct underlying PPSE_School measures mothers and fathers, and parents of boys and girls in a similar manner. Despite previous results indicating higher mean levels of PPSE_School in mothers than fathers (Pastorelli & Gerbino, 2001; Caprara, Regalia, Scabini, Barbaranelli, Bandura, 2004), our results suggest the absence of significant differences between mothers and fathers in the mono-factorial structure of the scale.

Secondly (**Study 1B**), we assessed the mono-dimensional factorial structure of the 11-item Perceived Efficacy for Self-Regulated Learning scale and its measurement invariance across children's gender (boys and girls). Our findings confirmed the mono-factorial hypothesized model (Bandura, 1990; Usher & Pajares, 2008) (see Table 7). In particular, our results supported a partial scalar invariance across boys and girls. Contrary to the hypothesis, the intercept of items 4 ("How

well can you take class notes of class instruction”) and 8 (“How well can you remember information presented in class and textbooks”) were not invariant across boys and girls, with a higher mean in boys for both items (see Table 8). However, except for these two items, our result concurs with the results of Usher & Pajares (2008), supporting the invariant mono-factorial structure on PESR_Learning across boys and girls.

Finally (**Study 1C**), we examined the longitudinal invariance of both scales across time (T1 = child’s age 12 years; T2 = child’s age 13 years; T3 = child’s age 14 years), and their construct validity in the full sample, separated by parents’ and children’s gender, and at the longitudinal level.

Regarding the longitudinal invariance of the PPSE_School scale, our results support the mono-dimensionality of the scale across time. Specifically, longitudinal metric and scalar invariances were completely supported; this result is consistent with previous psychometric studies, in which the mono-factorial structure of the PPSE_School scale was found in parents of junior and senior high school students (Pastorelli & Gerbino, 2001).

Regarding the longitudinal invariance of the PESR_Learning scale, our results support a partial longitudinal scalar invariance across time. The intercept of item 2 at Time 3 (“How well can you study when there are other interesting things to do”), and the intercept of item 10 at Time 1 (“How well can you motivate yourself to do school work”) were not invariant across time, with a lower mean in Time 3 for item 2, and a higher mean in Time 1 for item 10. Thus, except for these two items, our results concur with that of Usher & Pajares (2008), supporting the invariant mono-factorial structure on the PESR_Learning across time.

Lastly, construct validity is demonstrated by the positive associations between PPSE_School and parental/personal academic aspirations and adolescents’ academic achievement, and positive associations between PESR_Learning and parental/personal academic aspirations and adolescents’ academic achievement in the full sample. These findings support our hypothesis and are in line with previous studies showing positive associations between parental self-efficacy and indicators of academic functioning (Hoover-Dempsey, Bassler, & Brissie; 1992; Bandura, Barbaranelli, Caprara

and Pastorelli, 1996; Bogenschneider, 1997; Ardel & Eccles, 2001), and between academic self-efficacy and indicators of academic functioning (Zimmerman, Bandura & Martinez-Pons, 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli & Bandura; 2008). Additionally, the same patterns of significant associations were found in samples of mothers and boys, whereas in the sample of fathers PPSE_School was not significantly associated with children's academic aspirations, and in the sample of girls PPSE_School was not significantly associated with any indicator of academic functioning, thereby revealing significant gender differences.

Finally, regarding the longitudinal correlations, we found significant associations among PPSE_School from Time 1 to Time 3, and among PESR_Learning from Time 1 to Time 3, suggesting high stability of the considered constructs from early adolescence to adolescence.

Future research should also address and overcome several limitations of the present study.

Firstly, due to the psychometric nature of this study, we did not consider potential mediators or moderators of the identified relationships between PPSE_School and PESR_Learning and indicators of adolescents' academic functioning.

We cannot exclude that the identified relations could be moderated or mediated by other variables (e.g., family Socio Economic Status) or that our variables of interest (PPSE_School, PESR_Learning) could moderate or mediate the relationship between academic functioning and parents temperamental or personality traits, for instance.

Secondly, we did not investigate the construct validity of the PPSE_School scale in relation to the other identified dimensions of the Multidimensional Parental Perceived Self-Efficacy scales (Bandura, 1990; Pastorelli & Gerbino, 2001); and the PESR_Learning scale in relation to other dimensions of the Children Perceived Self-Efficacy scales (Bandura, 1990; Bandura et al., 1996; Pastorelli et al., 2001).

Lastly, future research should further examine the gender differences found in the present study.

Future studies should make these limitations clear.

Despite these limitations, we maintain that this study represents a step forward in the investigation of parental and personal self-efficacy beliefs in the school context, providing valid instruments to assess self-efficacy beliefs in the scholastic domain during the critical students' passage to middle school that is often characterized by several challenges that both parents and children must face. This study confirms the significant role of self-efficacy beliefs in acting as a protective factor for children's academic adjustment and it provides reliable instruments in term of prevention and intervention programs in the school context.

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CHAPTER III

Development of Perceived Parental Self-Efficacy in School-Related Performance during Adolescence and later Academic Achievement

STUDY 2

Development of Perceived Parental Self-Efficacy in School-Related Performance during Adolescence and later Academic Achievement

Abstract

This study investigates (a) the mean-level change in Perceived Parental Self-Efficacy in School-Related Performance (PPSE-School) from early adolescence to adolescence and (b) the relationship between the developmental course of PPSE-School and students' academic achievement assessed by teachers at the end of middle school. We examined a longitudinal dataset derived from the Genzano Longitudinal study which focused on personal and contextual determinants of social adjustment from childhood to young adulthood. Participants were 430 Italian adolescents (232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%) assessed over a 3-year period (children's age was 12, 13, and 14 years). An Unconditional Latent Growth Curve Model (LGCM) indicated a linear decrease of PPSE-School over the considered timeline. Secondly, the normative linear decrease of PPSE-School has a positive association with students' Academic Achievement at T3 (students' age of 14 years at the end of middle school), controlling for the initial level of students' Academic Achievement (students' age of 12 years at the first year of middle school). Lastly, high family socio-economic status was positively and significantly associated with high initial level of PPSE_School. In general, this study advances our knowledge on the normative developmental course of Perceived Parental Self-Efficacy in the scholastic domain during the transition to adolescence also supporting the key role plays by Parental Self-Efficacy in influencing later students' academic adjustment. Our findings' implications are discussed.

Keywords: perceived parental self-efficacy in school-related performance, academic achievement, developmental transition, early adolescence, latent growth curve analysis.

1. Introduction

Despite theoretical and empirical evidences have shown the crucial role plays by parental self-efficacy in affecting children's adjustment, we do not know much about its developmental course during the transition from early adolescence to adolescence. In particular, the limited number of studies on the developmental change of parental self-efficacy suggests that it varies with the children's age, supporting the lowest levels of parental self-efficacy especially in adolescence (Ballenski & Cook, 1982).

In fact, the typical changes in parent-child relationship and children's behavior during adolescence might predict a developmental decline in parental self-efficacy, thereby influencing the parents' views of and expectations (Glatz & Buchanan, 2015a).

However, to the best of our knowledge, with the exception of the study of Glatz & Buchanan (2015a), there are no other studies that have focused on the developmental course of parental self-efficacy during adolescence.

Accordingly, the present study had two primary aims: first, we attempt to examine the normative developmental course of parental self-efficacy in the scholastic domain from early adolescence to adolescence (from 12 to 14 years of children's age), being this transition characterized by the Italian students' passage from elementary to middle school. Second, we aim to investigate the relationship between the normative developmental course of parental self-efficacy and students' academic achievement at the end of middle school (students' age of 14 years), taking into account previous levels of students' academic achievement (students' age of 12 years).

In Italy, the school transition from elementary to middle school is distinguished by several changes that both parents and children must face. For example, the middle school system requests teachers to teach more formally their subjects and to adopt an evaluation system able to detect more stringently the progress during the school year. In this way student face regular evaluation on each subject. Also, there is an increase in the complexity of educational programs related to the school

subjects. Overall, students might find challenging the learning process of new subjects and related concepts, as well as the time-management of their school and after school activities.

At the same time, during the passage to middle school, students expand their friendships and start to spend more free time outside the home.

Considering all these changes, parents might experiment difficulties in helping their growing children in the academic work, in persuading them to persist in front the potential failures and definitively to value the importance of school.

1.2. Normative Developmental Course of Perceived Parental Self-Efficacy in School-Related Performance during Adolescence

A large body of research supports the idea that parents play a crucial role in affecting their children's academic adjustment (Eccles & Harold, 1996). The literature on parental school-involvement, defined in terms of parental engagement in school activities, communication with school and helping children with homework, (Stevenson & Baker, 1987), provide empirical evidences on its dramatic decline during the transition from elementary to junior high school (Epstein, 1986).

In this regard, Eccles & Harold (1996) suggest that a variety of variables could undermine parental-school involvement from childhood to adolescence, such as parents, community, child and school's characteristics. Specifically, during adolescence, parents may perceive their children's need for autonomy, and consequently they could assume that their school involvement should decline to satisfy their children's desire for independence. Furthermore, during the transition from elementary to junior high school, the decline in parental school-involvement may result from a decrease in the parents' sense of competence in helping their children in more advanced homework and academic goals, which require greater autonomy and responsibility of the student.

In this frame parental self-efficacy in the school domain constitutes one of the key factor in the study of the role parents may have in contributing to their children's academic success.

Furthermore, analyzing parental efficacy developmentally will help our understanding of its normative course. In fact, we do not know much about its age-related changes during various phases of development (Coleman & Karraker, 1998; Jones & Prinz, 2005).

Accordingly, in this section, we will describe previous studies that have focused on the developmental trajectory of parental self-efficacy.

The few studies that have examined the developmental course of parental self-efficacy, two of them focused on early childhood (Weaver, Shaw, Dishion, and Wilson, 2008; Lipscomb, Leve, Harold, Neiderhiser, Shaw, X., & Reiss, 2011), and the other two studies on adolescence (Ballenski & Cook, 1982; Glatz & Buchanan, 2015a).

In particular, a recent study by Lipscomb, Leve, Harold, Neiderhiser, Shaw, X., & Reiss (2011) longitudinally assessed a sample of 382 adoptive families during infancy when the children's age was 9, 18, and 27 months old. Perceived parental self-efficacy was measured using the Parenting Efficacy Scale (Teti & Gelfand, 1991) that consists of nine items addressing maternal self-efficacy beliefs in specific areas of infant care (e.g.: changing and bathing the baby) and one item addressing a general sense of parental competence. Results showed a significant decrease over time in parental self-efficacy for mothers, but not for fathers, and lower initial levels of self-efficacy for fathers as compared to mothers.

Another longitudinal study, conducted during toddlerhood by Weaver, Shaw, Dishion, and Wilson (2008), investigated the change over time in parental self-efficacy and its relationship with later children's problem behaviors in a sample of 652 ethnically and geographically diverse mothers and children who were at high risk for conduct problems (they were assessed annually from 2 to 4 years old). Using the 10-item Efficacy subscale of the Parenting Sense of Competence Scale (Johnston & Mash, 1989), that is a domain-general measure for the assessment of parental self-efficacy in their parenting role, results evidenced that maternal self-efficacy significantly increases between ages 2 and 4 and higher initial levels of maternal self-efficacy predicted lower children's conduct problems at the age of 4 years. Results of these two studies during earlier development period

attest to the need of further studies aimed at examining the developmental course of parental efficacy in order to.

Of interest to our study, only two studies have considered the adolescence period and only one used a longitudinal design (Glatz & Buchanan, 2015a).

The cross-sectional study of Ballenski & Cook (1982) considered samples of parents of infants (birth to 13 months), toddlers (14 to 36 months), preschoolers (3 to 5 years), school-age children (6 to 12 years), and adolescents (13 to 18 years). Parental self-efficacy was assessed using different age-related parenting tasks (e.g.: infants: “Caring for physical needs”; toddlerhood: “Learning to be away from mother”; preschool: “Helping child control emotions”; school-age: “Decision Making”; adolescence: “Child’s independence”). The results showed that two groups of parents were noticeably different from the others: parents of pre-school children with the highest self-efficacy and parents of adolescents with the lowest.

More recently, Glatz & Buchanan (2015a) conducted a three waves longitudinal study to examine parental efficacy in a sample of 398 parents and children from preadolescence (age:11/12) to adolescence (age: 14/15). In particular, perceived parental self-efficacy was assessed using two measures: the first assessed parents’ beliefs in their ability in “Maintaining adequate limits for the child,” “Adjusting to the child’s demands for independence,” “Dealing with the child’s demands for privacy,” “Dealing with moodiness in the child,” “Dealing with rebellious or defiant behavior in the child,” and “Dealing with conflicts with the child”; the second assessed how much parents believed they could influence their child to “Get the child to stay out of trouble in school,” “Help the child get good grades in school,” “Increase the child’s interest in school,” “Prevent the child from getting in with the wrong crowd,” and “Prevent the child from doing things they do not want him or her to do outside the home” (Freedman-Doan, Arbretton, Harold, and Eccles, 1993). In both constructs, the results showed a linear decrease over time in perceived parental self-efficacy.

In sum, few longitudinal studies have examined the developmental course of perceived parental self-efficacy during early developmental years (Weaver et al., 2008; Lipscomb et al., 2011),

and only one focused on the transition to adolescence (Glatz & Buchanan, 2015). In light of this later study there is some evidence supporting a developmental decline in parental self-efficacy during adolescence. However, longitudinal model of growth is necessary to further elucidate the changes that occur in parental self-efficacy beliefs during this critical and challenging developmental period, for both parents and children and also to examine its longitudinal impact on adolescents' adjustment.

1.3. Perceived Parental Self-Efficacy and Scholastic Adjustment

Perceived Parental Self-Efficacy in School-Related Performance refers to parents' beliefs in their personal efficacy to promote their child's interest in, and evaluation of education, to motivate them for academic pursuits, and to assist them with their school homework (Bandura, 1990; Pastorelli & Gerbino, 2001). Parents who are involved in their children's scholastic matters and who believe that they can contribute to their children's academic achievement, can affect children's intellectual and academic development (Bandura, Barbaranelli, Caprara and Pastorelli, 1996).

A set of empirical evidences is convergent in highlighting the mediational role of parental academic involvement (Hoover-Dempsey et al., 2001) and parental academic aspirations (Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Wentzel, 2002) in the relationship between parental self-efficacy and children's academic achievement.

The study conducted by Hoover-Dempsey et al. (Hoover-Dempsey, Bassler, & Brissie; 1992) confirmed significant associations between parental self-efficacy beliefs and several indicators of parental involvement in school activities. Specifically, the study was conducted in a sample of 390 parents of children from elementary school using a specially developed 12-item Parent Perceptions of Parent Efficacy Scale. Results showed significant positive associations between parental self-efficacy beliefs and hours of parent's classroom volunteering, hours spent on children educational activities, and less number of telephone calls with the teacher. Finally, in their review, Hoover-Dempsey et al. (2001) demonstrated that parental self-efficacy consistently plays a significant role in

parents' involvement in their children's homework and in influencing their children's self-regulated learning skills and academic achievement.

Furthermore, in a sample of 279 Italian mothers and their children attending middle school, Bandura, Barbaranelli, Caprara and Pastorelli (1996) found that both parental academic efficacy and parental academic aspirations contribute to children's academic achievement. Parents with high self-efficacy select and construct a productive environment conducive to the developmental success during school transitions. They also found that the relationship between parental academic self-efficacy and academic achievement was mediated by children's perceived self-efficacy and parental academic aspirations (Bandura, et al., 1996).

Overall, the results of several studies that focused on parental involvement (Bogenschneider et al., 1997; Hoover-Dempsey et al., 2001) are consistent in supporting the role that parents play in influencing children's academic outcomes. However, research analyzing these aspects during the transition to adolescence is still limited, especially in the area of parental academic self-efficacy (Bandura et al., 1996; Ardel & Eccles, 2001). Accordingly, research is needed to further investigate these relations, especially during the transition to middle school that is often associated with more stringent academic demands and greater challenges for both parents and children.

1.4. The Present Study

Considering the lack of studies focusing on the normative developmental trajectory of parental self-efficacy during adolescence (e.g.: Glatz & Buchanan, 2015a), and considering its relevance during this transitional period in affecting different aspects of the adolescents' adjustment, the overall aim of the present study is to identify the normative developmental trajectory of parental self-efficacy during the transition to middle school, using an Italian sample of parents and their children, and to examine its association with adolescents' later academic achievement.

The specific aims of the present study are: **(a)** to investigate the longitudinal developmental course of Perceived Parental Self-Efficacy in School-Related Performance from early adolescence to adolescence (PPSE_School; Bandura, 1990; Pastorelli & Gerbino, 2001); **(b)** to examine the association between the developmental trajectory of PPSE_School and adolescents' later academic achievement (age 14) controlling for the initial level of adolescents' academic achievement (age 12), child's gender and family socio-economic status.

In term of hypotheses, regarding the first aim, we expect to identify a linear decrease over time in perceived parental self-efficacy, based on the study of Glatz & Buchanan (2015a) which shows a developmental decline in parental self-efficacy from early adolescence to middle adolescence. Specifically, we are inclined to think that adolescents' biological and behavioural changes, along with the normative changes in their relationship with their parents, may lower parents' expectation and beliefs related to their parental role and undermine parental beliefs in their capacity to promote their children's positive academic development.

Accordingly, we expect to confirm a linear decrease of parental self-efficacy in school-related performance from early adolescence to adolescence.

Regarding the second aim, we expect to find a positive association between the developmental course of PPSE_School and adolescents' later academic achievement, based on previous studies evidencing positive associations between perceived parental self-efficacy and children's academic

achievement (Hoover-Dempsey, Bassler, & Brissie; 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider et al. 1997; Ardel & Eccles, 2001).

Furthermore, regarding adolescents' gender, the study of Glatz & Buchanan (2015) suggested that parents of adolescent boys have higher initial levels of self-efficacy beliefs than parents of adolescent girls; parents of boys also have a greater decrease in self-efficacy beliefs over time than parents of girls. However, the authors showed that the effect of the child's gender disappears when they considered the weight of other variables relevant to adolescence (such as pubertal status). Accordingly, although we do not advance a strict hypothesis on the effects of children's gender, we nevertheless expect to confirm the results of Glatz & Buchanan's (2015a) study.

Finally, we expect to find a positive association between family socio-economic status and the initial levels of parental self-efficacy in school-related performance, based on a previous study (Glatz & Buchanan, 2015a) highlighting a positive association between family income and the initial levels of Perceived Parental Self-Efficacy. In this area, empirical evidence suggests that parents who experience more difficult parenting situations, such as high economic pressure and limited financial resources, report lower parental self-efficacy than parents who live in privileged circumstances and who have more resources to positively affect their children's development (Jones & Prinz, 2005; Glatz & Buchanan, 2015a).

2. Method

2.1 Participants and Procedure

The participants in this study were 430 adolescents (232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%), already described in Study1 (see paragraphs 2.3.1 and 3.3.1, Chapter II).

The data collections schema, differentiated by cohort, is reported in Table 1; the sample size over time is reported in Table 2.

Table 1
Data Collections schema differentiated by cohort

	Cohort 1 (years)	Cohort 2 (years)	Cohort 3 (years)
1994	12		
1995	13	12	
1996	14	13	12
1997		14	13
1998			14

Table 2
Descriptive statistics of the measures and Sample size

Children's Age	Adolescents Sample (% boys)	Parents Sample (% mothers)
12	430 (54%) AC_ACH	424 (76%) PPSE_School
13		380 (78%) PPSE_School
14	379 (54%) AC_ACH	313 (76%) PPSE_School

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance; AC_ACH = Academic Achievement.

2.2 Measures

2.2.1 Children's Gender. Children's gender was coded 1 for boys and 2 for girls.

2.2.2 Family Socio Economic Status - SES. Family Socio Economic Status was based on the occupation and education of the parents as reported by themselves. We performed a confirmatory

factor model where SES was defined by parents' education and occupation. We used weighted least square estimators with robust standard errors, and mean and variance adjusted chi-squared test statistics (WLSMV) as a method of estimation (see Muthén, 1998-2012). This method is particularly suited for dealing with non-normal or categorical data (Flora & Curran, 2004). After establishing the mono-dimensionality of this set of indicators (53% of variance explained), we estimated the factor score of SES. This variable was included as proxy of family SES in all subsequent analyses

2.2.3 Perceived Parental Self-Efficacy in School-Related Performance – PPSE-School

(Bandura, 1990; Pastorelli & Gerbino, 2001).

See paragraph 2.3.2.3 (Study 1A, Chapter II).

Cronbach's alpha reliability coefficients were .87 (T1), .88 (T2), and .91 (T3) respectively.

2.2.4 Academic Achievement

See paragraph 4.3.2.7 (Study 1C, Chapter II).

Cronbach's alpha reliability coefficients were .93 (T1) and .87 (T3) respectively.

2.3 Data analytic approach

We preliminarily computed the descriptive statistics of the study variables and the (r Pearson correlations) associations among them, within and across three-time points.

Latent Growth Curve Modeling approach (LGCM; Duncan & Duncan, 2004; Bollen & Curran, 2006) was used to assess inter-individual differences in intra-individual change over time.

Two latent factors were estimated to model the change in Perceived Parental Self-Efficacy in School-Related Performance. The first factor was the intercept, that represented the initial level of Perceived Parental Self-Efficacy in School-Related Performance (age 12). The second factor was the slope of the rate of change over time (i.e. linear or nonlinear). We fixed the starting point for Perceived Parental Self-Efficacy in School-Related Performance at T1 (age 12) at 0 for all the models. Three unconditional models were tested to understand which was the best fitting model for our data.

1. No growth model. Firstly, we tested a no growth model that was an intercept-only model excluding any pattern of change over the time points (Model 1).

2. Linear growth model. Secondly, we tested a linear growth model that hypothesized a linear pattern of change (or a constant change) over the time points (Model 2).

3. Non-linear growth model. Finally, we tested a non-linear growth model with no "a priori" specified form of change from T1 to T3 (Model 3).

We first examined a no growth model (intercept only), followed by a linear model (constant change over time), and lastly a non-linear growth model. Because all these models were nested, we performed a Chi-square difference test (χ^2) in order to identify the best fitting model for our data (Kline, 2010). Finally, after established our baseline model, we tested our conditional growth model that examined the relationship between the developmental course of Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Academic Achievement at the end of middle school (T3: students' age of 14 years), controlling for the initial level of students' Academic Achievement (T1: students' age of 12 years), adolescents' Gender, and family Socio-Economic Status. For this purpose, we implemented a structural equation model (SEM) with maximum-likelihood estimation of the parameters, and the model fit was evaluated using the following standard procedures: χ^2 likelihood ratio statistic, comparative fit index (CFI), Tucker Lewis Index (TLI), root mean square error of approximation (RMSEA) with 90% confidence interval (CI), and SRMR values lower than .08 (Kelloway, 1998). We accepted models with RMSEA <.07, CFI and TLI >.90 (Kline, 2010).

2.4 Results

2.4.1 Preliminary Analysis

Observed means and standard deviations for study variables are presented in Table 3.

Almost all the variables were positively associated with each other.

Specifically, Adolescents' Gender was positively and significantly related with PPSE School-Related Performance at T2 ($r=.15^{**}$). Having an adolescent girls was associated with higher beliefs

in managing and promoting her academic development. Socio-Economic Status associated positively and significantly with T1 and T2 measures of PPSE School-Related Performance ($r=.14^{**}$, $r=.12^{**}$; respectively), and also with Academic Achievement across time ($r=.28^{**}$, $r=.23^{**}$; respectively for T1 and T3). Correlations between PPSE School-Related Performance from Time 1 to Time 3 ranged from $.43^{**}$ to $.52^{**}$, with the strongest correlation between T1 and T2 measures of PPSE School-Related Performance.

Lastly, T1 measure of PPSE School-Related Performance correlated positively and significantly with Adolescents' Academic Achievement assessed across time ($r=.17^{**}$, $r=.11^{*}$, respectively for T1 and T3); and PPSE School-Related Performance measured at T3 correlated positively and significantly with Academic Achievement at T3 ($r=.20^{**}$) (Table 3).

Finally, the means of PPSE School-Related Performance showed a decrease over time (5.27, 5.20, 5.06 respectively for the three Time Points)

Table 3

Descriptive statistics and Correlations for all the variables studied

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	M	SD
Adolescents' Gender (1)	-							-	-
Socio Economic Status (2)	-.01	-						.00	1.0
PPSE-School T1 (3)	.07	.14**	-					5.27	1.04
PPSE-School T2 (4)	.15**	.12**	.52**	-				5.20	1.04
PPSE-School T3 (5)	.05	.05	.45**	.43**	-			5.06	1.09
Academic Achievement T1 (6)	.04	.28**	.17**	.05	.08	-		3.25	.85
Academic Achievement T3 (7)	.08	.23**	.11*	.05	.20**	.74**	-	2.90	.95

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

2.4.2 Unconditional models of growth curve analysis: Developmental trajectories of Perceived Parental Self-Efficacy in School-Related Performance

Preliminary analysis supported the associations among the study variables, so we explored a series of structural equation models (SEMs) to understand the longitudinal developmental course of PPSE in School-Related Performance across the three-time points.

We tested three unconditional models to identify the best fitting model for the developmental change of PPSE School-Related Performance during the transition from early adolescence to adolescence. The unconditional models examined the no-change, linear and non-linear change of PPSE-School-Related Performance across the time. All three tested models revealed acceptable (model 1) or adequate (models 2 and 3) fit indices (Table 4). The chi-square difference ($\Delta\chi^2$) test of significance for nested models was used to identify the best fitting model for our data.

The change in overall chi-square between the no growth model, [$\chi^2(5) = 16.86, p = .00$, RMSEA = 0.07 (.03, .11), CFI = 0.94, TLI = 0.96, SRMR = 0.09], and the linear growth model, [$\chi^2(2) = 2.20, p = .33$, RMSEA = 0.01 (.00, .09), CFI = 0.99, TLI = 0.99, SRMR = 0.06], was significant [$\Delta\chi^2(3) = 14.66; p < .01$], indicating that there was a growth (change across the time) in our variable (PPSE School-Related Performance). The linear growth model (Model 2) was therefore chosen over the no growth model (Model 1). We then examined the change in overall chi-square between the linear growth model and the non-linear growth model [$\chi^2(1) = 0.85, p = .35$, RMSEA = 0.00 (.00, .12), CFI = 1.00, TLI = 1.00, SRMR = 0.01]. This last comparison between the two models was not significant, ($\Delta\chi^2(1) = 1.35; p = .24$), suggesting that the linear growth model was a better fit, showing a decreasing trend of our variable across time (Figure 1).

The significant mean of the intercept ($M = 5.28, p < .001$) indicated that the parents reported a positive average starting point different than zero at age 12, and the significant variance of the intercept showed that there was inter-individual variability around this mean ($I = .66, p < .001$). The mean of the slope was significant and negative ($M = -.09, p < .01$), suggesting that PPSE School-Related Performance tended to decline in a linear fashion over time. The variance of the linear slope was not significant ($S = .059, p = .11$), indicating no inter-individual variability in growth over time. Finally, the correlation between intercept and slope was significant and negative ($-.436^{**}, p < .01$),

meaning that high initial level of PPSE School-Related Performance was negatively associated with the linear decrease of PPSE School-Related Performance.

Table 4

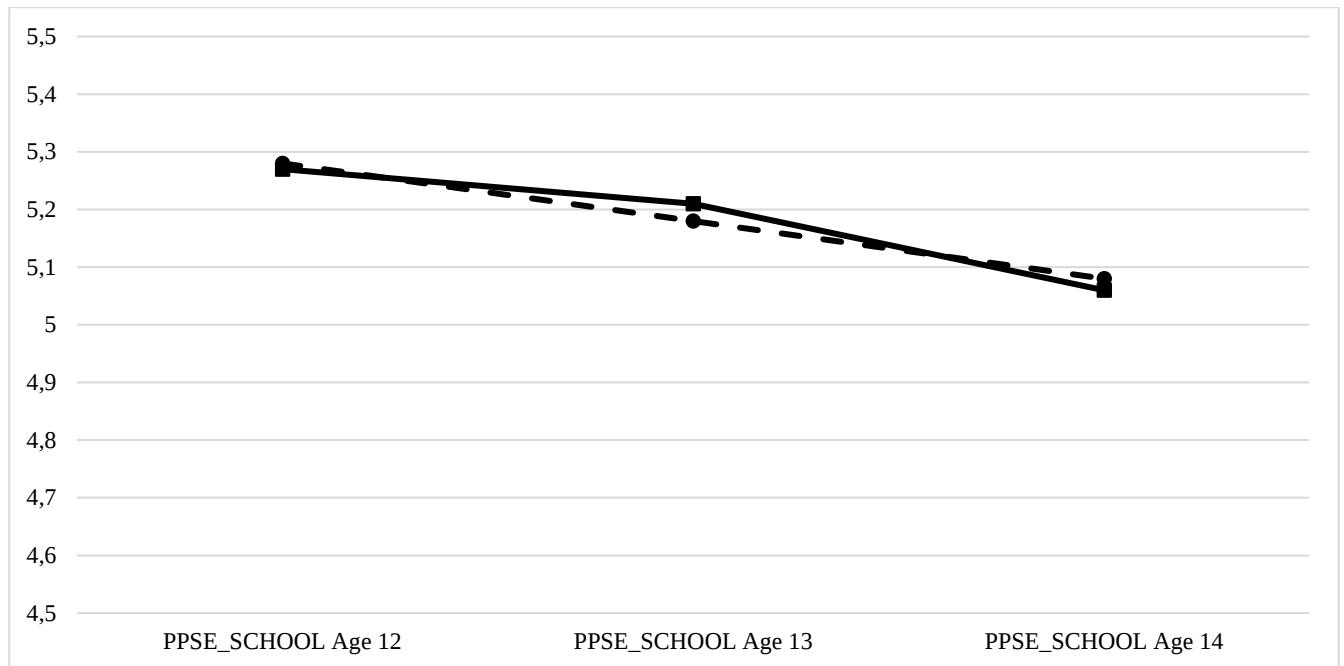
Latent Growth Curve unconditional models for PPSE School-Related Performance

	χ^2	df	p	CFI	TLI	SRMR	RMSEA	MC	χ^2_{diff}	Δdf	$\Delta\chi^2$
<i>PPSE School</i>											
1. No growth	16,86	5	0,00	0,94	0,96	0,09	0,74 (0,03-0,11)				
2. Linear Growth	2,20	2	0,33	0,99	0,99	0,06	0,01 (0,00-0,09)	1 vs 2	14,66	3	0,00
3. No Linear Growth	0,85	1	0,35	1,00	1,00	0,01	0,00 (0,00-0,12)	2 vs 3	1,35	1	0,24

Note: χ^2 = Chi-square Goodness of Fit; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residuals; RMSEA = Root Mean Square Error of Approximation; MC = Model Comparison; χ^2_{diff} = Chi-square difference test; Δdf = Δ degrees of freedom; $\Delta\chi^2$ = Δ Chi-square *p* value.

Figure 1

Latent Growth Curve Analyses of PPSE School-Related Performance



Note: PPSE – SCHOOL = Perceived Parental Self-Efficacy in School Related Performance. Solid line refers to sample's means. Dashed line refers to estimated means.

2.4.4 Conditional models: The role of LGCM of Perceived Parental Self-Efficacy in School-Related Performance in predicting Academic Achievement during the transition to adolescence

After establishing the best fitting growth curve model for the longitudinal development of PPSE School-Related Performance, we added Adolescents' Gender and family Socio-Economic Status as time invariant covariates. To evaluate the contribution of the initial level of PPSE School-Related Performance and its change over time on Academic Achievement, we tested a model considering junior high school grades reported by the teachers at the end of junior high school (8th grade), also controlling for the initial level of junior high school grades (6th grade) (Figure 2). This model revealed an excellent fit to the data [$\chi^2(7) = 13.252$, $p < .06$, CFI = .98, TLI = .96, RMSEA = .04 (.00, .08), SRMR = .04]. The structural relations among the variables are presented in Figures 2. As shown in the figure, the linear slope of PPSE School-Related Performance positively predicted

the final level of students' Academic Achievement (T3; age 14), controlling for their initial level of Academic Achievement (T1; age 12), for their Gender and for their Socio-Economic Status.

Specifically, Academic Achievement at age 12 was significantly and positively related to the initial level (intercept) of PPSE School-Related Performance ($\beta = .148^*$; $p < .05$) but not related to the linear growth curve (slope) of PPSE School-Related Performance ($\beta = -.137$; $p = .29$). This result indicates that, even though the higher level of Academic Achievement at age 12 was associated with higher initial level of PPSE School-Related Performance, it did not predict the developmental trajectory of PPSE School-Related Performance during adolescence.

Regarding the intercept and slope factors of PPSE School-Related Performance, results showed that only the slope was significantly and positively associated with Academic Achievement at age 14 (intercept factor: $\beta = .125$; $p = .16$; slope factor: $\beta = .365^{**}$; $p < .01$), suggesting that the less linear decrease of PPSE School-Related Performance was associated to higher level of Academic Achievement (age 14) at the end of junior high school.

Finally, as expected, Academic Achievement at T1 significantly predicted Academic Achievement at T3, indicating high stability during the junior high school years ($\beta = .760^{***}$; $p < .001$).

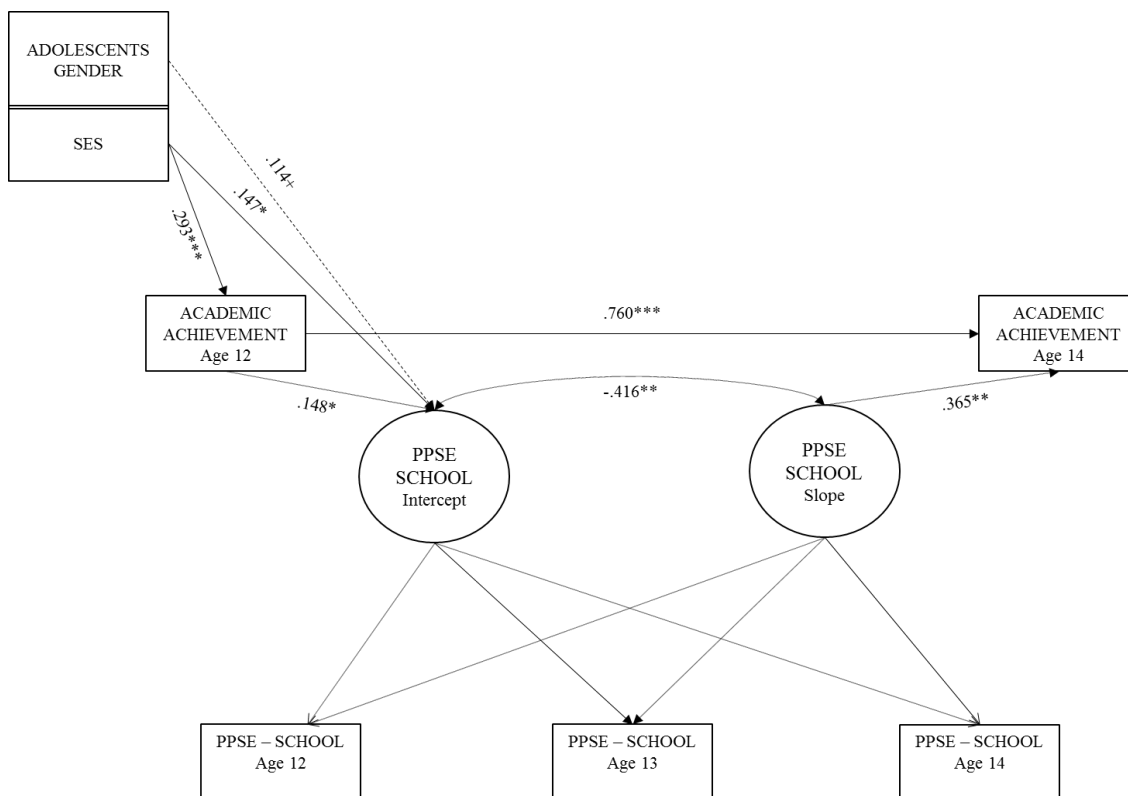
Lastly regarding the two covariates, Adolescents' Gender and family Socio-Economic Status, we found only an approaching significant association between Adolescents' Gender and the initial level of PPSE School-Related Performance [$\beta = .114$; $p = .06$]. However, family Socio-Economic Status associated significantly and positively with the initial levels of both Academic Achievement ($\beta = .293^{***}$; $p < .001$) and PPSE School-Related Performance ($\beta = .147^*$; $p < .05$), suggesting that higher Socio-Economic Status was associated with higher children's Academic Achievement at age 12, and with higher initial level of PPSE School-Related Performance. However, family Socio-Economic Status was not associated with the slope factor of PPSE School-Related Performance ($\beta = -.077$; $p = .57$), and did not predict Academic Achievement at age 14 ($\beta = .037$; $p = .51$).

Overall, the model explains a significant percentage (65%) of the variance of junior high school Academic Achievement at T3.

Finally, considering that we found a cohort effect for Academic Achievement measured at age 12 [$F(2,427) = 6.528, p < .01$] and 14 [$F(2,376) = 35.72, p < .001$], we repeated the complete set of analyses, controlling for the cohort effect. Specifically, we included in our analyses one categorical variable coded 0 (cohort 1), 1 (cohort 2) and 2 (cohort 3). Notably, the results remained the same when compared with those in which we controlled for cohort effects.

Figure 2

Latent Growth Curve conditional model



Note: $\chi^2 = 13.252$; $df = 7$; $p = .06$; CFI = .989; TLI = .969; RMSEA = .04 (C.I. = .00-.08); SRMR = .04. R^2 = Intercept: 7%; Slope: 3%; PPSE – SCHOOL Age 12: 61%; PPSE – SCHOOL Age 13: 48%; PPSE – SCHOOL Age 14: 48%; Academic Achievement Age 12: 8%; Academic Achievement Age 14: 65%. All the reported parameters are standardized. Not significant paths are not shown. PPSE SCHOOL = Perceived Parental Self-Efficacy School Related Performance; SES = Socio Economic Status. $^* = p < .05$; $^{**} = p < .01$; $^{***} = p < .001$.

3. Discussion and Conclusions

The aims of this study were **(a)** to investigate the longitudinal developmental course of Perceived Parental Self-Efficacy in School-Related Performance (PPSE_School) during adolescence, and **(b)** to examine its association with later adolescents' academic achievement (age 14), taking into account the initial level of adolescents' academic achievement (age 12), child's gender and family socio-economic status.

Regarding the first aim **(a)**, consistently with our hypothesis and the limited literature (Glatz & Buchanan, 2015), we found that PPSE_School significantly decreased through the adolescence period. Furthermore, parents' levels of PPSE_School did not significantly deviate from the average sample's trajectory, indicating the same rate of change among parents over the considered time-line, whereas the negative and significant average's level of the PPSE_School trajectory provides more support of its decline in a linear fashion over time.

In general, our result confirms the results of Glatz & Buchanan (2015a) that have shown a significant decline of parental self-efficacy with the growth of children towards adolescence as a result of the greater autonomy of children at this stage of development.

In our study, parents seem to become more doubtful in engaging in the school life of their children, during the transition to middle school. The increase of their children's independence from the family while facing the more complex school's system under various point of views maybe some of the plausible reasons of this decline. Indeed, our finding extends the current literature by considering the developmental course of parental self-efficacy in the scholastic domain at three-time points over three years. To our knowledge, this is only study that focused on the mean-level change in parental self-efficacy in scholastic domain during the transition to adolescence.

Regarding the second aim **(b)**, as expected (Hoover-Dempsey, Bassler, & Brissie; 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider et al. 1997; Ardel & Eccles, 2001), the developmental decline of PPSE_School was found positively associated with the students' records at the end of middle school, even after controlling for the initial levels of students' academic

achievement at age 12. This result means that the less decrease of PPSE School-Related Performance was associated to higher levels of Academic Achievement at the end of middle school. Importantly, our findings are in accordance with the current literature on parental self-efficacy (Bandura et al., 1996), which suggests that parents with high academic self-efficacy could positively affect their children's academic achievement through high academic aspirations and through their involvement in school activities. In fact, our results show evidence that parents who are less doubtful of their own beliefs during the course of adolescence tend to actively support and help their children in working hard at school, in recognizing the importance of the school context and finally being more effective in motivating their children to reach higher academic goals and results.

Regarding **adolescents' gender**, contrary to our expectations (Glatz & Buchanan, 2015a), we did not find significant associations between adolescents' gender and PPSE_School (both intercept and slope factors). However, our result is in accordance with other studies (for example Bogenschneider et al., 1997; Ballenski & Cook, 1982) which suggested the same positive relationship between maternal self-efficacy and academic achievement for both boys and girls, and no difference in the mean levels of parental self-efficacy in parents of adolescent boys and girls.

Finally, in accordance with our hypothesis (Glatz & Buchanan, 2015a), we found a positive association between family **socio-economic status** and the initial levels of PPSE_School. This result supports the importance of considering the ecological context, which is represented by demographic factors such as socio-economic status, that can affect the parental role and experience. In particular our results suggest that parents who experience more difficult parenting situations (e.g. low socio-economic status) report lower parental self-efficacy than parents who live in advantageous circumstances.

Nevertheless, the current study has some limitations.

First, we did not investigate the influence of other variables, such as family structure, parenting practices or personal characteristics of both parent and child, that can affect the relationship between parental self-efficacy and adolescents' academic achievement.

Second, we did not control our results for parents' gender (mothers and fathers). According to literature (Bogenschneider et al., 1997), we cannot exclude that the identified relations could be different in function not only of the children's gender, but also of the parents' gender in the parent-child dyads (mother-son; mother-daughter; father-son; father-daughter).

Furthermore, because we had only three data points, we cannot exclude a quadratic or cubic growth that requires more than three measurement points. In fact, it is possible that the change in parental self-efficacy could be better captured using more data points.

Finally, we did not examine transactional processes among PPSE_School, adolescents' academic achievement, and other variables such as adolescents' self-efficacy beliefs, that could be relevant in these processes.

Future studies should make these limitations clear.

Despite these limitations, this study provides new evidence of the normative developmental course of PPSE_School during the transition to adolescence, confirming the relevant role played by parental self-efficacy beliefs in affecting children's academic adjustment during this critical transitional period, thereby providing useful information in terms of theoretical and practical implications. Specifically, regarding theoretical implications, to our knowledge this is only the second study focused on the mean-level change in parental self-efficacy during the transition to adolescence, and the only one that specifically considers the scholastic domain. Finally, for what concern practical implications, our results suggest the relevance of increasing parental self-efficacy beliefs, acting for example on the sources of self-efficacy beliefs such as mastering experiences, verbal persuasion and vicarious experiences (Bandura, 2000), in order to promote adolescents' academic adjustment during the critical transition to middle school.

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CHAPTER IV

Longitudinal Bidirectional Relations between Parental Self-Efficacy and Children's Academic Self-Efficacy during the Transition to Middle School

STUDY 3

Longitudinal Reciprocal Relations between Parental Self-Efficacy and Children's Academic Self-Efficacy during the Transition to Middle School

Abstract

A lot of studies have shown links between parental self-efficacy and children's self-efficacy, but there are still a lack of studies concerning their bidirectional associations over time. Accordingly, this study investigated the reciprocal relationship between Perceived Parental Self-Efficacy in School-Related Performance (PPSE School) and Perceived Efficacy for Self-Regulated Learning (PESR Learning) in the Italian context during the transition to Middle school, in a sample of 430 adolescents ($M_{age} = 12$; 232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%), longitudinally assessed at three Time points (when the children were 12, 13, and 14 years old). Autoregressive Cross-Lagged Models were used to examine relationship between PPSE School and PESR Learning over time, considering family socio-economic status and the initial levels of students' academic achievement (age 12) as predictor variables, and the students' later academic achievement (age 14) as an outcome variable. Finally, we investigated the possible moderation effect of the child's gender by multiple-grouping analyses, imposing equal unstandardized paths across gender. Results from cross-lagged analysis and structural equation modeling showed T1 PPSE_School to predict T2 children's PESR_Learning, that, in turn, predicted T3 PPSE_School. Indeed, both T3 measures of PPSE_School and PESR_Learning were positively associated with students' later academic achievement (age 14), also taking into account the association between T1 and T3 students' academic achievement. Lastly, academic achievement at age 12 predicted T1 measures of both PPSE_School and PESR_Learning, while family socio-economic status predicted only T1 PPSE_School. Finally, the ARC gender constrained model suggested no differences between boys and girls in the associations among the variables studied. The present results attest the relevant

role played by parents in building children's sense of efficacy that is necessary to successfully face the challenges associated with the transition to middle school and they add to the literature focused on the effects of within family socialization in the school context.

Keywords: parental self-efficacy, academic self-efficacy, school transition, pre-adolescence, autoregressive cross-lagged model, academic achievement, gender differences, socio-economic status.

1. Introduction

Parental influences on the development of children's self-efficacy has been a subject of interest in psychological research, as the family is one of the most important socialization agent during development and creates the first opportunities in which their children can exercise human agency (Bandura, 1997). In this regard, empirical evidence has corroborated the important role played by parental self-efficacy in affecting various developmental outcomes and children's adjustment (Coleman & Karraker, 1998; Jones & Prinz, 2005). However, with the exception of few studies which suggest that parents' beliefs in their efficacy to promote their children positive development affect children's self-efficacy through positive parenting strategies (Bandura et al., 1996; Ardel & Eccles, 2001), we don't know much about the developmental flow of influence between parental self-efficacy and children's self-efficacy during adolescence. Indeed, much of the research on the associations between parental self-efficacy and children's self-efficacy is based on cross-sectional or only two Waves longitudinal data, without considering the long-term associations between parental self-efficacy and children's self-efficacy.

Accordingly, the present study intends to advance our knowledge on the flow of influence between parental self-efficacy children's self-efficacy, considering the scholastic domain in adolescence across three measurements waves. This period is generally characterized by a decrease in parental self-efficacy (Glatz & Buchanan, 2015a), due to a drop in parents' sense of competence in helping their children achieve more advanced academic goals which require greater autonomy. In addition, according to the agentic perspective in the study of socialization processes within the family, children are considered as active agents just like their parents, able to select their own environment based on their personal short and long-term goals (Rheingold, 1969; Sameroff, 1975), and able to influence their parents' beliefs and attitudes.

Accordingly, the overall aim of the present study is to investigate the longitudinal bidirectional associations between parental academic self-efficacy and children's academic self-efficacy during

the transition to middle school, and how these associations predict students' academic achievement at a later stage.

In the next sections, we will first review the literature related to role played by parental self-efficacy on children's self-efficacy. Then, we will examine the empirical evidence that focused on the bidirectional relationship between parental self-efficacy and children's self-efficacy.

1.2 Theory Regarding the Development of Self-Efficacy Beliefs from Parents to Children

The mechanisms through which self-efficacy beliefs are developed have been a subject of interest in psychological research, as they play an important role in affecting children's adjustment in various domains of activities.

In this regard, previous research has mainly focused on the study of how self-efficacy beliefs affect individual and intellectual functioning. However, according to Bandura (Bandura et al., 1996), people cannot be isolated from the social context in which they are involved. Therefore, the development of self-efficacy beliefs should be analyzed by considering the social relations network of individuals.

According to the Social Cognitive Theory (Bandura, 1986; 2000), self-efficacy beliefs can be considered as the product of different sources of information such as family, peers and school. In particular, parents are the most important socialization agents during development, allowing their children to build future interactions with the world beyond the home by gradually creating opportunities for effective actions through mastering experiences. In this regard, empirical evidence is consistent in considering the important role of parental self-efficacy in affecting individual adjustment. However, few studies have examined its influence on the development of children's self-efficacy (Bandura, 1996; Ardelet & Eccles, 2001).

In particular, Bandura and colleagues (Bandura et al., 1996; 2001) suggest that parents who are involved in their children's developmental contexts and who believe they can contribute to their

children's achievement, provide them with experiences in which their children can exercise the human agency.

In this section we will analyze the mechanisms through which parental self-efficacy is supposed to affect children's self-efficacy.

In particular, a first mechanism could be the *modeling*. It seems that parents with high self-efficacy beliefs act as positive role models for their children (*vicarious experiences*), who will adopt their parents' beliefs independently of the parents' effective behavior (Ardelt & Eccles, 2001).

Secondly, parents with high parental self-efficacy are better able to select contexts that favor their children's experiences of success and the development of competencies (Bandura et al., 1996, 2001; Glatz & Buchanan, 2015b). Essentially, the experience of success contributes to increase perceived efficacy and ease in overcoming the experiences of failure (*mastering experiences*).

Finally, parents with high parental self-efficacy are better able to model their children's beliefs through realistic positive feedback over their abilities (*verbal persuasion*), thereby strengthening their children's convictions of having the skills necessary to achieve personal goals (Bandura, 1997; Eccles et al., 1993).

Therefore, it is possible that parents who are more confident in their parental role are better able to structure a positive developmental environment in which their children can exercise control over events, thereby increasing their self-efficacy beliefs (Bandura et al., 1996; 2001).

In this regard, Bandura (1986; 1997) suggested within the parent-adolescent dyad a sort of a feedback-loop that creates reciprocal exchange in which children increasingly become active contributors to their adjustment. This concurs with the relatively recent theorization on bi-directionality (Kuczynski, 2003; Loulis & Kuczynski, 1997; Kuczynski & De Mol, 2015).

In particular, as we have already mentioned above, Bandura suggested that higher parental self-efficacy may favor the selection of positive developmental contexts in which it is most likely for children to achieve success (Bandura et al., 1996). The children's experiences of success can be considered as the most important source of self-efficacy, contributing to the increase in their sense of

efficacy (Bandura, 2000). In turn, the success achieved by children is likely to increase their parents' self-efficacy beliefs about their parental role (Bandura, 1997; Ardel & Eccles, 2001).

However, according to the social relation theory proposed by Kuczynski and colleagues (Kuczynski, 2003, Kuczynski, Harach & Bernardini, 1999), despite the agentic nature of the bidirectional exchanges in the relationship between parents and children, they are in an interdependent asymmetry because parents initially have more resources than their children. Accordingly, Ardel & Eccles (2001) suggested that the influence of parental self-efficacy on children's adjustment maybe stronger than the influence of children's success on parental self-efficacy.

In the next section, we will first examine empirical findings regarding the influence of parental self-efficacy on children's self-efficacy in the scholastic domain during the transition from elementary to middle school, and their relationship with students' academic achievement. Secondly, we will briefly summarize the few studies which have focused on the bidirectional exchanges between parental self-efficacy and children's self-efficacy from early adolescence to adolescence.

1.3 Findings regarding the Associations among Parental Academic Self-Efficacy, Students' Academic Self-Efficacy and Academic Achievement

Although several studies have examined the relationship between self-efficacy beliefs and indicators of adolescents' academic functioning, few studies have analyzed how parental self-efficacy shapes children's self-efficacy in determining students' later academic achievement (Bandura et al., 1996; Ardel & Eccles, 2001). In this regard, psychological research (Hoover-Dempsey et al., 1992; Hoover-Dempsey et al., 2001; Bogenschneider, 1997) has emphasized the relevant role played by parent-school involvement in affecting different aspects of students' academic adjustment, especially during the transition from elementary to middle school. During this school transition that is often characterized by an increase in the complexity of educational programs and in the number of subject matters, and in which most assessments becomes normative instead of being based on individual

progress, parental academic self-efficacy is particularly relevant in supporting students to successfully manage new challenges and new academic goals. In fact, despite few studies (Ballenski & Cook, 1982; Glatz & Buchanan, 2015a) suggesting that parental self-efficacy decreases during the transition to middle school as a result of a parents' lower sense of competence in helping their children in more advanced homework and academic goals, students still need to be aware that their parents support and guide their educational activities (Eccles & Harold, 1996). Therefore, parental academic self-efficacy is especially relevant in building their children's sense of regulatory efficacy necessary to face the challenges associated with the transition to middle school.

Regarding the impact of parental self-efficacy beliefs on adolescents' self-efficacy beliefs, some studies have examined how parental academic self-efficacy predicts children's academic self-efficacy. In particular, the study of Bandura, Barbaranelli, Caprara and Pastorelli (1996) in a sample of 279 Italian middle school students and their parents showed that parents' beliefs in their efficacy in promoting their children's intellectual development predict the adolescents' scholastic achievement, via their influence on the children's beliefs in their ability to manage different subjects and organize their learning activities. Specifically, Bandura (Bandura et al., 1996) suggested that parents' sense of efficacy increases adolescents' self-efficacy and academic achievement, through the creation of a supportive development atmosphere that favors an increase in the children's potentialities and competencies. Similar results were found by Ardelet & Eccles (2001), in a sample of 376 adolescents and their mothers, in a study with the overall aim of examining the effects of parental self-efficacy on children's self-efficacy and academic achievement in adverse environments. Two sets of 14 and 6 items, created by the Philadelphia Family Management Study, were administered to mothers to assess parental self-efficacy beliefs, while adolescents' self-efficacy beliefs were measured using 14 items concerning children's beliefs regarding their control over the environment. Finally, adolescents' academic achievement was assessed using multiple informants: the parent's report of their children's academic success, the children's self-report of their academic success, and the interviewer's report of the children's cognitive abilities. The results of the study

suggested that parental self-efficacy affected adolescents' academic achievement both directly and indirectly by increasing adolescents' self-efficacy beliefs and through positive parenting strategies (Ardelt and Eccles, 2001).

In particular, Ardel & Eccles (2001) suggested that parents with high self-efficacy beliefs acted as models for their children, who in turn adopted their parents' beliefs regardless of the latter's effective behavior (Eccles et al., 1993; Schneewind & Pfeiffer, 1995; Whitbeck, 1987).

Further research did not specifically analyze parental academic self-efficacy, but considered parental school involvement, a related construct, which concerns parental engagement in school activities, communication with school and helping children with homework (Stevenson & Baker, 1987). In particular, Adeyemo (2005) conducted a study with the overall aim to examine the relationship between parental school involvement and preadolescents' academic self-efficacy beliefs, in a sample of 250 students ranging from 9 to 12 years old. Parental involvement was assessed through Fantuzzo, Tighe and Child's (2000) questionnaire that measures the level of parents' participation in school activities, and how much they help their children in their school work. Academic self-efficacy was assessed using the scale developed by Jinks and Morgan (1999) that measures students' beliefs in their ability to study and to reach high academic results. The findings were consistent with previous studies highlighting that parental involvement affected children's academic self-efficacy, through its effect on parental academic aspirations. In particular, Adeyemo (2005) suggested that the impact of parental involvement on students' academic self-efficacy was stronger when parents had high expectations for their children.

Another study was conducted by Fan & Williams (2010) in a sample of 15,325 adolescents and their parents from the Educational Longitudinal Study of 2002 (ELS 2002), that had the overall aim to examine the impact of parental involvement (parental academic aspirations, parents' school contact concerning school problems, parental advising, family rules for watching television, school initiated contact with parents on school issues) on students' academic self-efficacy towards Maths and English. The results suggested that parents' academic aspirations and school-initiated contact

with parents positively affected academic self-efficacy in Maths and English, parental advising positively affected academic self-efficacy in English and parents' school contact concerning school problems negatively affected academic self-efficacy in Maths and English.

These studies provide empirical support for the impact of parental academic self-efficacy on preadolescents' academic self-efficacy. However, as we have already mentioned in the previous section, Bandura (1986; 1997) proposed a bilateral framework that emphasized the role of human agency in the bidirectional interaction processes between parents and children, suggesting that parents with high self-efficacy affect children's self-efficacy and adjustment, which in turn, increases parents' self-efficacy beliefs about their parental role. Regarding the research that supports Bandura's feedback-loop, it is relevant to consider the study Ardel & Eccles' (2001) study, previously described in this section. Further to studying the effects of parental self-efficacy on adolescents' self-efficacy and academic achievement, Ardel & Eccles' (2001) also studied the reverse influence of the children's success on parental self-efficacy. The results provided support for the bidirectional relationship between parents and children. However, they also suggested that parental self-efficacy affected children's academic achievement to a greater extent than how children's academic achievement affected parental self-efficacy. In this regard, the study of Ardel & Eccles provided support for the interdependent asymmetry in the relationship between parents and children, sustained by the social relation theory (Kuczynski, 2003, Kuczynski, Harach & Bernardini, 1999).

Lastly, to the best of our knowledge, there is only one study that longitudinally examined the bidirectional relationship between parents and children in the field of parental self-efficacy. We refer to the contribution of Glatz & Buchanan (2015b) in a sample of 305 families and their adolescents with a mean age of 11.5 years assessed at three-time points. The overall aim of the study was to analyze the overtime association among parental self-efficacy, parenting strategies and children's behavioral problems. The results relevant to study suggested that parental self-efficacy especially during early adolescence (assessed at Time 1) affected children's adjustment (assessed at Time 3) through parenting strategies (assessed at Time 2); whereas children's behavior during middle

adolescence (assessed at Time 2) affected parental self-efficacy (assessed at Time 3). Therefore, the study of Glatz & Buchanan (2015) suggested that during early adolescence, parental self-efficacy affects children's adjustment through parenting strategies, and later during the transition to middle adolescence, due to the normative decrease in parental self-efficacy, adolescents' adjustment affects the later sense of efficacy perceived by parents.

1.3.1 Children's Gender Differences in the Associations among Parental Academic Self-Efficacy, Students' Academic Self-Efficacy and Academic Achievement

Despite the contributions of several studies which analyzed gender differences in students' academic self-efficacy and academic achievement, to our knowledge there are no studies focused on the differences between boys and girls in the transactional relationship among parental academic self-efficacy, students' academic self-efficacy and academic achievement. Accordingly, in this section we examine empirical literature focused on students' gender differences in the relationship between academic self-efficacy beliefs and academic achievement, and in parental academic self-efficacy.

In this regard, Pajares & Schunk (2002) suggested that literature revealed mixed findings. Some supported gender differences in academic self-efficacy in favor of girls, others in favor of boys. Some also indicated the absence of gender differences.

However, psychological research has generally highlighted the tendency, especially during the transition to middle school, for girls to experience greater academic achievement and self-efficacy beliefs in humanistic subject matters than boys (Dwyer & Johnson, 1997), who conversely seemed more confident in their abilities related to mathematics and scientific subject matters (Wigfield, Eccles, and Pintrich, 1996, Pajares & Schunk, 2001).

Regarding empirical literature focusing on gender differences in the relationship between students' perceived efficacy for self-regulated learning and academic achievement, Zimmerman & Martinez-Pons (1990) examined students' gender differences in learning strategies and academic self-efficacy during the transition from elementary to junior and senior high school. The full sample of

the study was composed of 90 students in grades 5, 9 and 11. Using the self-regulated learning interview scale (for the assessment of various learning strategies) and academic efficacy scales (for the assessment of Verbal Efficacy and Mathematics efficacy), the study suggested that girls used more learning strategies than boys. However, contrary to the authors' expectations, girls obtained a lower score than boys in verbal efficacy and an equal score in mathematical efficacy. In this regard, Zimmerman & Martinez-Pons suggested that this unexpected result regarding students' gender differences in self-efficacy beliefs could be due to the fact that generally boys seem more optimistic about their ability than girls, who tend to underestimate their ability.

Another relevant contribution is the cross-national study conducted by Pastorelli et al. (2001) to investigate the replicability and generalizability of the three reduced dimensions of the Children Perceived Self-Efficacy Scales (Bandura, 1990; Bandura, Barbaranelli, Caprara & Pastorelli, 1996), on a sample of 1180 child ranging in age from 10 to 15 years (822 children from Italy; 219 children from Hungary; 143 children from Poland). The results showed that, compared to boys, Italian girls had stronger beliefs in their ability to study different subjects and to plan and organize their academic activities. In this regard, Pastorelli and colleagues suggested that these gender differences in academic self-efficacy in favor of girls were consistent with gender role stereotypes, according to which girls judged themselves to be competent in to theoretical and study activities, whereas boys perceived themselves to be better at practical or physical activities (Bandura et al., 1996).

Furthermore, Zuffianò, Alessandri, Gerbino, Kanacri, Di Giunta, Milioni, Caprara (2012) examined the contribution of self-efficacy beliefs to self-regulated learning in predicting academic achievement, controlling for the effects of the child's gender. The study was conducted in a sample of 170 eighth grade Italian students using nine items of the Self-Efficacy for Self-Regulated Learning Scale (Bandura et al., 1996). Despite results showing positive significant associations between child's gender and self-efficacy for self-regulated learning, and between child's gender and academic achievement, child's gender did not predict academic achievement at eighth grade. In particular,

although the results indicated that girls tended to have high self-efficacy beliefs and high academic results, this association did not contribute to explain the students' academic adjustment.

A recent study conducted by Di Giunta, Alessandri, Gerbino, Kanacri, Zuffianò & Caprara (2013) in a sample of 426 Italian students longitudinally assessed from the age of 14 to 19 years, evidenced that the general dimension of academic self-efficacy (composed of self-efficacy for self-regulated learning and self-efficacy for academic subjects) significantly predicted junior and senior high school grades, but without gender differences between boys and girls.

Therefore, several studies have highlighted that girls seem to use more learning strategies than boys and, accordingly, they judge themselves more efficacious in managing and organizing their academic activities. However, the results of recent studies are not consistent, suggesting that compared to the past, students' gender differences in academic achievement are reducing significantly (Voyer & Voyer; 2014)

Finally, regarding parental academic self-efficacy, few studies have examined the child's gender differences. Glatz & Buchanan (2015a) suggested that parents of adolescent boys had higher initial levels of self-efficacy beliefs than parents of adolescent girls. However, they also suggested that the effect of the child's gender decreased when they controlled for the weight of other variables. Similarly, other studies (Bogenschneider et al., 1997; Ballenski & Cook, 1982) indicated no differences in the mean levels of parental self-efficacy in parents of adolescent boys and girls, and the same positive relationship between maternal self-efficacy and academic achievement for boys and girls.

In sum previous studies support higher levels of academic achievement and academic self-efficacy beliefs in girls than boys (Pajares, 2002; Zimmerman & Martinez-Pons, 1990; Pastorelli et al., 2001); however, more recent research suggests that these gender differences in academic achievement and adolescents' self-efficacy are less pronounced (Di Giunta et al., 2013; Voyer & Voyer, 2014). Accordingly, and considering the lack of studies focusing on children's gender differences in perceived parental self-efficacy, it is necessary to clarify the role played by the students'

gender in the associations among parental academic self-efficacy, students' academic self-efficacy and academic achievement.

1.3.2 Family Socio-Economic Status, Academic Self-Efficacy beliefs and Academic Achievement

In line with the ecological systems theory proposed by Bronfenbrenner (1977), individual development is determined by the interaction among multiple systems which predict individual adjustment. Specifically, family background is a key factor in understanding adolescents' academic functioning, including a lot of variables that have a great influence on students' academic performance, such as family socio-economic status, parental practices and the child's aspirations, (Majoribanks, 1996).

In this section, we will briefly examine the literature on the associations among family socio-economic status, parental and adolescents' academic self-efficacy, and students' academic achievement.

Regarding the associations between family socio-economic status and children's academic achievement, Eva Eagle (1989), in a study conducted in a sample of high school students, high family socio-economic status (composed of maternal education, paternal education, family income, paternal occupation status and the presence of resources at home such as books or computers) was positively associated with high adolescents' academic achievement. Specifically, it seemed that high family socio-economic status affected students' academic achievement by providing many resources which offered children more chances to cultivate their skills, and due to fewer family difficulties. Similarly, in a meta-analysis on the longitudinal relationship between family socio-economic status and academic achievement, Sirin (2005) suggested that this association remained stable or tended to increase during the development (Walker, Greenwood, Hart, e Carta, 1994).

In this regard, The Social Cognitive Theory (Bandura, 1997; 1986) provided substantial empirical support in explaining the mechanisms through which family socio-economic status could

affect students' academic achievement. In particular, Bandura (1997) highlighted that socio-economic status could affect individual adjustment through its impact on the families' beliefs system. In particular, psychological research suggested that parents who experienced high economic pressure and limited financial resources reported greater parenting difficulties and perceived themselves as less efficacious in their ability to positively affect their children's development. Conversely, it appeared that parents living in privileged circumstances had more financial and contextual resources to favor opportunities for their children's positive development (Jones & Prinz, 2005; Glatz & Buchanan, 2015a).

Empirical evidence also supported that family socio-economic status did not affect students' academic self-efficacy directly, but rather through its impact on the family environment and in particular on parental self-efficacy beliefs. For example, in a sample of pre-adolescents and their parents previously described in this chapter, Bandura and colleagues (Bandura et. al., 1996) showed that high socio-economic status, assessed by fathers' occupation, predicted students' academic achievement, through its influence on parental academic self-efficacy beliefs, hence highlighting the importance of considering the effect of family background on individual academic adjustment.

Similarly, Bandura and colleagues (Bandura et al., 2001) conducted a longitudinal study in a sample of 272 children ranging in age from 11 to 15 years, and their parents, with the overall aim to examine the effects of self-efficacy beliefs on children's aspirations and career trajectories. Results of interest for our study showed that family socio-economic status did not have direct effects on children's self-efficacy beliefs (self-efficacy for academic achievement and self-efficacy for self-regulated learning) and academic achievement. Rather, its influence was mediated by parental academic self-efficacy and parental academic aspirations.

Eamon (2005) further demonstrated that, in a study conducted on a sample of 388 Latin students, parents with a high socio-economic status were more involved in their children's school activities, providing them with a more stimulating home environment that positively affects academic achievement. The results were also consistent with the findings of Barry (2006) showing that students

with high socio-economic status spent more time doing their homework, thereby positively affecting academic performance, compared to students with low socio-economic status.

It therefore seems that high family socio-economic status positively affects students' self-efficacy beliefs and students' academic achievement, through its impact on parental academic self-efficacy. However, few other studies suggested different paths of influence among these variables.

In particular, we refer to the contribution of Furstenberg (1993) and Ardelet & Eccles (2001), which have focused on the associations among parental self-efficacy, positive parenting strategies and children's academic success in adverse environments. The results of these studies suggested that the relationship between parental self-efficacy and academic achievement was more pronounced in families with low socio-economic status, because in the adverse environmental circumstances, parental self-efficacy was the only resource that parents could rely on to promote their children's positive development (Bugental, Shennum & Shaver, 1984; Eccles et al., 1993; Schneewind & Pfeiffer, 1995; Teti & Gelfand, 1991).

In sum, some studies evidenced that high family socioeconomic status affects parental self-efficacy beliefs and allows higher probability of academic success, by providing more resources and opportunities to play the parental role well. However, other studies (Frustenberg, 1993; Ardelet & Eccles, 2001) argue that the association between parental self-efficacy and students' academic achievement is higher in the condition of low socio-economic status, suggesting that when parents do not enjoy financial or material resources, they rely more on their parental skills. Therefore, considering that there is not a full convergence in the literature on this matter, in the present study we intend to further examine the associations between family socio-economic status and parental and adolescents' academic self-efficacy, and between family socio-economic status and students' academic achievement.

1.4. The Current Study

Considering the important role played by parents in shaping children's self-efficacy during their development (Bandura et al., 1996; Ardel & Eccles, 2001), and considering the lack of studies focusing on longitudinal bidirectional associations between parental self-efficacy and adolescents' self-efficacy, the overall aim of the present study is to examine the over-time association between parental self-efficacy and adolescents' self-efficacy in the scholastic domain during the transition to middle school, in an Italian sample of parents and their children longitudinally assessed at three Time Points (when the children are 12, 13, and 14 years old), and to examine the relationship between these variables and adolescents' academic achievement at the end of middle school.

The specific aims of the present study are: **(a)** to analyse the longitudinal bidirectional association between PPSE School and adolescents' PESR Learning during the transition to middle school; **(b)** to investigate the effect of PPSE School and adolescents' PESR Learning (T3) on adolescents' academic achievement at the end of middle school, taking into account the previous adolescents' academic achievement; **(c)** to examine the predictive effects of family socio-economic status on PPSE School (T1), adolescents' PESRL (T1) and students' later academic achievement (T3); **(d)** to investigate the differences between boys and girls in the associations among the variables studied.

Regarding the first aim **(a)**, we expect PPSE_School to have a significant impact on adolescents' PESR_Learning, in accordance with the studies of Bandura and colleagues (1996) and Ardel & Eccles (2001), which showed that parental academic self-efficacy significantly affected students' academic self-efficacy in early adolescence through the creation of a supportive development atmosphere that favored an increase in children's potential and competencies and through modeling.

Specifically, we expect that T1 PPSE School (child at 12 years old) affects T2 adolescents' PESR Learning (child at 13 years old), and that T2 adolescents' PESR Learning (child at 13 years old) affects T3 PPSE School (child at 14 years old). This is based on the interdependent asymmetry

in the relationship between parents and children sustained by Kuczynski's (2003) social relation theory. Ardel & Eccles (2001) also found that the influence of parents on children's adjustment was stronger than the influence of children's adjustment on parental self-efficacy. Furthermore, Glatz & Buchanan (2015b) showed that parental self-efficacy affected children's outcomes in early adolescence, whereas children's outcomes in middle adolescence affected parental self-efficacy.

Regarding the second aim **(b)**, we expect to find positive associations between T3 assessments (child at 14 years old) of PPSE School and students' academic achievement, and between T3 assessments of adolescents' PESR Learning and students' academic achievement, controlling the association between the T1 and T3 measures of students' academic achievement. This hypothesis is based on previous studies highlighting positive associations between parental academic self-efficacy and adolescents' academic achievement (Hoover-Dempsey, Bassler, & Brissie; 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider et al. 1997; Ardel & Eccless, 2001), and between adolescents' academic self-efficacy and academic achievement (Zimmerman, Bandura & Martinez-Pons, 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli & Bandura; 2008).

Regarding the third aim **(c)**, we expect to find positive significant associations between family socio-economic status and T1 and T3 measures of students' academic achievement, and between family socio-economic status and T1 PPSE School (child at 12 years old), based on previous studies suggesting positive associations between family socio-economic status and adolescents' academic achievement (Eva Eagle, 1989; Sirin, 2005), and based on the study of Bandura and colleagues (2001) in which the effect of family socio-economic status on children's academic self-efficacy beliefs was not direct but was mediated by parental academic self-efficacy and parental academic aspirations.

Finally, regarding the differences between boys and girls in the associations among the variables studied **(d)**, we do not propose any strict hypothesis, considering the fact that there are no studies investigating children's gender differences in the over-time associations between parental academic self-efficacy and children's academic self-efficacy. Nevertheless, based on previous studies

suggesting no differences in parental self-efficacy between parents of boys compared to girls (Bogenschneider et al., 1997; Ballenski & Cook, 1982), and based on previous works supporting that gender differences in academic outcomes were decreasing significantly (Voyer & Voyer, 2014; Di Giunta et al., 2013), we do not expect to find any differences between boys and girls in the longitudinal associations among all the variables studied.

2. Method

2.1 Participants and Procedure

The participants in this study were 430 adolescents (232 boys, 54%; 198 girls, 46%) and their parents (100 fathers, 24%; 324 mothers, 76%), already described in Study1 (see paragraphs 2.3.1 and 3.3.1, Chapter II).

The data collections schema differentiated by cohort is reported in Table 1; the sample size over time is reported in Table 2.

Table 1
Data Collection schema differentiated by cohort

	Cohort 1 (years)	Cohort 2 (years)	Cohort 3 (years)
1994	12		
1995	13	12	
1996	14	13	12
1997		14	13
1998			14

Table 2
Descriptive statistics of the measures and Sample size

Age	Adolescents Report (% boys)	Teachers Report	Parents Report
12	430 (54%) PESR_Learning	430 (54%) AC_ACH	424 (76%) PPSE_School
13	419(54%) PESR_Learning		380 (78%) PPSE_School
14	392(54%) PESR_Learning	379 (54%) AC_ACH	313 (76%) PPSE_School

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance; PESR_Learning = Perceived Efficacy for Self-Regulated Learning; AC_ACH = Academic Achievement.

2.2 Measures

2.2.1 Children's Gender. Children's sex was coded 1 for boys and 2 for girls.

2.2.2 Family Socio Economic Status - SES.

See paragraph 2.2.2. (Study 2, Chapter III).

2.2.3 Perceived Parental Self-Efficacy in School-Related Performance – PPSE-School

(Bandura, 1990; Pastorelli & Gerbino, 2001).

See paragraph 2.3.2.3 (Study 1A, Chapter II).

Cronbach's alpha reliability coefficients were .87 (T1), .88 (T2), and .91 (T3) respectively.

2.2.4 Perceived Efficacy for Self-Regulated Learning – PESR-Learning (Bandura, 1990;

Bandura et al., 1996; Pastorelli et al., 2001).

See paragraph 3.3.2.2 (Study 1B, Chapter II).

Cronbach's alpha reliability coefficients were .85 (T1), .85 (T2), and .87 (T3) respectively.

2.2.5 Academic Achievement

See paragraph 4.3.2.7 (Study 1C, Chapter II).

Cronbach's alpha reliability coefficients were .93 (T1) and .87 (T3) respectively.

2.3 Data analytic approach

We preliminarily computed the descriptive statistics of the variables studied and the (r Pearson) correlations among them within and across the time points.

We used structural equation modeling for testing our hypotheses. An Auto Regressive Cross-Lagged model with maximum-likelihood estimation of the parameters was implemented to analyze the direction of the effects between Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Perceived Efficacy for Self-Regulated Learning (Dwyer, 1983). To deal with measurement error, all the variables included in the model were posited as single indicator latent variables by estimating the error terms from reliabilities (Kline, 2010).

We added our outcome variable at T3 in our best fitting model to analyse the predictive values of the relationship between Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Perceived Efficacy for Self-Regulated Learning, in determining Adolescents' Academic Achievement (age 14), also controlling for the initial level of students' Academic Achievement (age 12) and family Socio-Economic Status (SES).

Finally, the possible moderation effect of children's gender was assessed by multiple-grouping analyses (e.g., Laible et al., 2004), imposing equal unstandardized paths between sexes. The plausibility of these equality constraints was examined with the χ^2 (i.e., constrained model vs. the unconstrained model).

The following criteria were employed to evaluate the goodness of fit: χ^2 likelihood ratio statistic, Tucker and Lewis Index (TLI), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA) with associated confidence intervals, and standardized root mean square residual (SRMR). We accepted TLI and CFI values greater than .95, RMSEA values lower than .07, and SRMR lower than .08 (Kline, 2010).

2.4 Results

2.4.1 Preliminary Analysis

Zero-order correlations among all the variables studied, as well as the means and standard deviations are presented in Table 3.

Almost all the variables were positively associated with each other.

Specifically, children's gender correlated positively and significantly with PPSE School-Related Performance at T2 ($r=.15^{**}$), and with adolescents' PESR Learning measured at different time points ($r=.10^*$, $r=.15^{**}$, $r=.12^*$; respectively for the three-time points). Socio-Economic Status associated positively and significantly with T1 and T2 measures of PPSE School-Related Performance ($r=.14^{**}$, $r=.12^{**}$; respectively), and with Academic Achievement across time ($r=.28^{**}$, $r=.23^{**}$; respectively for T1 and T3).

The correlations between PPSE School-Related Performance from Time 1 to Time 3 ranged from .43** to .52**, with the strongest correlation between T1 and T2 measures of PPSE School-Related Performance.

Moderate correlations were also found between Adolescents' Efficacy for Self-Regulated Learning from Time 1 to Time 3, ranging from .52** to .61**.

The correlations between Parental Self-Efficacy in School-Related Performance and Adolescents' Efficacy for Self-Regulated Learning assessed across time tended to be positive, with the highest significant correlation of .27** at T3 (Table 3).

Lastly, T1 measure of PPSE School-Related Performance correlated positively and significantly with Adolescents' Academic Achievement assessed across time ($r=.17^{**}$, $r=.11^{*}$, respectively for T1 and T3), and PPSE School-Related Performance measured at T3 correlated positively and significantly with Academic Achievement at T3 ($r=.20^{**}$) (Table 3).

Finally, the correlation between Academic Achievement and Adolescents' Efficacy for Self-Regulated Learning assessed across time tended to be positive, ranging from .30** to .38**.

Table 3

Descriptive statistics and Correlations for all the study variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	M	SD
Adolescents' Gender (1)	-										-	-
Socio Economic Status (2)	-.01	-									.00	1.0
PPSE-School T1 (3)	.07	.14**	-								5.27	1.04
PPSE-School T2 (4)	.15**	.12**	.52**	-							5.20	1.04
PPSE-School T3 (5)	.05	.05	.45**	.43**	-						5.06	1.09
PESR-Learning T1 (6)	.10*	.03	.05	.11*	.18**	-					3.91	.66
PESR-Learning T2 (7)	.15**	.02	.11*	.15**	.26**	.56**	-				3.99	.58
PESR-Learning T3 (8)	.12*	.08	.09	.12*	.27**	.52**	.61**	-			3.91	.64
Academic Achievement T1 (9)	.04	.28**	.17**	.05	.08	.34**	.30**	.30**	-		3.25	.85
Academic Achievement T3 (10)	.08	.23**	.11*	.05	.20**	.32**	.37**	.38**	.74**	-	2.90	.95

Note: PPSE-School = Perceived Parental Self-Efficacy in School-Related Performance. PESR-Learning = Adolescents' Perceive Efficacy for Self-Regulated Learning. M = Mean; SD = Standard Deviation. ** = $p < .01$; * = $p < .05$.

2.4.2 AR Cross-Lagged Model

An AR Cross-Lagged model (Dwyer, 1983) with maximum-likelihood estimation of the parameters was implemented to analyze the direction of the effects between Perceived Parental Self-Efficacy in School-Related Performance (PPSE-School) and Adolescents' Efficacy for Self-Regulated Learning (PESR-Learning) across time. In order to deal with measurement error, the two classes of variables most of interest in the present study (PPSE-School and PESR-Learning) were posited as single indicator latent variables by estimating the error terms from reliabilities (Kline, 2010). Model fit was evaluated using the following standard procedures: χ^2 likelihood ratio statistic, comparative fit index (CFI), Tucker Lewis Index (TLI), and root mean square error of approximation (RMSEA) with 90% confidence interval (CI). We accepted models with RMSEA $< .07$, CFI and TLI $> .90$ (Kline, 2010).

A baseline model was estimated so that Socio-Economic Status and Adolescents' Academic Achievement at age 12 were allowed to predict the Time 1 measures of PPSE_School and Adolescents' PESR_Learning; time-adjacent stability coefficients were estimated within each construct. Time 3 measures of PPSE_School and Adolescents' PESR_Learning were allowed to predict the adolescents' Academic Achievement at Time 3 while controlling for the associations between Socio-Economic Status and Academic Achievement at ages 12 and 14, and for the relationship between the two-time measures of Adolescents' Academic Achievement. This model was estimated and provided a relatively poor fit of the data [$\chi^2(23) = 92.968, p < .01, CFI = 0.932, TLI = 0.896, RMSEA = 0.08$ (90% CI .06 - .10), SRMR = 0.08]. Next, four within-time residual correlations were added, which led to a significant improvement in the model fit [$\chi^2(20) = 82.932, p < .01, CFI = 0.93, TLI = 0.89, RMSEA = 0.08$ (90% CI .06 - .10), SRMR = .06; $D \chi^2(3) = 10.03, p < .05$]. Finally, the cross-lagged paths from PPSE_School predicting later PESR_Learning (Time 1 predicting Time 2, and Time 2 predicting Time 3), and from PESR_Learning predicting later PPSE_School (Time 1 predicting Time 2, and Time 2 predicting Time 3) were added, which led to a significant improvement in the model fit [$D \chi^2(4) = 23.677, p < .01$]. The final ARC model fit the data well [$\chi^2(16) = 59.255, p < .01, CFI = 0.958, TLI = 0.907, RMSEA = 0.08$ (90% CI .05 - .10), SRMR = 0.04]. In order to improve the fit of the model, we set to 0 the within-time1 and time2 residual correlations, which were not significantly different from 0 (T1 residual correlation: $\beta = .01, p = 0.86$; T2 residual correlation: $\beta = .05, p = .48$) [$\chi^2(18) = 59.776, p < .01, CFI = 0.96, TLI = 0.92, RMSEA = 0.07$ (90% CI .05 - .09), SRMR = .04; $D \chi^2(2) = 0.521, p = .77$].

Lastly, the ARC sex constrained model (Fig. 1), in which the parameters were constrained to equality across gender, reported a good fit to the data [$\chi^2(55) = 99.359, p < .01, CFI = 0.95, TLI = 0.94, RMSEA = 0.06$ (90% CI .04 - .08), SRMR = 0.06], and was not statistically different from the unconstrained model with freely estimated parameters [$D \chi^2(19) = 8.024, p = .98$].

In the final ARC Cross-Lagged Model, the equality of the autoregressive paths (e.g., PPSE_School T1 -> PPSE_School T2 = PPSE_School T2 -> PPSE_School T3, so on and so forth),

which were all statistically significant for both males ($p < .001$; PPSE_School mean $\beta = .533^{***}$; PESR-Learning mean $\beta = .706^{***}$) and females ($p < .001$; PPSE_School mean $\beta = .558^{***}$; PESR-Learning mean $\beta = .738^{***}$), reflected the same relationship structure over time. The results indicated that the variables in the model were highly stable across time. Despite the stability of constructs across time, the following cross-lagged paths were significant: T1 PPSE_School predicted T2 Adolescents' PESR_Learning ($\beta = .091^*$, $p < .05$; $\beta = .101^*$, $p < .05$; respectively for males and females) and, T2 Adolescents' PESR_Learning predicted T3 PPSE_School ($\beta = .233^{***}$, $p < .001$; $\beta = .229^{***}$, $p < .001$; respectively for male and females). However, the following cross-lagged paths were not significant: T1 Adolescents' PESR_Learning did not predict T2 PPSE_School ($\beta = .083$, $p = .10$; $\beta = .081$, $p = .10$; respectively for male and females); T2 PPSE_School did not predict T3 Adolescents' PESR_Learning ($\beta = .030$, $p = .05$; $\beta = .033$, $p = .05$; respectively for males and females). Indeed, Socio-Economic Status positively and significantly predicted only T1 measures of PPSE_School ($\beta = .122^*$, $p < .05$; $\beta = .116^*$, $p < .05$), while T1 measures of Academic Achievement significantly and positively predicted both T1 PPSE_School ($\beta = .142^{**}$, $p < .01$; $\beta = .135^{***}$, $p < .01$; respectively for male and female) and T1 Adolescents' PESR_Learning ($\beta = .406^{***}$, $p < .001$; $\beta = .412^{***}$, $p < .001$; respectively for males and females). Lastly, Academic Achievement at age 12 significantly and positively predicted Academic Achievement at age 14 ($\beta = .684^{***}$, $p < .001$; $\beta = .666^{***}$, $p < .001$; respectively for males and females), and was positively related to Socio-Economic Status ($\beta = .294^{***}$, $p < .001$; $\beta = .295^{***}$, $p < .001$; respectively for males and females). Finally, Academic Achievement at age 14 positively related to T3 PPSE_School ($\beta = .100^*$, $p < .05$; $\beta = .094^*$, $p < .05$; respectively for males and females) and T3 PESR_Learning ($\beta = .169^{***}$, $p < .001$; $\beta = .148^{***}$, $p < .001$; respectively for males and females).

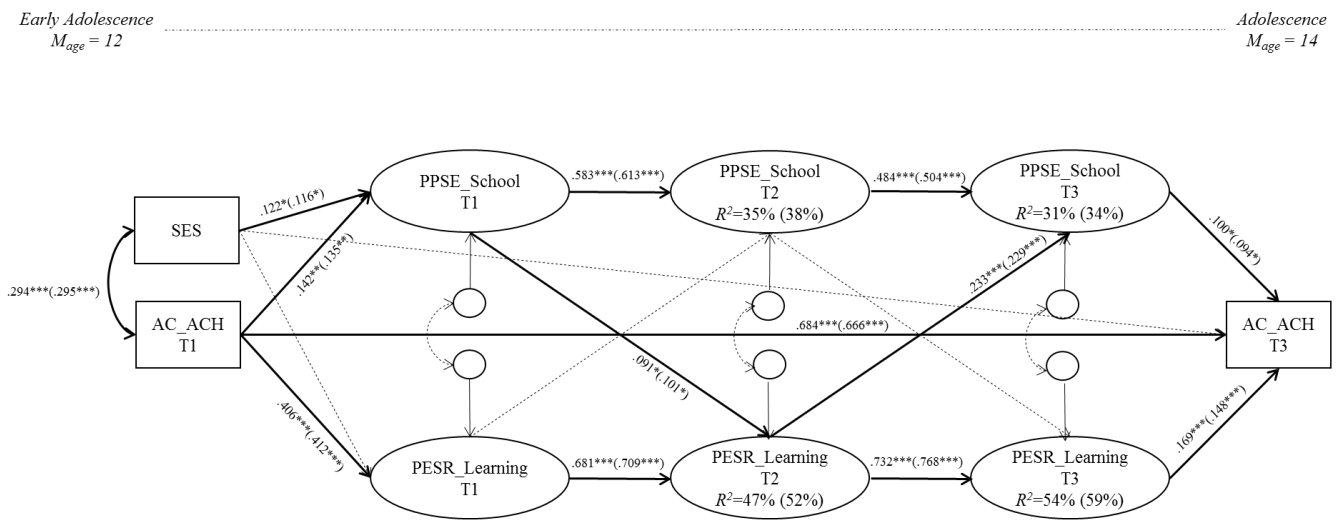
Overall, the model explained a significant percentage of the variance (54% and 55% of the variance of junior high school Academic Achievement at T3 for males and females respectively).

Finally, considering that we found cohort effects for Academic Achievement measured at age 12 [$F(2,427) = 6.528$, $p < .01$] and 14 [$F(2,376) = 35.72$, $p < .001$], and for adolescents' efficacy for

self-regulated learning at age 13 [$F(2,416) = 4.584, p=.01$], we repeated the complete set of analyses while controlling for cohort effects. Specifically, we included in our analyses one categorical variable coded 0 (cohort 1), 1 (cohort 2) and 2 (cohort 3). Of note, the results remained the same when compared with those where we controlled for cohort effects.

Figure 1

AR Cross-Lagged Model



Note: $\chi^2 = 99.359$; $df = 55$; $p < .01$; CFI = .95; TLI = .94; RMSEA = .07; SRMR = .06. All the reported parameters are standardized and reported separately for males and females (in parentheses). Dotted lines represent not significant. SES = Socio-Economic Status; PPSE_School = Perceived Parental Self-Efficacy School-Related Performance; PESR_Learning = Perceived Efficacy for Self-Regulated Learning; AC_ACH = Academic Achievement. * = $p < .05$; ** = $p < .01$; *** = $p < .001$.

3. Discussion and Conclusion

The aims of the study were: **(a)** to analyze the longitudinal reciprocal associations between Parental Self-Efficacy in School-Related Performance (PPSE School) and Adolescents' Perceived Efficacy for Self-Regulated Learning (PESR Learning) during the transition to middle school; **(b)** to examine the effects of PPSE School and PESR Learning on students' academic achievement at the end of middle school, considering the initial levels of students' academic achievement (T1); **(c)** to examine the predictive effect of family socio-economic status on T1 PPSE School, T1 PESR Learning and T3 academic achievement; **(d)** to investigate the differences between boys and girls in the associations among the variables studied.

Regarding the first aim **(a)**, as expected (Bandura et al., 1996; Kuczynski, 2003; Ardel & Eccles, 2001; Glatz & Buchanan, 2015b) we found that T1 PPSE_School positively and significantly predicts T2 PESR_Learning, and that T2_PESR Learning positively and significantly predicts T3_PPSE School.

Our results, firstly attests that parents' beliefs in their capability to promote their children's positive academic development is particularly relevant in shaping children's beliefs in their self-regulatory efficacy to plan and organize their academic activities. In fact, according to the Social-Cognitive theory, parents who are better able to promote their children's interest in learning activities and motivate them for academic pursuits, not only select contexts which favor the increase in children's self-efficacy through mastering experiences, but also act as positive role models for their children who will adopt their parents' beliefs and attitudes. Secondly, our findings regarding the overtime associations between parental and adolescents' self-efficacy beliefs concur with the Bandura's hypothesis of bidirectionality and the construction of the agentic relation between parents and children, suggesting that, parents with high self-efficacy beliefs contribute to model their children's self-efficacy by providing various experience in which children can exercise the human agency. Later in development, also children's academic self-efficacy influences the parents' perceived efficacy. Also, our results corroborate Kuczynski 's (Kuczynski, 2003) Social Relation

Theory, in which recognize both parents and children as equal agents during development, even if there is an initial interdependent asymmetry relation. In fact, parents have greater resources (knowledge, physical strength, control) than their children, and later during the development, the relationship between parents and children becomes more equal in terms of reciprocal resources and powers.

Regarding the second aim **(b)**, we confirmed our hypothesis (Hoover-Dempsey, Bassler, & Brissie; 1992; Bandura, Barbaranelli, Caprara and Pastorelli, 1996; Bogenschneider et al. 1997; Ardel & Eccless, 2001; Zimmerman, Bandura & Martinez-Pons, 1992; Caprara, Fida, Vecchione, Del Bove, Vecchio, Barbaranelli & Bandura; 2008) that both T3 PPSE School and T3 adolescents' PESR Learning positively and significantly predict adolescents' academic achievement at the end of middle school, even after controlling the initial level of students' academic achievement. These results attest to the importance of increasing both parental and adolescents' academic self-efficacy in influencing academic adjustment, and affirm the importance of human agency in affecting successful developmental outcomes.

Regarding the third aim **(c)**, we confirmed our hypothesis (Eagle, 1989) that high family socio-economic status is significantly associated with high initial level of academic achievement (age 12), providing more resources and opportunities to increase individuals' potential. However, contrary to our expectations (Sirin, 2005), family socio-economic status did not significantly predict students' academic achievement at the end of middle school. Nevertheless, it is possible that our results are due to the fact that in our analysis we controlled for the weight of the initial level of academic achievement (age 12) in predicting academic achievement at the end of middle school (age 14). Indeed, in line with our expectations (Bandura et al., 2001), family socio-economic status significantly predicts T1 PPSE School (child's age of 12) but not T1 PESR Learning (child's age of 12). In particular, results suggest that parents who experience greater difficulties (e.g. high economic pressure) may provide their children with less material resources, perceive themselves as less able to positively affect their children's development, compared to parents who live in privileged circumstances. Indeed, according

to Bandura and colleagues (2001), our results support that the family socio-economic status does not have a direct effect on children's academic self-efficacy beliefs, but that it is possible that the effect of family socio-economic status is mediated by parental academic self-efficacy beliefs.

Finally, regarding the fourth aim **(d)**, we did not advance strict hypothesis regarding the differences between boys and girls in the associations among the variables studied. In accordance with more recent studies our result corroborates the hypothesis (Voyer & Voyer, 2014; Di Giunta et al., 2013) of a recent decrease in the differences between boys and girls in academic functioning, thereby supporting the hypothesis that the relationship between maternal self-efficacy and academic achievement does not differ due to the child's gender (Bogenschneider et al., 1997).

In general, the findings of the study attest to the relevant role played by parents in building children's sense of efficacy that is necessary to successfully face the challenges associated with the transition to middle school, and the importance of increasing parents' beliefs in their ability to positively affect their children's academic development and to achieve developmental success. Children whose parent convey high beliefs in their capacity to be involved in their school life likely enhance their confidence in achieving higher academic progress than those whose parents show doubts about their involvement. Indeed, our findings have important implications for prevention programs aimed at promoting adolescent school success and adjustment. Findings suggest that intervention programs be aimed at increasing Parental efficacy during adolescence.

To the best of our knowledge this is the first study examining the bidirectional associations between parental self-efficacy and children's self-efficacy longitudinally and results highline the importance to assume an agentic perspective when considering the role of parents and children that contribute to individual adjustment.

However, future research should address some limitations of the present study.

Firstly, despite the relevance of the present study in considering the transition to middle school, it would be interesting to examine how the bidirectional processes between parental and adolescents' self-efficacy change over a longer period, such as during the transition to senior high

school. Secondly, we cannot exclude that the identified associations could differ due to the parents' gender (mothers and fathers).

Finally, it would also be useful to examine the specific mechanisms through which parental self-efficacy shapes children's self-efficacy, and through which children's self-efficacy affects parental self-efficacy.

Despite these limitations, this study provides new evidence of how the association between parental self-efficacy and adolescents' self-efficacy change during the transition to middle school being the first study longitudinally focused on the reciprocal associations between parental self-efficacy and children's self-efficacy, and also confirms the relevant role played by parental self-efficacy beliefs in affecting children's self-efficacy during this critical school transition. Finally, this study significantly contributes understanding the mechanisms through which parents with high self-efficacy could positive affect their children's sense of efficacy via adaptive experiences and the exercise of human agency. This aspect is theoretically relevant because it integrates the literature focused on the development of self-efficacy beliefs with the within family socialization theories. Also, it is practically relevant in terms of prevention and intervention programs focused on the increase of self-efficacy in both parents and children.

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CHAPTER V

General Conclusions

General Conclusions

The present dissertation aimed to analyze the contribution of Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Perceived Efficacy for Self-Regulated Learning to Academic Achievement during the transition to middle school (from age 12 to age 14). In particular we analyzed:

- The psychometric properties of the Perceived Parental Self-Efficacy in School-Related Performance Scale and the Adolescents' Self-Efficacy for Self-Regulated Learning Scale, examining the invariant function of the scales between mothers and fathers (for the Perceived Parental Self-Efficacy in School-Related Performance Scale), parents of boys and girls, and across time (for both the scales), as well as the construct validity of the scales (Chapter II).
- The identification of the normative developmental trajectory of Perceived Parental Self-Efficacy in School-Related Performance through Latent Growth Curves Models during the transition to middle school, examining its association with adolescents' later academic achievement at age 14 (Chapter III).
- The over-time associations between Perceived Parental Self-Efficacy in School-Related Performance and Adolescents' Perceived Efficacy for Self-Regulated Learning during the transition to middle school, examining their impact on adolescents' academic achievement at the end of middle school, as well as focusing on the predictive effect of family socio-economic status and on the differences between boys and girls in the associations among the study variables (Chapter IV).

In general, this dissertation adds to the current literature focused on the effects of within-family socialization on adolescents' academic functioning during the transition to middle school in various aspects.

Firstly, Study 1 represents a step forward in the investigation of the psychometric properties of parental and personal self-efficacy beliefs in the scholastic domain from early adolescence to adolescence. In fact, to the best of our knowledge few studies have focused on the validity of Parental academic self-efficacy in the Italian context (Bandura, Barbaranelli, Caprara & Pastorelli, 1996; Pastorelli & Gerbino, 2001), and with the exception of one study (Usher & Pajares, 2008), previous works focusing on the psychometric properties of the Perceived Efficacy for Self-Regulated Learning scale did not investigate the invariant function of the scale between boys and girls and across time. In this regard, our contribution provides valid instruments to assess parental and adolescents' academic self-efficacy beliefs, supporting their significant associations with students' academic adjustment.

Secondly, regarding Study 2, to our knowledge this is the second study that focuses on the mean-level change in parental self-efficacy during the transition from early adolescence to adolescence, and the only one that specifically considered the scholastic domain. In particular, our study confirmed the hypotheses that Perceived Parental Self-Efficacy in School-Related Performance declines during the transition to adolescence but, its less decline could act as a protective factor during the students' transition to middle school, increasing students' later academic achievement.

Lastly, Study 3 is the first study that examined the bidirectional associations between parental self-efficacy and children's self-efficacy at a longitudinal level, extending the literature on the relevant role played by parents in shaping their children's beliefs about their efficacy. In particular, Study 3 highlights the importance of increasing parents' beliefs in their efficacy to positively affect their children's academic development, in order to build their children's sense of efficacy necessary to reach higher and more complex academic goals of middle school.

Combining the results of these studies, the present dissertation advances our knowledge on the mechanisms through which parental self-efficacy beliefs contributes to individual adjustment via adolescents' self-efficacy beliefs. High initial levels of Parental Self-Efficacy in School-Related Performance constitute a protective factor to build high adolescents' academic self-efficacy, and that,

despite its decrease during the transition to middle school, it continues to affect adolescents' academic self-efficacy and academic adjustment because the success achieves by children becomes a process that drives parents' beliefs in their parental role, which in turn positively affects students' later academic achievement.

Overall, our findings suggest that the role played by parents in affecting their children's beliefs and outcomes in the school context is particularly relevant and significant during this challenging developmental period, characterized by the passage from elementary to middle school. Indeed, this dissertation supports the importance of considering both parents and children in an agentic perspective, they both contribute to their environment and adjustment.

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