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Parent and Teacher Influences on Children's Academic Motivation

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Parent and Teacher Influences on Children's Academic Motivation

by

Tatiana Snyder

A dissertation submitted in partial fulfillment of the
requirements for the degree of

Doctor of Philosophy
in
Systems Science: Psychology

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Portland State University
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Abstract

In the last two decades, a growing body of research has indicated that both parents and teachers play an important role in children's academic success. Multiple features of parenting and teaching have been found to facilitate children's academic self-perceptions, motivation, and school engagement. However, prior research has focused on parents and teachers as unrelated social contexts and the effects of parenting and teaching on children's academic performance are usually studied within isolated and independent traditions. Currently, little is known about the combined effects of parents and teachers on children's school performance. Only a few studies have explored the link between both contexts and it is still not understood whether the effects of one social context simply add to the effects of another, or whether both contexts interact and modify each other.

The current study developed a comprehensive theoretical framework of joint multiple contextual influences (JMCI framework) to guide empirical investigation of combine influences of social contexts on children's academic outcomes. Drawn from several general frameworks, four models of joint social influences were proposed: Independent, Interactive, Differential, and Sequential. Using a motivational framework, all four models were tested empirically for joint effects of parents and teachers on children's self-perceptions (relatedness, competence, and autonomy) and classroom engagement.

Overall, this study provided some empirical support for every category of models proposed in the JMCI framework. The joint influences of parents and teachers on children's self-perceptions were mostly independent and unique. Most joint influences were additive: one social context couldn't buffer or amplify the effects of the other context. Only joint effects of Non-Supportive parents and Supportive teachers interacted in their influences on children's competence: Supportive teachers were able to safeguard and counterbalance the negative influences of Non-Supportive parents.

The study also indicated that self-system processes are possible pathways through which parents and teachers exert their influences on children's academic engagement and that this influence depends on the age of the developing child. The study also suggested that children's engagement may be a mechanism that mediates the relationship between parents' and teachers' contexts.

Inclusion of both parents and teachers allowed for a finer differentiation among social influences and greater explanatory specificity in predicting children's school outcomes. When social contexts are combined together within one study, a new unique property emerges which becomes an attribute of the *whole*, and this property is virtually invisible if each of the social contexts is examined independently.

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INTRODUCTION

It is well established in psychological research that both parents and teachers have a substantial and lasting influence on children's success in school. Families and schools are primary social contexts in which children construct beliefs about themselves, the people they interact with, and the social worlds that they experience. The quality of interactions that children have with parents at home and teachers at school shape their academic skills, interests, competencies, aspirations, and their orientation towards achievement and learning. Multiple features of parenting and teaching have been found to influence children's academic self-perceptions, motivation and school engagement. Caring parents who have high expectations for their children and are involved in schooling and supportive teachers facilitate children's academic successes.

Even though a great deal is known about how parents and teachers individually play important roles in children's academic performance, very little is known about how the effects of these two contexts combine in day-to-day interactions influencing children's academic development. Prior research has been generally focused on parents and teachers as distinct and independent contexts, and the study of parents' or teachers' influences on children's academic performance has been represented by relatively distinct lines of research and theory.

Although it seems clear that parents and teachers have distinctive yet interrelated roles in children's academic development, it is still rare for researchers to examine the effects of these two social contexts in a single study. Despite researchers' and theorists' continuing suggestions to incorporate the effects of

multiple social contexts and to develop more contextual and systemic approaches for empirical investigation, surprisingly, only a few studies have attempted to incorporate these approaches (Anderman & Anderman, 2000; Bronfenbrenner, 1978; Bronfenbrenner & Crouter, 1983; Goodenow, 1992; Learner, 1995; Pintrich, 1994).

These studies pose such important questions as: Do children's relationships with parents relate to the quality of the relationships that children establish with their teachers? Do the effects of one social context simply add to the effects of another context? Does the quality of children's relationships with their parents interact and modify the type of relationships that children develop with their teachers? If home and school are governed by different rules and have different qualities and characteristics, how do children adapt to the differences and navigate the transitions?

Some researchers suggest that the effects of family and school may depend on whether children experience each context as a source of support or tension and trepidation. If children's experiences are consistent across social contexts (e.g., both contexts are either supportive or non-supportive), the effects of one context may be, at least in part, amplified by the effects of the other. However, if children's quality of interaction with parents and teachers are incongruent (e.g., parents are supportive and teachers are non-supportive or vice versa), the effects of a more positive context may safeguard, at least in part, against the negative effects of the other context.

Overview of the Problem

The few studies that examine the joint effects of parents and teachers on children's academic performance, find that both social contexts are important. However, that is about all the studies agree upon. There is a great deal of confusion

about how exactly these effects combine to exert their influences. In some cases where multiple studies are compared, the same effects were found but they were labeled with different names. Other times, within the same study, different constructs were tapped for parent and teacher contexts or they were measured by instruments with differing psychometric properties. Such inconsistencies in conceptual and operational definitions of constructs undermine the within- and between-study comparability and make interpretations of the subsequent findings more difficult. Moreover, all studies have some common flaws. For example, none of the studies examined change in outcome variables over time. Interactive effects of parent-teacher-child relationships are likely to produce developmental changes, and to detect these requires the examination of influences over time.

Finally, and most importantly, there are no general conceptual models that specify the nature of joint effects among the contexts and provide guidelines about the nature of underlying mechanisms, processes, and functional principles and how they operate together. Without such conceptual models, the wide range of inconsistencies and contradictions in empirical findings is not surprising. What *is* rather puzzling, is that although the need for studying multiple contextual influences has been clearly articulated, there are no comprehensive conceptual models designed to provide unification and guidance for more systemically-oriented empirical investigations (Anderman & Anderman, 2000; Bronfenbrenner, 1978; Bronfenbrenner & Crouter, 1983; Goodenow, 1992; Learner, 1995; Pintrich, 1994).

Purpose of Present Study

In the light of these critiques, the purposes of this project are three-fold. First, the project aimed to develop a more comprehensive framework of joint multiple contextual influences (JMCI framework) that can be general enough to be applicable to various contexts and various developmental outcomes, and at the same time be specific enough that it can provide clear and detailed guidelines for future empirical investigations. The second purpose was to test empirically the proposed framework, using data from a study examining the effects of parent and teacher support on the development of children's academic self-perceptions and engagement in the classroom during the elementary school years. The third purpose of the project was to reexamine the utility of the JMCI framework based on the empirical analyses conducted in the study and make clarifications, elaborations, and modifications as needed.

To develop the JMCI framework, existing models of joint effects in the literature were closely examined, integrated, and organized. In addition, several different theoretical models and approaches (the Ecological model, Systems Science approach, Risk and Protective Factors approach, and Contextual Change Over Time models) were employed to provide specific insights as well as a broader and deeper understanding of multiple contextual influences. Each of these conceptual models has its own strengths and weaknesses. When integrated, the strengths of one model or approach often compensated for the limitations of another, cumulatively offering a more inclusive and explicit account of multiple contextual influences and providing a theoretical foundation for the development of the JMCI framework.

Specifically, the Ecological model, which is the most general and well-developed contextual model in the current literature, provided an overarching view of the parent-teacher-child system and addressed the dynamics inherent in this social system. The model suggests that a person develops within a sequence of multiple nested environments (*microsystem, mesosystem, exosystem, and macrosystem*). Face-to-face reciprocal interactions within immediate settings (or *proximal processes*) are primary mechanisms explaining the functionality within the system. Cumulatively, these proximal processes facilitate or undermine individuals' normative development. In addition, the Ecological model suggests further that 1) *personal characteristics* (e.g., age, gender, personality, or level of intelligence) have to be accounted for, since they affect the quality and nature of proximal processes, and 2) *time* envelopes all interacting elements and processes of the system.

Although the Ecological model suggests that an individual develops within complex contextual systems, it does not specify how to identify the system under study and how to organize the hierarchy of nested contexts in which the system is embedded. The Systems Science approach was utilized to provide clear guidelines for *defining a system*. The notion of *levels of perception*, which is inherent in a system definition, was useful for this project because it urges researchers to be mindful about multiple observational standpoints from which a system under study is perceived and interpreted. The Systems Science concept of *feedback loops* was also helpful in better understanding the dynamic functionality of context-person interrelationships.

The Risk and Protective Factor theoretical framework was employed to provide further elaboration of the dynamical relationships within the parent-teacher-child system. It suggests specific factors (present within a context as well as within a developing person) that continuously interact, shaping development. This framework suggests that both protective and risk factors have to be identified, because one supports and the other undermines developmental outcomes. According to this approach, the effects of risk and protective factors are not additive, but *interactive* and cumulative. The Risk and Protective factor framework suggests two different interactive models: 1) *amplifying* and 2) *buffering*, which are to date, the most specific and comprehensive elaboration on combined interactive contextual influences.

Finally, insights from the Models of Contextual Change Over Time were used to emphasize the importance of time when joint contextual effects are under study. The Contextual Change models, in unison with the Ecological model, argue that both context and person are *continuously changing* over time. Even more importantly, the relationship of change between context and a person is *reciprocal*. The reciprocity of change over time is captured by *compensatory* and *magnifying* patterns of influence.

Joint Multiple Contexts Influence Framework

Drawing on the insights from these different models and approaches, as well as existing empirical literature on joint effects, the JMCI framework was developed in a way that can be summarized in four specific classes of models: (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential Effects Models. According to the

independent effects model, each social context has its own influences on a developing person. However, the effects of these multiple social contexts are not related. Independent effects can be (a.1) substitutive or (a.2) unique. In the *substitutive* model, the effects of one context can replace the effects of the other context. In the *unique* effects model, each social context has its own unique influences on a developing person. These unique contextual influences are cumulative. Depending on the quality of social contexts, substitutive effects models can be subdivided further into (a.1.a) *alternative contexts* or (a.1.b) *alternative pathways* effects model. Unique effects models can be subdivided further into (a.2.a) *congruent* or (a.2.b) *incongruent* effects models.

The *interactive effects* model, with its multiple subcategories, is the most elaborate and refined model in the proposed framework. According to this model, the effects of social contexts are not independent. Therefore combined effects of social contexts cannot be understood unless they are considered simultaneously. Two categories of Interactive Effects Models are proposed: (b.1) complete dependence and (b.2) partial dependence.

In the *complete dependence* model, the presence and absence of effects of one context depends entirely on the quality of another social context. Taking into consideration various combinations of positive and negative qualities of social contexts, four types of interactive effects models are proposed: (b.1.a) *activating*, (b.1.b) *buffering*, (b.1.c) *compensating*, and (b.1.d) *immunizing*.

In contrast to the complete dependence model, the *partial dependence* model suggests only a limited dependence of one social context on the other. Specifically,

supportive or non-supportive effects of one context can be increased or decreased depending on the quality of the other context, but not turned "on" or "off."

Considering various combinations of contexts' positive and negative qualities, four types of partial dependence models are suggested: (b.2.a) *amplifying*, (b.2.b) *boosting*, (b.2.c) *diminishing*, and (b.2.d) *counterbalancing*.

In the *differential effects* model of the JMCI framework, the effects of social contexts on a developing person may depend on (c.1) the type of *mediator* that links the context and the outcome or (c.2) the *characteristics of a target person*.

In the *sequential effects* model of the JMCI framework, there are various time-graded links between social contexts and a developing person. Social contexts and a developing person could possibly have three sequences of influences: (d.1) *context to person to context*, (d.2) *context to context to person*, and (d.3) *person to context to context*.

Each of these proposed models can be thought of as a discrete level of analyses under study with corresponding sub-categories of models. The four proposed models of the JMCI framework [(a) Independent, (b) Interactive, (c) Differential, and (d) Sequential Effects Models] reflect the complexity of possible relationships between parents, teachers, and a developing person, and they specify the focus and level of testing for empirical investigation. Notably, various patterns of the four proposed models are so general and all-inclusive that they can be applied not only to parents and teachers but also to other social partners (e.g., peers).

Organization of Dissertation

This dissertation project is organized in the following manner. Chapter One is a review of empirical studies, which are presented in three sections: 1) studies that examined parental influences on children's academic motivation, 2) studies that examined teacher influences on children's academic motivation, and 3) studies that examined joint parent and teacher influences on children's academic motivation.

Chapter Two introduces four general conceptual models and approaches, namely, the Ecological model, the Systems Science approach, the Risk and Protective Factors approach, and Contextual Change Over Time models. Each of these models and approaches are described and critiqued with respect to their relative contribution to the development the JMCI framework. Chapter Three presents four newly developed conceptual models of joint effects (*independent*, *interactive*, *differential*, and Sequential Effects Models), elaborating on each type of effects that it represents.

In the Fourth chapter, the current empirical study is described: 1) the Motivational model is presented as a theoretical foundation for the empirical testing of all four proposed models, and 2) this is followed by the sets of research questions addressing each model. Chapter Five presents the methods and procedures used to collect the data on which the models were tested. Chapter Six elaborates on the step-by-step statistical procedures and results obtained in testing four proposed models in the JMCI framework. In this chapter, results for empirical testing of Independent and Interactive Effects Models are presented first, followed by the results for *differential* and *sequential* effects models. The dissertation concludes with the final

chapter titled Discussion. The Discussion chapter 1) starts with an overall summary of the current study findings, 2) proceeds to elaborating on limitations and contributions of the study, and 3) suggests the direction for future research.

CHAPTER 1: REVIEW OF RESEARCH ON PARENT AND TEACHER INFLUENCES ON CHILDREN'S ACADEMIC PERFORMANCE

This chapter is a summary of the literature and empirical findings on how parents and teachers influence children's performance in school. The chapter has three sections. The first section elaborates on parents' role in children's academic motivation. The second section addresses the role of teachers in children's school motivation. The third section presents studies that examined how effects of both parents and teachers combine together to facilitate or undermine children's academic success.

Parental Influence on Children's Academic Motivation

A growing body of psychological research has established a strong connection between the quality of parent-child interactions and children's school performance. A number of parenting characteristics have been linked to children's academic success. In general, it has been found that warm, nurturing, involved, and democratic parents have children with higher grades and higher scores on achievement tests (e.g., Okagaki & Frensch, 1998; Paulson, 1994; Patrikakou, 1997; Stevenson & Baker, 1987; Taylor et al., 1995; Weiss & Schwarz, 1996). In contrast, parents who are hostile, excessively strict and controlling and parents who are uninvolved and permissive have children with lower academic performance (Dornbusch et al., 1987; Stainberg et al., 1994).

Although multiple studies have established a clear relationship between parenting practices and children's academic performance, researchers recently have begun to pose the next important question: *How* do parents affect their children's

school performance? Many researchers agree that children are active participants in their interactions with parents as they perceive, organize, and transform their experiences into cognitive representations and internal resources and carry them from the home environment into a school setting. There is an increasing interest in understanding how certain parenting practices contribute to the development of a child's characteristics or internal resources, and how these changes may possibly mediate the relationship between parenting and school outcomes.

Many researchers suggest motivational resources as one possible pathway through which parenting influences children's school performance (Connell, 1990; Connel, 1994; Deci & Ryan, 1991; Deci et al., 1991; Estrada et al., 1987; Glasgow et al., 1997; Grolnick & Ryan, 1989; Grolnick & Ryan 1992, Grolnick & Slowiaczek, 1994; Grolnick et al., 1991; Ryan & Powelson, 1991; Steinberg et al., 1989;Wagner & Phillips, 1992; Wentzel, 1994). Multiple features of parenting have been linked to children's academic motivation. The majority of the studies have focused on three features of parenting in relation to children's motivation: (1) extent and quality of parental *involvement* in children's schooling, (2) specific *dimensions* of parenting (e.g., warmth and control), and (3) *styles* of parenting (e.g., authoritative, authoritarian, permissive). This section will summarize findings that illustrate the link between each of the three features of parenting and children's academic motivation.

Parental Involvement in Schooling

Consistently, across a wide range of children's age groups, studies indicate that children have an academic advantage when their parents are involved in

schooling (Fan & Chen, 2001; Griffith, 1997; Grolnick & Slowiaczek, 1994; Grolnick et al., 1997; Stevenson & Baker, 1987; Comer & Haynes, 1991; Simons-Morton & Crump, 2003). For example, parents' awareness and participation in their children's homework was found to benefit children's learning at home (Pekins & Milgram, 1996). Parental involvement in the educational domain includes parents' educational expectations, attitudes, achievement-related beliefs and encouragement, all of which were positively correlated with children's academic motivational outcomes (Patrikakou, 1997; Seginer, 1983; Agrawal & Pande, 1997; Gonzalez-Pienda et.al., 2002; Juang & Silbereisen, 2002; Xu & Corno, 1998; Cooper et al., 1998; Halle et al., 1997).

Quality of involvement. Several researchers have raised the issue of quality of parental involvement. Researchers suggest that it is not parental involvement in children's education *per se* that leads to higher academic performance, but rather the manner in which parents are involved in their children's schooling (Solomon, et. al., 2002). For example, surveillance of homework (i.e., parental reminders and insistence that children do homework) was found to have a negative relationship with intrinsic motivation, which in turn was related to lower academic performance (Ginsburg & Bronstein, 1993).

When parents experience strong negative emotions while helping children with their home-work, they are likely to undermine rather than support their children's learning (Hoover-Dempsey, et. al., 1995). It was also suggested that parents who were more controlling in checking and helping their children with homework have children who are less likely to perform well academically (Mau, 1997). Thus, parents

who are involved in children's schooling, but are controlling, intrusive, and demanding, may have different effects on children than parents who are involved in autonomy supportive ways.

Parenting Dimensions

Many studies have examined specific features of parent-child interaction at home as factors influencing children's motivation in school. Generally, various parenting practices have been clustered by psychologists along three dimensions: *warmth vs. hostility*, *structure vs. chaos*, and *autonomy vs. coercion* (Schaefer, 1965; Maccoby & Martin, 1983; Baumrind, 1971; Deci & Ryan, 1985; Grolnick & Ryan, 1989; Skinner, 1991, Skinner et al., 2005). Consistently throughout the literature, appearing under slightly different construct labels, these dimensions have emerged as significant predictors of children's school motivation (Deci et al., 1991; Grolnick & Ryan, 1989; Herman et al., 1997; Steinberg et al., 1992; Wagner & Phillips, 1992).

Parents who are high on *warmth* evaluate their children positively, express affection, try to see things from the child's perspective, and share activities, plans, and interests together with their children. In contrast, hostile parents are rejecting, ignoring, and irritable and evaluate their children negatively. Parental warmth predicts children's positive perceptions of their academic abilities (Wagner & Phillips, 1992), higher academic performance (Estrada, 1987; Herman et al., 1997; Taris & Bok, 1996), and lower drop-out rate (Taris & Bok, 1996). Parental hostility was found to be negatively related to children's GPA (Wentzel, 1994). Children, whose parents reacted to grades with punishment or criticism, showed lower intrinsic motivation and lower academic performance (Ginsburg & Bronstein, 1993).

The dimension of *structure vs. chaos* refers to parental practices which promote in children an experience of competence and self-regulation and create a predictable environment for development. This dimension indicates the amount of supervision, and monitoring that parents provide to their children, presence or lack of clear rules and expectations, and level of predictability and consistency in parenting practices. Parental provision of structure was found to be related to children's control understanding, which was linked to higher classroom grades and scores on standardized achievement tests (Grolnick & Ryan, 1989). It was also found that harsh and inconsistent parental discipline negatively related to the children's cognitive self-worth, which was positively related to their GPA (Wentzel, 1994).

The dimension of *autonomy support* refers to parental practices that respect children's individuality, encourage independence and freedom of expression. In contrast, parental *coercion* refers to negative control, inflexibility, and enforcement of obedience and conformity. Parental autonomy support was linked to children's intrinsic motivation and perceived competence, which in turn, positively affected children's academic performance (Deci, et al., 1991; Grolnick & Ryan, 1989). Parental provision of autonomy was also positively associated with adolescents' grades (Herman et al., 1997).

Parenting Style

There is large body of research that examines the link between patterns of parent-child interaction (or emotional climate in which the interaction between the parent and child takes place) and children's academic performance. This emotional climate is labeled "parenting style" and is distinguished from specific parenting

behaviors and practices. There are four traditional parenting styles, which are characterized according to how parents exert their control and authority over children and how affectionate they are. These styles were defined by Baumrind (1971) and elaborated by Maccoby & Martin (1983) as authoritarian, authoritative, permissive/indulgent, and indifferent/uninvolved.

Authoritative parents are characterized by warmth and affection towards their children, encouragement of independence, and expression of respect for their children's rights and individuality. At the same time, authoritative parents exercise firm control, enforce rules, and set clear expectations for their children.

Authoritarian parents are also characterized by a high degree of control and consistency in enforcing rules. However, they do not encourage independence in their children, but expect order and obedience. Such parents are also low on the expression of affection and warmth toward their children. In contrast, *permissive/indulgent* parents are nurturing but make few if any demands and restrictions on their children. They are lax or inconsistent in enforcing rules or structure and usually have low expectations. Finally, *indifferent/uninvolved* parents are low in demonstration of both control and affection.

Both authoritarian and permissive styles, in contrast to the authoritative style, have been related to lower levels of academic competence in children (Baumrind, 1973, 1989, 1991; Steinberg et al., 1994). Consistently, the authoritative style of parenting has been found to predict more positive attitudes towards school, higher levels of academic competence, higher level of psychological development, higher engagement, higher grades, and lower internalized distress and problem behavior

(Dornbusch, et al., 1987; Lamborn et al., 1992; Maccoby & Martin, 1983; Steinberg et al., 1992).

Parents who were characterized as neglectful and indulgent had children with lower academic engagement and GPA, lower self-reliance, and higher level of behavior problems (Lamborn et al., 1992). In relation to most outcomes, children with authoritarian parents scored between children with authoritative and indulgent/neglectful parents. In sum, research has linked authoritative style of parenting to a variety of positive academic outcomes, while authoritarian, neglectful, and indulgent styles were linked to a variety of negative outcomes.

Summary of Parent Influences on Children's Academic Performance

A large body of research established a strong relationship between parenting practices and children's academic motivation. Three features of parenting have been discussed in this section. First, it was shown that overall parental *involvement* in schooling is beneficial for children's academic outcomes: in general, parents who are more involved in schooling have children who perform better academically. Second, general parenting practices, also known as *dimensions* of parenting (e.g., warmth, provision of structure, and autonomy support) also play an important role in children's academic successes. Finally, parenting *style*, or the general emotional climate of the parent-child relationship, affects the quality of children's school performance: an authoritative style of parenting, in contrast to authoritarian, permissive, and uninvolved styles, facilitates optimal academic outcomes.

Teacher Influence on Children's Academic Motivation

In addition to parental influences on children's school performance, a

considerable body of research supports the proposition that teachers also play an important role in children's academic success. The early research was focused on the quality of teachers' instruction and the classroom environment as the primary factors influencing children's academic outcomes. Later, children's academic motivation became one of the focal points of research. It was suggested that if teachers foster students' motivation in the classroom, students are more engaged in the classroom, learn more, and, as a result, have higher academic performance. More recently, researchers began to argue that the quality of relationships that teachers develop with their students can foster or undermine children's motivation. This section presents studies that have examined 1) the structure and classroom environment that teachers create to promote students' academic success, and 2) the quality of the relationship that teachers have established with their students to support children's academic motivation.

Structure and Classroom Environment

Depending on how teachers organize and structure their classroom environment and curriculum, they may optimize or undermine children's involvement in schooling, motivation, attitude towards learning, and general academic adjustment. For example, when teachers create orderly and predictable classroom environments they foster children's motivation and, as a result, students have lower rates of absenteeism and dropping out (Bryk & Thum, 1989; Wentzel, 1997).

Teachers who employ clear and appropriate goals in their classrooms have students who are more willing to seek help when needed, as well as have higher

academic self-efficacy, motivation, and overall academic achievement (Ryan et al., 1998; Urdan et al., 1998). When schools have rigid policies and teachers employ harsh punishments, students experience such context as "over-regulated" or unfair and as a result their academic engagement and achievement declines (Barber & Olson, 1997). Use of social comparison and emphasis on competition in classrooms undermines students' sense of scholastic competence and decreases their intrinsic motivation (Harter, 1992).

Quality of Teacher-Child Relationship

In the last couple of decades, researchers have begun to suggest that teachers influence children's academic performance not only by the quality of instruction and classroom structure, but also by the nature of the relationship they establish with their students. Although research on the effects of the quality of the teacher-child relationship on children's academic motivation is not as substantial as on parental effects, there is enough evidence to suggest that teachers, as social partners, provide a social context in which children develop. As students observe and experience teachers' specific behaviors in their daily interactions, they make interpretations of the experiences, actively constructing views of themselves and their academic competencies, and forming attitudes towards learning (Graham, 1990; Parsons et al., 1982; Thorkildsen et al., 1994).

When teachers develop close, non-conflictual, and autonomy supportive relationships, students are more, motivated, engaged, self-directed, competent, cooperative, have more positive attitudes towards school and learning, and feel less lonely in school (Ames et al., 1977; Barber & Olson, 1997; Birch & Ladd, 1997;

Brothy, 1987; Connell, et al., 1995; Graham, 1990; Hamre & Pianta, 2001; Pianta, 1994; Pianta et al., 1995; Stipek et al., 1995; Thorkildsen et al., 1994; Wentzel & Asher, 1995; Wentzel, 1997). Children who drop out of high school report that poor relationships with teachers (children perceived teachers as disrespectful, disinterested, and unfair) was the most influential factor in their decision to leave school (Farrell, 1990).

Although the effects of the quality of the teacher-child relationship are evident, a theoretical framework is needed that specifies the dimensions of a teacher's caregiving in the classroom and explains how and why it affects students' performance. Some researchers suggest that teachers' practices in the classroom provide a socialization context similar to parents' context and, hence, it is possible that parenting models of socialization can be generalized and utilized for identifying the dimensions of teachers' caregiving and for understanding how they may optimize or undermine students' learning (Birch & Ladd, 1997; Pianta, et al., 1995; 1998; Wentzel, 1999; Wentzel, 2002). Indeed, many aspects of teachers' caregiving have been linked in the psychological literature to the three dimensions, which have been identified within the parenting literature: 1) *warmth vs. hostility/rejection*, 2) provision of *structure vs. chaos*, and 3) *autonomy support vs. coercion*. The following section will summarize research findings that illustrate how these three aspects of teachers' caregiving are related to children's academic motivation.

Warmth. Studies indicate that it is important for children to know that their teachers care about them, respect and approve of them, and value them as individuals (Wentzel, 1997). It appears that students benefit when they receive warmth and

personal attention from their teachers and they want to see teachers as their well-wishers. For example, if students perceive their teachers as sources of support and comfort, if they can freely approach teachers, asking for help or expressing their feelings, it facilitates children's involvement in the classroom and promotes more positive attitudes toward school (Birch & Ladd, 1997; 1998). This aspect of the teacher-child relationship is still in the early stages of exploration and has been studied under such names as "psychological environment" (Roeser et al., 1996), "emotional climate" (Brophy, 1986), or "pedagogical caring" (Wentzel 1997).

When teachers are supportive, caring, and involved in relationships with their students, they also facilitate children's fundamental need to belong, need to relate to others, and to be acknowledged and valued as individuals. When this need is satisfied, it fosters children's positive self-perceptions in the academic domain, which, in turn, facilitates their behavioral and emotional engagement in the classroom, and contributes to higher academic achievement (Connell, 1990; Deci & Ryan, 1985). In contrast, conflicting relationship with teachers can be a source of stress for children and can illicit fear, anxiety, anger, noncompliance, and the experience of loneliness and alienation. Teachers' pedagogical caring creates an emotional classroom climate that is conducive to learning and fosters children's internalization of academic goals and values (Ryan & Powelson, 1991). Some researchers argue that academic objectives cannot be met unless teaches create caring and supportive classroom environments (Noddings, 1992).

There have been attempts to specify the teacher behaviors that constitute such pedagogical caring. It has been suggested that caring teachers express personal

interest in their students, engage their students in conversations that are respectful and lead to mutual understanding, encourage and assist their students, and provide them with positive feedback (Pintrich & DeGroot, 1990; Noddings, 1992; Brophy, 1983). It was found that teachers who demonstrate such behaviors (in comparison to teachers who are less supportive and responsive and who employ criticism, threat, ridicule, or punishment) have students who experience a sense of belonging in school, who are academically more competent, more self-directed, motivated to learn, engaged in their work, have more effective coping strategies, stronger effort, better school adjustment and overall academic performance (Birch & Ladd, 1997; Bowen & Bowen, 1998; Brophy, 1986; Felner et al., 1985; Goodenow, 1993; Marchant et al., 2001; Roeser et al., 1996; Ryan et al., 1994; Skinner & Belmont, 1993; Wentzel & Asher, 1995; Wentzel 1997).

Structure. A second important category of teacher behavior in the classroom is the provision of structure. More specifically, structure refers to the amount of information and guidance teachers provide students for understanding ways of optimizing their learning and how to perform effectively in the classroom setting. Teachers facilitate structure by providing clear rules and regulations, consistent assistance, instrumental help, academic feedback, and monitoring students' work, as well as by setting appropriate goals and expectations, and adjusting their teaching strategies to the level at which students' learning is optimal (Alvidrez & Weinstein, 1999; Pintrich, et al., 1985; Roeser et al., 1996; Skinner & Belmont, 1993). It has been argued that teachers' provision of structure facilitates students'

need for competence and effective functioning in the academic setting (Deci et al., 1991).

When teachers foster this need, students experience themselves as competent individuals capable of effective and successful performance within the academic setting (Midgley et al., 1995; Schunk, 1991; Skinner & Belmont, 1993). In general, teachers' clear rules and expectation, their ability to continuously monitor the entire classroom even when working with an individual, providing a variety of appropriately challenging assignments and clear accountability and follow up procedures were associated with higher levels of student competence, engagement in the classroom, and overall academic performance (Brophy, 1986).

However, sometimes teachers create an environment in which students do not feel competent and may repeatedly experience failure. Such teachers are focused on external evaluations and comparisons of children's performance and they may acknowledge only those students who are motivated to learn, which induces a long-lasting sense of incompetence in students who are ignored (Stipek et al., 1995). Interestingly, although teachers' public recognition of students' excellent performance in front of classmates is considered to be an effective motivating practice, some children may perceive such practices as unfair and preferential, and, as a result, their academic effort and motivation suffers (Thorikildsen et al., 1994). In addition, when teachers provide more opportunities for higher achievers, but monitor the work and behaviors of low achievers, children become aware of such differential treatment and their academic self-perceptions may be undermined (Brattesani et al., 1984).

The structure of teachers' feedback is also very important for students' academic self-perceptions. For example, work praise was perceived as an affirmation of correctness and a recognition of children's ability, but criticism had negative effects on students self-perceptions. Interestingly, it was found that perception of work criticism did not always imply inability; criticism of high achievers was usually interpreted as lack of effort or carelessness (Pintrich, et al., 1985).

Teachers' goal structure in the classroom has also been linked to children's academic outcomes. If teachers emphasize personal improvement and task mastery goals, children use higher levels of cognitive strategies and demonstrate higher levels of self-efficacy and positive in-school behavior. However, if teachers focus on comparison, competition, and relative ability, children use surface level cognitive strategies, have lower self-efficacy, and show more discipline problems (Ames, et al., 1977; Midgley, et al., 1995; Stipek, et al., 1995).

Autonomy support. A large body of research suggests that children's need to experience themselves as independent and unique individuals, capable of self-directed behaviors and decision making, is fundamental for children's academic successes. Teachers support students' autonomy by giving them freedom to determine their own course of action, focusing children on the intrinsically valuable aspects of the task, acting as facilitators, allowing time for children's independent work, providing choices, and by withholding pressures, coercion, exhortation, evaluative cues, and extrinsic incentives (Brown & Campione, 1994; Perry, 1998; Reeve, et al., 1999; Ryan & Powelson, 1991; Ryan & Stiller, 1991; Wentzel 1997).

It was found that, when teachers create an autonomy supportive classroom environment and orientation, it satisfies children's intrinsic motivation and promotes academic performance. Intrinsically motivated students engage in classroom activities for the pleasure inherent in the activities and the satisfaction obtained from mastery over the task itself. Autonomy supportive teachers, in comparison to controlling teachers, promote students' self-esteem, academic competence, self-regulation, desire for challenge, independent mastery, and curiosity, and students perceive them as more likable and warm (Deci et al., 1981; Perry, 1998; Ryan & Grolnick, 1986; Skinner & Belmont, 1993; Wong et al., 2002).

Students of controlling teachers develop extrinsic orientations and they work to please their teachers and obtain rewards. Extrinsic rewards may be efficient in eliciting short-term academic engagement, but they put long-term performance and motivation at risk (Deci & Ryan, 1987). Extrinsic rewards are enjoyable to children, but students may lose their interest in classroom activities when such controlling techniques are no longer used (Boggiano & Katz, 1991). When children are motivated by external reasons for learning, they depend more on others to complete their work and they prefer less challenging activities. In other words, students of controlling teachers tend to feel like "pawns" rather than the "origin" of learning in the classroom (Deci & Ryan, 1987; Ryan & Grolnick, 1986; Ryan & Stiller, 1991).

It has been suggested that in day-to-day interactions with students some teachers prefer controlling techniques over more autonomy supportive methods to motivate students (Boggiano & Katz, 1991). Controlling teachers are perceived by administrators and parents as more competent, enthusiastic, and effective. Teachers'

tendency to "push" students is believed to be important for creating an optimal climate for learning. When controlling teachers receive higher ratings and better evaluations, this tendency to pressure students is reinforced. It is a rather paradoxical finding, given the well-documented negative effects of controlling strategies. It is surprising that teachers continue to use controlling strategies, despite of the awareness of their negative effects.

Summary of Teacher Influences on Children's Academic Motivation

The quality of interactions that students have with their teachers is important source of children's academic motivation. The type of relationships children form with their teachers support and shape the course of children's adaptation and success in school. Confrontational, controlling, unstructured, uninvolved relationships lead to children's behavioral and emotional disengagement in classroom activities and children are more likely to have academic problems and develop negative attitudes towards school. In contrast, close, supportive, autonomous, and structure-supportive relationships lead to children's positive engagement, higher academic performance, competence, and better attitudes toward school.

Joint Influence of Parents and Teachers on Children's Academic Outcomes

Although it is evident that parents and teachers have distinctive yet interrelated roles in children's academic development, it is still rare for researchers to examine the effects of these two social contexts in a single study. Many researchers have argued for incorporating multiple social contexts in to empirical investigations and a need for more systemic and contextually focused theories (Anderman & Anderman, 2000; Bronfenbrenner, 1979; Bronfenbrenner & Crouter, 1983;

Goodenow, 1992; Learner, 1995; Pintrich, 1994). However, research on joint effects of social contexts is still scarce and the corresponding theoretical framework is still in the process of emerging.

The following section is an overview of empirical work investigating joint effects of parents and teachers on children's academic outcomes. Up to now, only two models of combined effects have appeared any frequency: 1) unique effects model and 2) interactive effects model. Studies that examined simultaneous unique effects of parenting and teaching on children's academic performance are presented first. Then, studies that examined the interactive effects of the two social contexts are discussed, with the focus on amplifying and compensatory influences. The implications of the findings of these studies for conceptual models describing joint effects are also briefly discussed. Summary of the empirical studies that examined joint contextual influences is presented in Table 1. Summary of the conceptual models of joint influences, used in the studies, is presented in Table 2.

Simultaneous Unique Effects

The most basic and straightforward way of exploring joint effects of parents and teachers on children's academic outcomes is to test their combined unique effects. Usually this exploration is statistically driven. Researchers employ

Table 1
Summary of the Empirical Studies that Examined Joint Contextual Influences

Authors N & age	IV	DV	Conceptual Model	Testing Statistic
Bowen & Bowen, 1998 N=782 Middle- & High-school Children	a) home environment b) teacher support	a) grades b) affective investment in schooling	risk/protective factor	ANOVA
Furrer & Skinner, 2003 N=641 5-6 graders	Relatedness to: a) parents b) teachers c) peers	grades Mediator b) engagement a) perceived control	differential cumulative compensatory effects	MANOVA Bronferroni post hoc comparison
Gauze et al., 1996 N= 138 5-6 graders	a) friendship quality b) family climate	a) social competence b) self-worth	buffering, interactive effects	hierarchical regression, post-hoc procedures
Marchant et al., 2001 N=230 5-6 graders	<i>Parental:</i> a) demendedness b) responsiveness c) values d) school participation <i>Teachers</i> a) control b) responsiveness <i>School atmosphere:</i> a) responsiveness b) supportive social environment	grades Mediator: a) competence b) motivation	combined effects	multiple regression
Paulson et al., 1998 N=230 5-6 graders	<i>Parents</i> a) demandingness b) responsiveness c) academic values <i>Teachers</i> a) control b) responsiveness <i>School environment</i>	a) grades b) competence	congruent incongruent contexts additive & compensatory effects	hierarchical agglomerative cluster analysis, ANOVA
Ryan et al., 1994 N=606 7-8 graders	security, emotional utilization & emulation towards a) parents b) teachers c) peers	<i>Children's</i> a) coping b) self-regulation c) control d) engagement e) self-esteem	unique combined effects, transference, representation	multiple simultaneous regression
Wentzel, 1998 N=167 6-8 graders	perceived support from a) parents b) teachers c) peers	a) motivation b) grades	interactive & additive effects	multiple regression

Table 2

Summary of Conceptual Models of Joint Effect

<i>Term</i>	<i>Description</i>	<i>Reference</i>
<i>Compensatory model</i>	Joint influences can be aggregated by adding individual effects In testing: both risk and protective factors have significant main effects and no interaction effect.	Garnezy et al., 1984 Bowen et al., 1998 Bowen & Bowen, 1998
<i>Immunity model</i>	Protective factors alter the effects of risk factors by buffering or mediating their negative consequences. Protective factors may have no effect in the absence of risk factors. In testing: significant interaction between risk and protective factors, no main effect for the protective factor.	
<i>Synergistic Interactions</i>	Interaction among risk factors, in which one risk factor increases the effects of another risk factor, "rich get richer and poor get poorer" effect.	Ruter, 1983
<i>Buffering effects</i>	Interaction among risk and protective factors, in which protective factors buffer the effects of risk factors	
<i>Compensatory effects</i>	There is discordance in the quality of relationships between the contexts. Positive features of one context buffer for the negative features of another context.	Birch & Ladd, 1996
<i>Compensatory effects</i>	Reciprocal relationships in which changes in a person compensate for changes in context (or changes in context compensate for the changes in a person).	Kindermann & Skinner, 1992
<i>Magnifying effects</i>	Reciprocal relationships in which changes in context amplify changes in the person (or changes in the person amplify changes in the context).	
<i>Combined or Additive effects</i>	Congruent contexts would have greater impact than any one context. Positive effects of complimentary or compensatory contexts are more likely than negative effects of a single negative context	Epstein, 1983 Marchant et al., 2001 Paulson et al., 1998
<i>Interactive or Compensatory effects</i>	Supportive features of context alleviate or at least lessen the negative effects of contexts that are stressful.	Wentzel, 1998

simultaneous multiple regression to find out if both contexts, when examined simultaneously, can account for unique variance in children's academic performance. Sometimes a hierarchical regression is used to test if the effects of one social context account for variance in children's outcomes over and above the effects of the other context. Three studies used this approach.

Marchant, Paulson, and Rothlinsberg. Marchant and colleagues (2001) examined simultaneous influences of multiple aspects of parenting (demandingness, responsiveness, values, and school involvement) and teaching (control and responsiveness) on children's academic outcomes (motivation and competence). When the influences of all the factors of both contexts were considered simultaneously, only selective features of parenting and teaching were important to children's outcomes: parents' values and teachers' responsiveness were significant predictors, but not parental demandingness, responsiveness, or involvement and not teachers' control.

It was found that the combined effects of the two social contexts have a greater impact on children's motivation and competence than the unique effects of either context, if considered alone. The finding indicates that, when parents and teachers are tested simultaneously, there is an additive effect of these two social contexts on children's academic performance. For example, children's academic outcomes will be most likely maximized if both parents and teachers have a positive impact. Thus, simultaneous consideration of multiple features of both social contexts also allows for more precise predictions and discriminatory understanding of the nature of the effects.

Ryan, Stiller and Lynch. A second study, conducted by Ryan, Stiller and Lynch (1994), found that the qualities of relationships children develop with their parents and teachers have simultaneous and unique effects on children's school functioning. Specifically, these researchers found that children's perception of how secure they felt with their parents and teachers explained children's coping in school, self-regulation, engagement, perceived control, and self-esteem. The findings suggest that the more children are able to utilize positive aspects of their relationship with these adults, the higher their performance on academic outcomes.

Furthermore, after controlling for parental influences, the researchers found that teachers account for variance over and above parental effects. Ryan and his colleagues suggested two possible interpretations of this finding. First, it is possible that supportive relationships with teachers have a greater impact on children's academic functioning than supportive relationships with parents. A second explanation is that students themselves may generate substantial support from their teachers. It is possible that students, who are already secure and well adjusted, perceive their teachers in a more positive manner. It is also possible that securely-attached children may behave in such way that it elicits greater support from the teachers. As a result, teachers become more influential social partners in children's academic experiences and important facilitators of their academic successes. Although not tested empirically, this suggestion of bi-directional influences appears to be a reasonable possibility.

Finally, significant correlations between children's perceptions of parents and teachers were another finding that lead Ryan and his colleagues to rather interesting

interpretations. Because children's experience of interactions with parents predicted the quality of relationships with teachers, the researchers suggest that there may be a great deal of generalizability or transference of the representations across these relationships. For example, students who feel supported by parents at home are more likely to experience their relationships with teachers as supportive as well. In other words, children may have preexisting schemas or mental representations of social interactions, originally formed within their home experiences and later transferred to interactions with other adults in other settings, in this case, the classroom setting. This corresponds to a study by Ryan and Grolnick's (1986) in which they suggested that the same teacher in the same classroom might be perceived differently by different children depending on what type of experiences children have with their parents at home.

Wentzel. The third study that examines unique effects was conducted by Wentzel (1998); she examined the effects of family cohesion and teachers' support on children's motivation and academic performance. Although she expected to find interactions among the effects of social contexts, the results revealed the presence of only additive effects: parents and teachers had significant but independent influences on children's academic outcomes. Since Wentzel examined multiple aspects of children's motivation (e.g., school interest, goal pursuit, mastery, and performance orientation) she found that some outcomes were predicted by one social context, but not by the other.

Fore example, children's class interest and goal pursuits were affected only by teacher support, whereas students' mastery orientations were predicted only by

family cohesion. School interest was the only construct that was predicted simultaneously by both parent and teacher variables. This is another example of how simultaneous consideration of parents and teachers contexts allows for a better understanding of the nature of their effects.

Simultaneous Interactive Effects

In addition to studies that investigated simultaneous unique effects, four studies took one step further by examining interactions among the contexts. Often these studies are more theory-oriented, compared to the studies presented previously which are more likely to be method-driven. For example, the Risk and Protective model (Bogenschneider, 1996) or the Immunity model (Garmezy, 1984) were used in several studies as a theoretical basis for examining the amplifying and compensatory effects of social contexts on children's outcomes. Amplifying and compensatory effects derive from the notion that sometimes children's experiences of parents and teachers are congruent and sometimes they are incongruent. Interested in the interplay of these experiences, researchers may compare different groups of children categorized by various combinations of favorable/unfavorable and congruent/incongruent features of the social contexts. Usually ANOVA or MANOVA statistics are employed, as well as follow-up group comparisons, to determine differences in children's outcomes as a function of their group membership. Four studies used these procedures.

Bowen and Bowen. Bowen and Bowen (1998) conducted a study in which they examined the combined effects of home environment risk factors (low income, race, level of parent education, family size, number of adults at home, and quality of

relationships at home) and school protective factors (teacher support) on children's academic achievement and affective investment in schooling. Researchers suggested that when risk factors accumulate in the family environment, the likelihood of negative outcomes increases, and as a result, children may need more support from their teachers in order to succeed in their academic endeavors. Teachers may act as a protective factor that buffers the effects of risk factors in children's home environments. Consistent with Rutter (1979) and Sameroff (1985), Bowen and Bowen argued that compounded risks cannot solely determine children's outcomes, if they coexist with protective factors.

However, the study did not provide support for the hypothesis that teacher support would buffer an unfavorable home environment. Instead, a compounding or amplifying effect was found: The more risk factors children had in their home environment, the less support they received from their teachers in school. The findings indicate that, in general, the risk factors that the child experiences in one social setting may compound the risk factors in another setting and the accumulation of such factors increases the likelihood of negative school outcomes.

Paulson, Marchant, and Rothlisberg. Paulson and colleagues (1998) also examined the interactive effects of parental factors (demandingness, responsiveness, school involvement, and academic values) and teacher factors (control and responsiveness) on children's perceived academic competence and grades. The researchers were interested in 1) verifying whether children's experiences with parents and teachers were congruent or incongruent and 2) how various

combinations of these congruent and incongruent experiences may influence children's academic outcomes.

Depending on whether the experiences were congruent, four clusters of children were identified: 1) *congruent authoritative* - both parents and teachers are high on responsiveness and moderate on control, parents are also involved in schooling and have high achievement values; 2) *congruent moderate* - both parents and teachers are moderate on all measured features; 3) *incongruent/ authoritarian parents* - parent are high on control and low on responsiveness whereas teachers are moderate on responsiveness and control; and 4) *incongruent/authoritarian teachers* - parents are low on responsiveness, moderate on control, and low on involvement whereas teachers are low on responsiveness and high on control.

It was found that children in the first cluster (congruent authoritative) had the highest perceived academic competence and grades, whereas children in the second cluster (congruent moderate) had lower grades and perceived competence compared to the first cluster. However, children in the third cluster (incongruent/ authoritarian parents) had outcomes similar to children in the second cluster. Finally, children in the fourth cluster (incongruent /authoritarian teachers) had the lowest grades and perceived competence. The finding, that students who had congruent and positive experiences with their parents and teachers had the best academic outcomes (whereas students who had environments that were both negative had the most negative outcomes), indicates that 1) the combined influences of parent and teacher context provide more information about the outcome than if considered alone, and 2) the effects of the contexts are not substitutive but cumulative.

A perhaps even more interesting finding is that incongruent parenting and teaching were linked to moderately positive children's outcomes when at least one context was more positive. For example, children in cluster three (parents are high on control and low on responsiveness and teachers are moderate on responsiveness and control) had grades and academic competence similar to children in cluster two (congruent parenting and teaching: both moderate on responsiveness and control). This finding suggests that positive teacher behavior could compensate, at least in part, for inadequate parenting. This interpretation has to be viewed with caution, since interaction effects were not statistically tested in this study, and therefore no conclusive conclusions can be made.

Finally, Paulson and colleagues' interpretation of children's congruent and incongruent perceptions of social contexts are also worth mentioning. Consistent with Ryan and Grolnick (1986) and Ryan, Stiller and Lynch (1994), Paulson and colleagues suggest that children in the same classroom may perceive the same teacher's behaviors rather differently. Interestingly, the researchers suggest that the congruency in children's perceptions does not depend on teachers' actual behaviors. It is possible that these perceptions are influenced by children's experiences in other settings, such as in their homes. For example, children who have more positive interactions with parents at home may perceive their teachers more positively as well.

These findings offer some suggestions about how children's congruent and incongruent perceptions of contexts are created. First, students may form their perceptions of social interactions based on their experiences at home. If children's

experiences with parents are negative, they may form a general belief that social interactions are unpleasant and stressful. Children carry these beliefs into the classrooms and perceive their teachers through these negative filters. Thus, it is possible that children's perceptions of their teachers are based on these beliefs rather than on actual teachers' behaviors. Thus, students' perceptions of teachers' behaviors may be, at least partially, independent from what actually is going on in the classroom. Alternatively, students' perception of the classroom setting may indeed reflect teachers' differential treatment of students from different family backgrounds (Brophy, 1982). As a third possibility, students themselves may behave in such way that they elicit certain responses from their parents and their teachers, and these responses may create congruencies in children's experiences.

However, some children in Paulson and colleagues' study did not have congruent perceptions. Interestingly, these students in general tended to see their environments more negatively. For example, if students perceived their parents more negatively (high on control and low on responsiveness), they tended to perceive their teachers as only moderate on responsiveness, despite the fact that other students perceived the same teachers as highly responsive. Students who experienced their parents as neglectful (low responsiveness, high control) tended to perceive teachers, whom others saw as only moderate on control, as highly controlling. Thus, although some children's perceptions of the two contexts were incongruent, there was still a small suggestion of transference effect.

Furrer and Skinner. Additive and compensatory effects of social partners on children's engagement were also examined in a study conducted by Furrer and

Skinner (2003). The researchers investigated the simultaneous influences of children's perceived relatedness to three social contexts: parents, teachers, and peers. For each child, a profile was created depending on the score of relatedness to each partner (high or low). Four groups of profiles were formed based on cumulative relatedness: 1) children who had no low scores on relatedness to any social context, 2) children with one low score to one of the contexts, 3) two low scores, and 4) all low.

Comparison of groups revealed that the highest engagement was found in students who were highly related to all social partners and the lowest engagement was found in students who had difficulties relating to any of the social partners. This finding indicates the presence of additive effects. Furthermore, children who felt highly related to their teachers, but not parents and peers, had higher emotional engagement compared to children who felt highly related to parents, but not to teachers and peers. It appears that children's experience of relatedness to teachers is more important, since "high" parents can not compensate for "low" teachers, but "high" teachers can compensate for "low" parents.

Similarly, children, who experienced high relatedness with their teachers and peers, but not with their parents, do not differ from children, who experienced high level of relatedness with all three social partners. Although interactive effects were not tested in this study, these findings may, at least in part, indicate a possibility of compensatory joint effects: the deleterious effects of having a non-optimal relationship with parents may depend on whether children have an optimal or non-optimal relationship with their teachers.

Gauze, Bukowski, Aquan-Assee, and Sippola. This section concludes with the review of a study conducted by Gauze and colleagues (1996). Although the researchers investigated the effects of parents and friends, not parents and teachers, it is important to mention their work because their study was very valuable, in that it measured changes in children's outcomes over time and predicted those changes from the combined effects of the social contexts. What makes this study even more unusual is that it examines changes in peer context (friendship status) over time and how these changes interact with children's family environment to produce an effect on children's outcome.

Longitudinal designs are essential for gathering more accurate empirical evidence of the joint, interactive effects of the two contexts (amplifying and compensatory effects). Findings of studies on compensatory effects at a single time point can not really be conclusive about the direction of effects. Therefore, since no longitudinal studies could be found that investigated parents' and teachers' influences, the findings of this study could be insightful and relevant to the issues discussed in this review.

Gauze and colleagues investigated how children's family climate (e.g., ability to adapt to internal and external stresses and emotional bonding between the members of the family) and quality of relationship with friends (e.g., reciprocity, support, security, and closeness) predicted changes in children's perceived social competence. The study examined whether children's experience of stress in one context makes the quality of relationship in the other context even more important, based on the ability of that context to buffer or amplify the negative effects of stress.

One of the key foci of the study was friendship status. For some children, friendship status did not change throughout the year: children maintained their friends all year long or remained friendless. For other children, friendship status did change over time. Some children went from being friendless to finding new friends or from having friends to being friendless. Children, whose friendship status had changed over time, were of especial interest, because it was important to know whether these changes in friendship status interact with children's family environment, producing change in children's perceived competence.

Clear and strong interaction effects were found in this study (statistically, interaction terms were just as strong, and in some cases, even stronger than main effects). These interactions were of two kinds. First, when children from a non-optimal family (negative factor) became friendless (risk factor), there was a decrease in their social competence over time. Similarly, when children from an optimal family (positive factor) went from not having friends to finding friends (positive factor), there was an increase in their social competence over time. These are interactive amplifying effects also known as "rich get richer and poor get poorer" effects. This finding suggests that children are at double risk if both of their social contexts are disadvantageous. On the other hand, children's outcomes are maximized if both social contexts are favorable.

A second important interactive effect was a compensatory effect. When children from non-optimal families (negative factor) went from having friends to being friendless (negative factor), there was a decrease in their social competence over time. However, when children from optimal families (positive factor) went from having

friends to becoming friendless (negative factor), their level of social competence did not change over time. Thus, supportive family environments buffer children's social competence from the stress of losing friends.

Summary of Research on Joint Effects of Parents and Teachers on Children's Academic Outcomes

This small group of studies represents initial attempts at the long needed empirical endeavor to link the combined effects of two social contexts with children's academic outcomes. Although findings are not always consistent and interpretations and implications are not always straightforward or even comprehensive, these studies are the first step towards a better understanding of how parents and teachers jointly influence children's academic successes and failures. It is apparent that studying parents' and teachers' influences independently will always provide only an incomplete account of children's real life experiences. In real life, children's experiences are rich with dynamic and interactive contextual effects. The effects of children's relationships in one context may vary, depending on the quality of the relationships that children develop in another context. Findings on interactive amplifying and compensatory effects provide more precise and discriminatory understanding of which features of which social contexts have an impact on which children's developmental outcomes. Cumulatively, presented studies are an indication of a significant progress towards unraveling the intricacy of joint contextual effects.

Critique of the Literature on Parents' and Teachers' Joint Effects on Academic Outcomes

The purpose of this section is to highlight the contributions that current reviewed studies have made to the understanding of parents' and teachers' joint effects on children's academic outcomes as well as to summarize the limitations inherent in the studies.

Contributions of Studies of Joint Effects

A major contribution of the studies reviewed in this section is in their clear indication that empirical investigations benefit from targeting parent and teacher contexts together. If taken one at a time, each context cannot adequately account for children's experiences in the larger social world. The findings suggest that parents and teachers, examined simultaneously provide more information about children's outcomes than when studied in isolation. Thus, a critical contribution of these studies is in suggesting that traditional domain-specific and individual-centered research should be supplemented by a more contextual and systemic approach.

In addition to illustrating the general importance of studying the joint effects of parents and teachers, the reviewed studies also made specific predictions about how these two contexts may work together to influence change in children's outcomes. The findings suggest that the effects of family and school may depend on whether children experience each context as a source of support, or conflict and stress. If children experience both contexts as stressful and non-supportive, than the effects of one context may be, at least in part, amplified by the effects of another. On the other hand, if socializing strategies or children's experiences in each context are

not uniformly negative, then more positive experiences and supportive relationships in one context may counterbalance disadvantaged relationships with another context.

Finally, the reviewed studies suggested various pathways that may link social contexts and a developing person. The fact that there is an overlap in how children perceive their parents and teachers, suggests that children's experiences in one context may carry over, or transfer, to another context. Researchers propose that children's experiences with teachers may depend on children's experiences with their parents. For example, children of supportive parents may behave in school in such way that it elicits a positive response from their teachers (whereas, children of non-supportive parents may elicit a different response). It is also possible that the quality of children's relationships with their teachers in school influences the quality of children's relationship with their parents at home. Although these suggested pathways were not tested empirically, they are helpful in conceptualizing possible processes that interconnect multiple contexts and a developing person.

Thus, the findings of the reviewed studies constitute an important first step towards understanding and unraveling the complexity of multiple contextual influences. Despite the fact that the exact nature of the processes and interacting effects in a parent-teacher-child system needs further empirical investigation, the insights provided by the researchers can be used for developing a more general and comprehensive theoretical framework on joint contextual effects.

Limitations of the Studies of Joint Effects

Although studies exploring the combined effects of parents and teachers on children's academic outcomes are scarce, they are the next logical step towards constructing more systemic and interactive models. The contributions of the presented studies are evident; however, in order to make progress, it is also important to critically examine the findings and general direction of the research and to point out possible flaws and limitations.

A noticeable problem with the studies is the wide range of inconsistencies in findings. Although studies make clear that combined parents' and teachers' variables are better predictors of children's academic outcomes than a set of either variables on its own, there is still a great deal of confusion about how exactly the effects combine to exert their influences. Different studies found different combined effects. For example, although Wentzel (1998) expected to find interactive effects, she found only unique effects, and concluded that parents and teachers have rather independent influences on children's outcomes. Bower and Bower (1998), on the other hand, although predicting interactive compensatory effects, found only compounding effects. They concluded that children from disadvantaged and stressful home environments are most likely to receive very little support from their teachers at school. In contrast, other studies found compensatory effects, suggesting that disadvantages and stresses that children encounter at home can be counterbalanced by positive experiences at school (Furrer & Skinner, 2003; Paulson et al., 1998).

There are at least six limitations that can explain the inconsistencies in findings. These limitations and possible suggestions for off-setting the limitations of

the presented studies and improving future research are summarized in Table 3.

The next section presents these limitations.

Table 3

A Summary of the Limitations in Current Studies of Joint Effects of Parents and Teachers and Some Suggested Solutions

<p><i>Limitation 1:</i> Lack of construct comparability between studies. <i>Solution:</i> Comparable constructs and equivalent measurements of parent, teacher, and outcome variables should be used.</p>
<p><i>Limitation 2:</i> Lack of comparability of constructs within individual studies. <i>Solution:</i> Use comparable constructs and equivalent measurements for both parent and teacher variables <u>within</u> each study.</p>
<p><i>Limitation 3:</i> Multicollinearity among variables measuring the same context can misrepresent true relationships between predictors and outcomes. <i>Solution:</i> Select the strongest predictor variable or aggregate highly correlated variables to create single indicators of parent and of teacher contexts.</p>
<p><i>Limitation 4:</i> Changes in variables over time are not considered. <i>Solution:</i> Use multiple time measurements and longitudinal designs.</p>
<p><i>Limitation 5:</i> Lack of process models explaining how joint contextual effects are transmitted to outcomes. <i>Solution:</i> Develop theoretical framework for empirical testing of psychological processes that govern joint effects.</p>
<p><i>Limitation 6:</i> Lack of general conceptual models designed to guide more systemically-oriented empirical investigations. <i>Solution:</i> Suggest a theoretical framework that specifies the target phenomenon and nature of interconnections among the constructs as well as underlying mechanisms and functional principles that govern these interconnections.</p>

(1) Lack of construct comparability between studies. One factor that likely contributed to the inconsistencies in general findings are inconsistencies in how studies have conceptualized and operationalized their constructs. In fact, the quality

of a parent-child relationship was conceptualized and measured differently in every study reviewed (see Table 1, p.27). Wentzel (1998) examined parental support using a measure of family cohesion. Marchant and colleagues (2001) looked at parenting styles, measured by two dimensions: demandingness and responsiveness. Paulson and colleague (1998) also measured parental demandingness and responsiveness but added another parental factor: academic values. Ryan and colleagues (1994) measured the quality of parent-child relationships by how secure children feel with their parents and how strongly they identified with their parents. Furrer and Skinner (2003) studied children's sense of relatedness to their parents. Finally, in Bowen and Bowen's (1998) study, quality of the parent-child relationship was measured by whether children discuss with their parents school activities, events, and study topics. Conceptualizations and measurements of teaching practices had similar inconsistencies.

The wide range of inconsistencies is a significant limitation that undermines the comparability of the studies reviewed. These inconsistencies in measurements make interpretations of findings rather difficult. It cannot be concluded with certainty whether the differences in studies' findings are due to factors that were measured in one study but not in the other. In order to understand the joint effects of the two contexts, it is important that there be conceptual and measurement equivalence across the studies.

(2) Lack of construct and measurement equivalence within studies. In addition to discrepancies in constructs' measures between the studies, there is a lack of construct comparability within the studies. Constructs of parenting and teaching

practices were not always comparable within a study. For example, in Bowen and Bowen's (1998) study, quality of home relationships were based on whether children discussed school activities, events, study topics, and future plans with their parents. On the other hand, the quality of relationship with teachers was measured by student's perceptions of teachers' attitudes and affect, willingness to work with them after school, and appreciation of cultural differences.

Similarly, in Wentzel's study (1998), supportive relationships with parents were measured by the family cohesion subscale of a family environment scale, containing items assessing the broader home setting, whereas quality of the student-teacher relationship was measured by questions targeting specific teachers' supportive practices. Finally, in some studies parenting context was measured by more variables than teachers' context (Marchant et al., 2001). When combined effects are under study, it is important for constructs to be comparable. If not, then difference between the effects of parent and teacher contexts (as well as presence or absence of combined effects) could be due to the different constructs used to assess each social context.

Measurement equivalence is another potential problem for statistical testing. If the internal consistency of a measure is very low in one social context but high in the other context, failure to find significant effects may be due to the poor construct measurement rather than absence of effects. Differences in the items measuring a construct (e.g., number of questions) can interfere with psychometric equivalence. Thus, comparable constructs as well as reliable and equivalent measures are desired when between-contexts comparisons are under study.

(3) Multicollinearity within contexts. A third limitation of the reviewed studies can be found in statistical models. Usually, each social context construct was measured by multiple factors (e.g., parental warmth and autonomy support). If these factors are correlated, it could lead to within-context multicollinearity. The presence of multicollinearity in statistical analyses can cause a significant problem. For example, if parental warmth and autonomy support are correlated, then when they are tested simultaneously in statistical analyses, they would account for the same variance in dependent variables multiple times. As a result, even significant effects of individual dimensions may be missed, or appear to be non-significant, due to multicollinearity. Thus, minimum within-contexts multicollinearity is desirable in order to conduct between-contexts comparisons.

(4) Lack of attention to change over time. Another limitation in the studies is the virtually non-existent consideration of changes in variables under study. One-time measurement is only a snapshot of a complexity inherent in parent-teacher-child dynamic interconnections. Several studies attempted to understand these interconnections by testing for possible compensatory or amplifying effects (Bowen & Bowen, 1998; Furrer & Skinner, 2003; Paulson et al., 1998; Wentzel, 1998). However, when such effects were found, their empirical validity is rather questionable, because the effects were not tested within multiple time measurements.

Compensatory or amplifying contextual effects should explain over time change in children's outcomes. Specifically, the combined effects of parents and teachers on children's outcome at time 1 should be compared to children's outcome at time 2 in order to claim that the effects are amplifying or compensatory. Similarly, in order to

test a sequential pathway of effects (e.g., parents effect children, and children, in turn, effect teachers; or teachers effect children, and children, in turn, effect parents), measures at multiple time points are required. For example, it takes time for parental influences to produce change in children, and it takes time for these changes in children to affect teachers' behaviors. There is no known study that examined change over time in parents' and teachers' interactive effects. Thus, lack of designs employing multiple time points is a significant limitation of the studies.

(5) Lack of process models describing how effects are transmitted. In general, studies also lacked process models that can explain how the combined effects are transmitted. Without such conceptual models, the studies mainly focused on structural descriptions of the relationships, and did not attempt to specify possible processes and mechanisms that might underlie the structure of the relationships. As a result, there is great inconsistency in how variables were selected and tested in each study. For example, in different studies the target academic outcomes were measured by a range of variables: grades, academic competence, sense of control, affective investment in schooling, engagement, self-regulation, coping, self-esteem, and motivation. Given that each study focused on a different academic outcome, it is not clear whether inconsistencies across studies are due to differential effects of parents and teachers or difference in outcome measurement.

Furthermore, variables that were defined as an outcome in some studies, were tested as a mediator in other studies. Specifically, perceived control, motivation, and competence were tested as mediators in some studies (Furrer & Skinner, 2003; Marchant et al., 2001) and the same factors were tested as outcome variables in other

studies (Ryan et al., 1994; Palson et al., 1998; Wentzel, 1998). This discrepancy suggests that the field is in need of conceptual models that could guide systematic investigations by providing structural and functional hypotheses for empirical testing.

(6) Lack of general conceptual models. Although in recent decades, the need for studying multiple contextual influences has been clearly articulated (Anderman & Anderman, 2000; Bronfenbrenner, 1979; Bronfenbrenner & Crouter, 1983; Goodenow, 1992; Learner, 1995; Pintrich, 1994), there are no comprehensive conceptual models designed to guide more systemically-oriented empirical investigations. Studies of combined parents' and teacher's influences on children's academic performance lack conceptual models that specify the target phenomenon and nature of interconnections among the constructs as well as underlying mechanisms, processes, and functional principles that govern these interconnections. Without such models, it is difficult to make sense of inconsistencies in research findings or to plan future studies.

Summary of Limitations of the Studies of Joint Effects

The previously reviewed studies are among the first to search empirically for answers to questions about the joint effects of teachers and parents on children's performance in school. Although looking for joint contextual effects is the first step towards understanding the complexity of parent-teacher-child interactions, in general, the findings of studies are rather inconsistent and even contradictory. Several possible explanations for these discrepancies in the research findings have been suggested.

First, the constructs *between studies* were not comparable. Parent, teacher, and child constructs were conceptualized and measured differently in every study reviewed. Presented studies examined so many different parenting and teaching practices as well as such a range of children's academic outcomes that findings are not unified, consistent, or comprehensive. In order to make findings comparable between studies, a general criterion for conceptualization and assessment of parent, teacher, and child constructs needs to be generated.

Second, *within each study*, the constructs describing parents were not comparable to those describing teachers. In most cases, completely different constructs were used. Often, their psychometric quality and equivalence were, at best, questionable. Thus, it is important to conceptualize and measure these constructs consistently. In order to compare parent and teacher effects, comparable constructs need to be utilized, all with equivalent measurement properties.

Third, within-context multicollinearity was never addressed as an important factor, which undermines the validity of the research findings. For example, when multiple teacher constructs are included in a study and none of them are significant unique predictors, it not possible to determine whether multicollinearity of variables within context is responsible to lack of significant effects. Two possible solutions to address multicollinearity should be considered: aggregation and selection. If constructs within a context (multiple teacher predictors such as involvement, provision of structure, or control) are highly intercorrelated, they can be aggregated. Aggregation of highly correlated constructs takes care of multicollinearity. Another solution to address multicollinearity is to identify the strongest single predictor among parent variables

and the strongest predictor among teacher variables, and to use them for further testing parent-teacher combined effects.

Fourth, some studies tested interactive influences (e.g., compensatory or amplifying effects) using data from a single time of measurement. However, such influences can be detected only within a longitudinal design. Thus, in order to test interactive combined effects of parent and teacher contexts, multiple time measurements must be utilized.

Finally, taken together, it is clear that studies of joint parent-teacher influences are lacking a comprehensive theoretical framework to provide guidance for more systemically-oriented empirical investigations. It is important to identify (a) general over-arching systemic models, as well as (b) more complex models of joint effects and c) process models that specify the mechanisms of influence.

CHAPTER 2: GENERAL CONCEPTUAL MODELS FOR EXAMINING JOINT CONTEXTUAL EFFECTS

The following chapters address the six limitations described previously. This chapter addresses the most fundamental limitation, namely, lack of general conceptual models designed to guide more systemically-oriented empirical investigations (limitation six) by suggesting three conceptual models and approaches to better understand the dynamics of parents' and teachers' joint influences on children's outcomes: (1) The Ecological Model, with a broad and overarching perspective on the parent-teacher-child system; (2) The Systems Theory, which elaborates on a definition of a system and unique levels of perception within the system; and (3) The Risk and Protective Factor Theory that explains the nature of the joint parent and teacher influences. Then, this chapter addresses limitation four, namely the lack of attention to over time changes in variables, by elaborating on change over time models that describe the possible dynamics in relationships between changing contexts and the developing person. The other limitations are addressed in Chapter 3, "Purpose of the Study."

Ecological Model

The Ecological model represents a more general conceptual framework that gives an expanded and overarching view on how parents' and teachers' influences may combine together to affect children's academic outcomes. This section introduces structural components (microsystem, mesosystem, exosystem, and macrosystem) and functional components (proximal processes, person characteristics, and time) of the Ecological model as well as discusses the limitations of the application of the model.

Traditionally, the accumulation of knowledge about human development within the field of psychology has been compartmentalized by highly specialized research focused on particular topics within specific sub-fields. The practice of specialization, while contributing to the gathering of detailed knowledge, usually fails to give meaning to interconnections and interdependence within the larger pattern of human development. Much of the research captures the interconnections *within* specific levels and domains of development, but generally ignores the interconnection *between* the levels and domains. If examined carefully, many of the psychological theories and experimental studies are based on an assumption that people exist in a contextual vacuum, and that the relations among the variables are linear, unidirectional, and can be captured by a one-time measure. Thus, the field needs a larger theoretical framework that allows description of multiple interconnected contexts.

In the last three decades, Urie Bronfenbrenner and his colleagues (Bronfenbrenner, 1977, 1979; Bronfenbrenner & Crouter, 1998; Bronfenbrenner, 2000) have attempted to construct a more complete and comprehensive model of human development, referred to as the Ecological model, because it embraces the complexity and dynamics inherent in social systems. The model reflects a life-course perspective that focuses on the unique experiences of a person within a sequence of environments, social settings, and specific interactions. Within the field of psychology, the Ecological model is arguably the most well-developed and comprehensive contextual model.

Early descriptions of the model (Bronfenbrenner, 1977) were the first attempt to redirect traditional laboratory-based and individual-centered research to a broader understanding of development as taking place within the ecology of multiple interrelated environments. The main goal of the early version of the Ecological model was to define and distinguish these multiple environments. In other words, the model was focused on the contextual structure within which individual development takes place. In later versions of the model, Bronfenbrenner and colleagues focused on explaining how the environments are interconnected and function together to produce development. The following section presents the Ecological model, discussing its structural elements first, and then its functional components.

Structural Components of the Ecological Model

According to the Ecological model, an individual develops within the context of multiple environments in his/her real-world settings or ecology. The ecology of complex interactions is composed of four distinct, but interrelated and partially-nested structures: microsystem, mesosystem, exosystem, and macrosystem.

Microsystem. Microsystems refer to interpersonal relationships between two developing persons (e.g., child and parent or child and teacher) in a given face-to-face setting with its physical features and characteristics. A home or a classroom, with its distinct features and characteristics, are examples of microsystems. Features and characteristics of a setting are defined by specific interactions between persons (e.g., between parent and child at home and between teachers and students in a classroom) with all the unique behaviors, activities, events, and roles in which they are engaged. Specific places and times within which interactions unfolds are also defining features

of the setting. Since most of the traditional research on children's academic performance is conducted at the level of microsystem, this model suggests that the complexity and variety of the components need to be recognized, closely evaluated and, as much as possible, considered in the research.

Mesosystem. Developing persons do not exist in just one social setting. They experience interactions within multiple contexts. Arguably, these contexts do not exist independently of one another, but are interrelated, and have simultaneous interactive effects on the developing organism. Such interactions among microsystems constitute a second ecological level called the mesosystem. Bronfenbrenner, in his earliest work, defined this level as “the interrelations among major settings containing the developing person at a particular point in his or her life” (1977). Generally, prior research has focused on parent-child and teacher-child microsystems as independent entities, ignoring the combined interrelations of both social systems. The implication of the Ecological model in terms of a child’s academic performance is that in any study, the effects of both the parent and the teacher must be considered together as a whole, and that the study of either separately would be incomplete.

Exosystem. The exosystem is defined as social structures, both formal and informal, that do not themselves contain the developing person, but influence or even determine what is going on in the microsystems that do. Specifically, parent-child interactions may be influenced by events that take place in systems in which the child takes no part (e.g., parents’ employment or teachers' homes). For example, it has been shown that mothers who worked outside the home (and who wanted to

work) had more positive and less controlling interactions with their children than mothers who stayed home with their children but in reality wanted to work (Farel, 1980). Similarly, teachers could also be wives and mothers. Their home lives and the quality of their relationships outside of school might affect how these teachers interact with students at school. Thus, the developing child may be influenced by microsystems in which he/she is not directly involved. Thus, the exosystem adds further understanding of the complexity in which development takes place.

Macrosystem. The macrosystem is the most global level of the environment in which all the above-mentioned systems are embedded. This system includes the larger community, economic, social, legal and political institutions, as well as cultural values and beliefs. For example, parents from middle/upper socioeconomic status would most likely live in safe neighborhoods, have better funded schools with more qualified teachers, and would more likely provide a variety of extracurricular activities for their children.

In contrast, children who live in chronic or transitional poverty would more likely experience inferior schools, dangerous and decaying neighborhoods, lack of job opportunities, fewer extracurricular offerings, and poor recreational facilities. In some cultures, young children are expected to work to provide for the family and, as a result, may be deprived of formal education, whereas in other cultures formal education is viewed as critically important for developing children. Thus, cultural differences noted in the macrosystem are important in assessment of children's academic performance.

Functional Model

One of the limitations of the early versions of the Ecological model was that it focused mainly on contextual influences and not on the developing person. Later descriptions of the model (Bronfenbrenner & Crouter, 1983; Bronfenbrenner & Morris, 1998; Bronfenbrenner, 2000) emphasize the centrality of the developing person and focuses more intensively on how the context and person function and interact with one another to shape development. As such, the later version of the model is more dynamic and functional in its essence, because it explains how elements of systems work together and how mechanisms bind the elements as a unit. Three components were added to the later version of the model: proximal processes, person characteristics, and time.

Proximal processes. The primary mechanism posited to explain the functionality within the microsystem, is the notion of "proximal processes." Proximal processes are specific face-to-face interactions between a developing person and other individuals, or even objects and symbols. To qualify as proximal process, these interactions should occur on a relatively regular basis, become progressively more complex over time and, as a result, systematically affect development. Proximal processes can produce two kinds of developmental outcomes: competence or dysfunction. This means that proximal processes have a capacity to optimize or undermine individuals' normative development. Indeed, Bronfenbrenner and Morris (1998) considered proximal processes so fundamental that they labeled such processes "the primary engines of development."

One of the defining features of proximal processes is reciprocity. Contrary to traditional research that is based on the assumption that the relationship between two developing individuals is unidirectional (e.g., parents affect children), the Ecological model argues that the relationships are bi-directional and that parents and children reciprocally influence one another. Parents affect the child, but how parents execute their effects, at least in part, depends on the children themselves. Children's behaviors and characteristics influence parents, and parents' characteristics and reactions to children's behaviors influence children. In a sense, children organize feedback to themselves. It is possible that such reciprocal relationships are governed by multiple feedback loop mechanisms.

Similar reciprocal proximal processes can be identified within the teacher-child relationship. For example, teachers through expectations, encouragement, support, and involvement may affect children's engagement in a classroom. At the same time, children also affect teachers' behavior: psychologically mature, self-motivated, and independent children may elicit more autonomy supportive teaching practices, or children who perform poorly may elicit greater academic support from teachers, which in turn, can generate improvement in the children's academic performance.

Person characteristics. The quality, direction, and effects of proximal processes within microsystems largely depend on personal characteristics. People's dispositions (e.g., personality, attractiveness, and sociability) can initiate proximal processes and sustain or derail them over time. Personal resources are another example of person characteristics (e.g., intelligence, self-system processes, and

skills) that influence proximal processes. Finally, demand characteristics (e.g., temperament, psychological wellbeing, and physical illness) are also parts of the person that can reinforce or undermine the quality, frequency, duration, and intensity of proximal processes. Thus, at the microsystem level, children's unique personal characteristics may elicit differential reactions from their parents or teachers. However, these differential reactions, at least in part, depend on parents' and teachers' own unique set of person characteristics.

Time. Time is another important component that reveals the dynamic nature of the model. All four nested ecological systems described above are not fixed or static structures. They are continuously and simultaneously changing and evolving within ontogenetic and historic time. According to Bronfenbrenner and Crouter (1983), time is also a system that they call the *chronosystem*. Parent-child and teacher-child relationships, with all their interconnectedness to other ecological systems, change in real time, develop across life span, across individual normative and non-normative developmental time, as well as across the overarching and all-encompassing historic time.

According to the model, the chronosystem has multiple dimensions: 1) moment-to-moment time, also known as microtime, describes the continuities and discontinuities within proximal processes, 2) broader time intervals which encompass days and weeks or specific developmental time, or mesotime, and 3) time within or across generations and overarching historic time, or macrotime. Since developmental changes take place at all levels of ecological structures, and change occurs within the dimension of time, it is important to include multiple time

measures in developmental research. Thus, the choice of proper time measurement is important at each ecological level of a system under study.

Summary of the Ecological Model

The Ecological model, developed over the course of Bronfenbrenner's entire academic career, offers a life-course perspective on the nature and sequence of the environments within which development takes place. This model suggests four nested levels of environments or systems: microsystem, mesosystem, exosystem, and macrosystem. Each of these ecological contexts, with its own distinct characteristics and features, compose a complex structure within which a person develops. This model also attempts to explain the functionality within and between the systems, mainly by introducing such constructs as proximal processes, person characteristics, and time. The joint function of a proximal processes, person characteristics, context, and time offers a broader and more dynamic perspective on the complexity of interactions between a growing individual and an ever-changing environment.

Limitations of the Application of the Ecological Model

The Ecological model has made a fundamental contribution to the field of psychology by specifying multiple contexts in which person develops as well as how these contexts function and change over time. The model became a lifelong scientific endeavor of Bronfenbrenner and his colleagues to redirect traditional laboratory-based research towards real-life, dynamic, and systemic ways of studying the complexity of human development.

Despite the fact that the 'all-inclusiveness' of the model is its major contribution, when applied to specific empirical investigations, it may become its

most notable limitation. The broad conceptual framework of the Ecological model provides only an overall perspective or "menu," in that it identifies the constructs to look for in a setting in which development unfolds. Of course, the model is a framework and not a substantive theory, and therefore it is not intended to provide clear and comprehensive criteria for identifying a psychological system under study. It does not specify how to identify a system's most relevant attributes and organize multiple levels in the hierarchy of nested environments. Thus, although the model is representative of real-life development within a set of complex systems, it gives very little guidance on how to depict this complexity in empirically testable terms.

Furthermore, the parameters describing functions within the microsystem (proximal processes, person characteristics, and change over time) are also rather broad and are not very helpful in organizing and guiding specific empirical investigations. The model itemizes components of a microsystem and suggests that they function together, but it does not specify mechanisms underlying the relationships and mediating processes that bind element together. Thus, lower level theories are needed that can describe specific proximal processes and organizing principles within the microsystems.

Finally, the model suggests that a person develops within several interacting microsystems. Although the model implies that these interactions are important, it does not specify how the interactions take place. For example, the model makes clear that children's experiences at home may affect their experiences at school and vice versa, but it does not give any specific suggestions on the nature and quality of these combined effects. Thus, the model lacks a comprehensive framework that can be

used for testing interactive effects between microsystems and provides no guidance for such empirical investigations. To offset the limitations of the Ecological model, other theories and models can be utilized (see Table 4).

Table 4
Limitations of the Ecological Model and List of General Conceptual Models Compensating for These Limitations

<i>Limitations of the Ecological Model</i>	<i>General Conceptual Models Compensating for the Limitations</i>
1. Not intended to provide criteria for identifying <ul style="list-style-type: none"> • a psychological system • most relevant attributes • complexity in empirically testable terms 	Systems Science
2. Doesn't specify how microsystems interact	Risk and Protective Factor theory
3. Doesn't specify notion of time	Models of Contextual Change Over Time
4. Doesn't specify mechanisms and mediating processes	Motivational model

Theories that compensate for the aforementioned limitations are presented in the following sections. First, the insights from systems theory are presented. Systems theory can be helpful in defining the phenomenon under study, specifying different levels of organization within a system's structure, and explaining how the different levels of the system nest together, constituting the whole. Second, the Risk and

Protective theory provides suggestions about the combined effects of multiple microsystems focusing, for example, on cumulative, amplifying, and buffering patterns of joint effects. Third, models of contextual change over time are presented to better understand how contexts and people are changing across time. Finally the Motivational model, which explains the mechanism of the relationship between contexts and developmental outcomes, is presented in Chapter 4.

Insights from Systems Science

Limitations in the application of the Ecological model can be supplemented by insights from the discipline of Systems Science. In general, traditional Systems Science theories, ideas, concepts, and methodologies attempt to meet three criteria: to be exact (expressed mathematically), scientific (factual, measurable, “bear upon – draw from and/or contribute to scientific disciplines”), and metaphysical (making abstract propositions of general interest) (Zwick, in preparation).

Systems theory and systems analysis, which is sometimes called the study of complexity and complex adaptive systems, aims at generating a set of ideas and principles that apply to a wide range of empirical phenomena across various disciplines. Thus, systems theory is also known as a general theory, because it is so abstract that it is applicable to a variety of fields and problem types. Systems Science integrates the knowledge generated in various disciplines into broader and more powerful theories that can create unified yet precise and scientific perspectives on phenomenon under study. One way of unifying separate disciplines is by bringing forth a basic and common conceptual category – a system.

Bronfenbrenner's Ecological model suggests that an individual develops within complex and interactive systems. However, it does not indicate how to identify the system under study and how to organize the hierarchy of nested contexts in which the system is imbedded. This limitation can be compensated for by insights from Systems Science. Although systems theory does not necessarily add substantive information to the phenomenon under study, it does provide a model for the organization of existing information. In addition, it offers a perspective that may encourage the discovery and clarification of further information regarding the system's behavior. The following sections first define a system and then describe a hierarchy of perceptual levels in which the system is embedded. Secondly, the system definition and hierarchy of perceptual levels is applied to a parent-teacher-child system as it pertains to children's academic outcomes.

Definition of a System

If any social system is closely examined, one common trend can be found: complexity. This means that the system has multiple components which interrelate with other systems and their corresponding components. However, what is a system? How can researchers identify its attributes and interactions? Most importantly, how does the system work as a whole?

One definition of systems that has proven useful depicts two facts: a system is "A) a unit with certain attributes perceived relative to its (external) environment, and B) a unit that has the quality that it internally contains sub-units and those sub-units operate together to manifest the perceived attributes of the unit" (Lendaris,

1986 p.604). At first glance, this definition seems deceptively simplistic; however, each word is carefully selected and essential for understanding a system construct.

A level: The system as a whole. In part A, the system is defined as a *unit*. This refers to a fundamental property of ‘systemness,’ which is the whole. Further, this unit has certain *attributes* or properties-of-the-whole. For example, the attribute of a watch is to tell time, and the attribute of a school (as a whole) is to educate. Another important quality of the unit is that it is *perceived*. This implies that there is a perceiver or beholder who looks, studies, and/or uses the unit. Thus, the system is ‘observer dependent.’ In other words, a system exists in the mind of the beholder, and without an observer, there is no system.

To explore the notion of *observer* further, each observer processes sensory data through: 1) his/her own senses that are limited by nature and 2) his/her personal biases (a selective perception of data). The *focus* of attention of the beholder depends on a variety of factors such as time, place, social roles, and previous experiences. Thus, every beholder looks upon the world through what are called his/her own unique *perceptual filters*. Thus, ‘systemness’ is defined differently by different users. It is important to be mindful about these filters, understanding how they affect the course and outcome of their application to research.

Part A of the definition of a system concludes with the statement that, “a unit is perceived in relation to its (external) environment.” The *environment* is a context within which a system exists and is *relevant* to the focal system (or what a researcher is focusing on). In a sense, the context represents an embeddeness of the system in other systems. The context provides a boundary of focus, indicating what is relevant to

the system and what is not. The attributes of the unit can only have meaning relative to a defined context. Thus, the context is one of the most important constructs for a system researcher to continuously keep in mind during the research process.

B level: The parts of the whole. In part B, the system definition shifts to a focus inside the system unit. It identifies yet another important component of the system, sub-units. Sub-units are the parts or elements of the unit with their own relevant attributes. For example, sub-units of a watch are comprised of gears, the battery, and watch hands. In regards to a school, sub-units could be defined as teachers, students, and classrooms. All sub-units relate and operate together in such a way that they manifest the attributes of the whole unit.

The parts of the whole can have distinct and independent properties. When combined together, they operate in such manner that a new unique property emerges which becomes an attribute of the *whole*. This quality is virtually invisible when each of the sub-units are independently examined. From a systems perspective, this is why the whole is always greater than the sum of the parts. In other words, attributes of the whole are intrinsic to *joint* operation of the parts.

Much of psychological research has been focused on isolated decontextualized parts (e.g., individuals with specific behaviors or processes). The systems approach argues that once broken down into more basic *components*, the phenomenon ceases to represent the complexity of the real-life situation. Individuals are *composites* and they interact with other composites rather than isolated variables or states. Since composites are always greater than the sum of their isolated

components, researchers cannot study isolated components and expect the findings to apply to the composites that are inherently complex.

In addition, part A and B of the system definition can be understood as two levels of perception. At the ‘A-level’, a researcher is looking at the unit and attributes manifested by the whole (this is also known as Wholism). At the ‘B-level’, a researcher examines the parts, but remains mindful of the whole unit (this is also known as Holism). Thus a system is not a “thing” as a lay-person may believe, but a *perception* that incorporates both Wholistic and Holistic observations. It is important to remember that these observations are always affected by the perceptual filters of the person who is looking at the system.

Levels of Perception

Inter-relatedness of multiple levels of organization is implicit in the definition of a system. Systems approaches encourage researchers to be very clear and specific about the levels of analysis under study, how are they specified, and how they are organized. If closely examined, there are three levels of *organization* within any system. Part A of the definition consists of two levels of perception: that of the environment and that of the unit. In Part B, there are also two levels of perception: unit and sub-unit. Unit is a common level in both parts. Hence, there are three levels in definition of a system: (1) environment, (2) unit, and (3) sub-unit.

Level above: *Environment*

Focal level: *Unit*

Level below: *Sub-unit*

In addition to these three levels, if the Environment is considered a "supra-system" and sub-units are considered "sub-systems" then, a system obtains additional levels of perception that could be thought of as systems as well. For example, a system step-up from the focal system is a supra-system with its own focal unit, environment, and sub-unit. A system step-down from the focal system is a sub-system with its own focal unit, environment, and sub-unit (see Table 5, adapted from Lendaris, 1986 p.606).

Table 5
Levels of Perception within the System

Perceptual levels	Observer 1 Supra-system	Observer 2 System	Observer 3 Sub-system
1	Environment		
2	Unit	Environment	
3	Sub-unit ←	Unit	Environment
4		Sub-unit →	Unit
5			Sub-unit

There are five levels of perception in this subdivision. It is important that researchers become aware at which level they make observations, keeping in mind that each system at the higher level provides an environment for its sub-system on the immediate lower level and each level interacts with the level below. These levels can be thought of as vertical relations among systems components. In addition, there are interactions and relations between units and sub-units at the same horizontal

level. Hence, the emergence of both horizontal and vertical relations must be noted when defining a system.

The consideration of sub-systems necessitates a further examination of relations and constraints among relationships between sub-systems. Multi-level systems are usually multi-purpose systems as well, with different goals at different levels. Higher levels within the system depend upon the performance of the lower levels to achieve higher-level goals. Temporal ordering is another important property of a system hierarchy, such that any supra-level unit deals with slower aspects of system behavior when compared to its sub-units (by definition they depend on the performance and goal completion at the lower levels) (Hall, 1989).

Most empirical research within the discipline of psychology is implicitly based on a closed system approach and fails to incorporate a system's dependence on input from its corresponding environment (or supra-system). Systems theory emphasizes that a social system gains its meaning through functioning within its environment. In addition, the environment of a social system is usually sufficiently structured that it becomes a higher-level system in itself. The tendency to disregard a social system's dependency on the environment leads to over-emphasis of the internal organization of the system in psychological research and over-simplification of how a system operates in the real world. For example, when children's academic motivation is under study, researchers typically emphasize children's self-perceptions and perceptions of their social relationships (factors inside the child) while over-simplifying multiple contextual influences, processes, and mechanisms that link the child and contexts together.

The Parent-Teacher-Child System

Research on the effects of parents and teachers on children's academic performance can benefit from a systems perspective by incorporating both the definition, and especially the different levels of organization of a system. By adopting the notion of hierarchy, researchers become aware of the different levels that exist and how to account for their relatedness that constitutes the whole. In addition, this approach encourages researchers to become more mindful of the variables that need to be included or excluded from the study, given the level of analysis within the systems hierarchy.

It is important to point out, that in the process of applying systems ideas to psychological phenomenon, they should be used as ways of “looking” at the phenomenon or a source of an insight. Some systems concepts (e.g., limited whole, openness and closeness, and self-organization) are derived from specific mathematical theories and can be characterized as well-established systems ideas. However, when these concepts are applied to a concrete psychological phenomenon, they need to be interpreted with caution.

Levels of perception. With regards to the parent-teacher-child system, there are multiple levels of perception. At an intra-individual level, the child's attributes (e.g., temperament, competence, psychological maturity, etc.) are *sub-systems*. The subsequent *system* is an emergent property of the relations among children's attributes (e.g., academic performance). Most predictors of children's academic performance are "inside the child" (e.g., measured by child report). Parenting and teaching practices (e.g., warmth and control) are *environments* or supra-system. This

is similar to Bronfenbrenner's notion of micro-systems of parent-child and the teacher-child.

If research is conducted at an inter-personal level, then qualities of parent-child and teacher-child interactions become *sub-systems*. These interactions can be thought of as 'proximal processes' using the terminology of the Ecological theory. The quality of interconnection between parent-teacher-child is an emerging property, or a *system*. This emerging property corresponds to Bronfenbrenner's notion of mesosystem (see Figure 1).

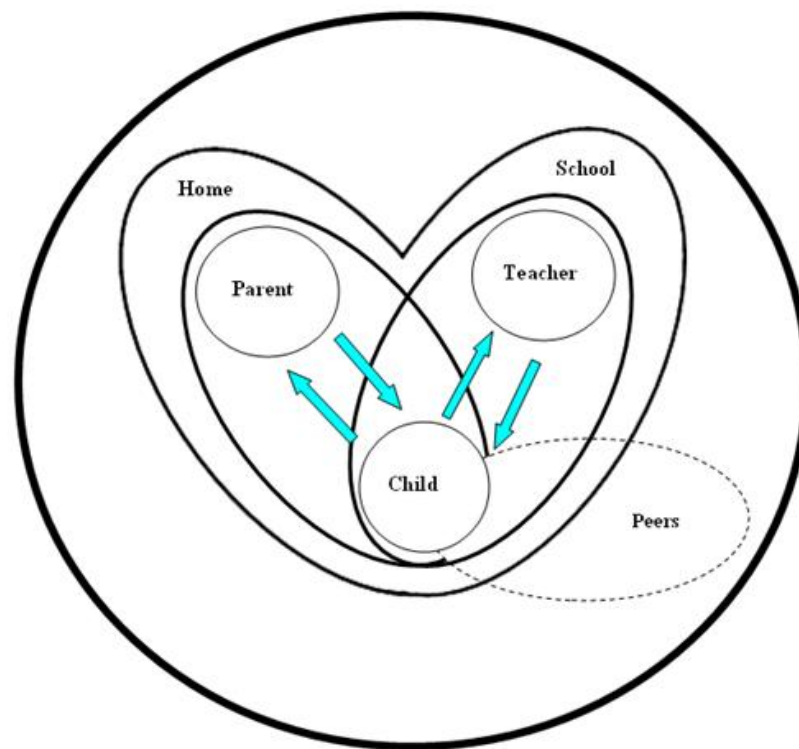


Figure 1. A parent-teacher-child system: based on the Ecological and Systems approaches

When perception shifts to the next level of the hierarchy, school and family become *sub-systems* and specific community, school district, or cultural setting would be the resulting environment (corresponding to Bronfenbrenner's macrosystem). Thus, systems approach provides a means to become mindful about the multiplicity of levels in parent-teacher-child inter-relationships. This also calls for a selection of the appropriate hierarchical level, depending on the research interests.

Directed system. Furthermore, the parent-teacher-child system is a directed system because the attributes have deterministic relationships and there are multiple causal links between them (e.g., parenting and teaching practices predict children's academic performance). Directed systems are constrained. Constraint is an intrinsic feature of systems relations. Parents, teachers, and children have a multiplicity of states that attributes may take. However, the relationships among these attributes bind them in a deterministic pattern, restricting the inherent multiplicity and facilitating the emergence of a coherent whole. If it is known that the mother consistently provides love, autonomy, and structure to her child, then it is also highly likely that the child feels competent. To say it differently, the likelihood of the child feeling incompetent is constrained by the mother's love and parenting practices. Constraint sustains order in the system.

Focus of the research. In a parent-teacher-child system, the focal unit is that of the child. Thus when we apply the aforementioned systems definition to a parent-teacher-child system, children's academic performance constitutes level A or the emergent property of the whole. The resulting level B is the quality of parent-child

and teacher-child interactions. Sub-sequentially this can be referred, using the Ecological theory terminology, as proximal processes within parent-child and teacher-child microsystems. This perceptual stance is demonstrated in Figure 2.

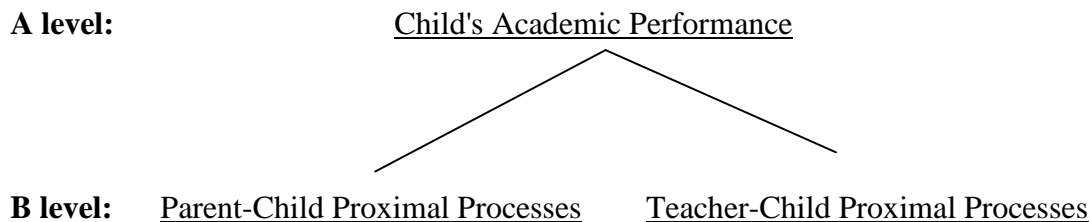


Figure 2. A causal A-B level parent-teacher-child system model

Limited whole. Another valuable insight from systems theory is that any system is incomplete or a “limited whole.” First, not all attributes of the parent, teacher, and child are included into the system under study. Although these three elements have numerous attributes, usually researchers select only those that are suggested by a specific psychological theory. For example, the child's temperament or parent and teacher role satisfaction may be not noted by a motivational theory. As a result, they may be excluded from the description of the system. This is potentially problematic since in reality, these attributes could be important for understanding the psychological phenomenon under study.

Second, the parent-teacher-child system does not organize *all* elements relevant to child academic success. For example, children's relationship with peers is not accounted for by the system, but nevertheless, peers often may play an important

role in children's academic performance (Crick & Ludd, 1993; Guay et al., 1999; Kurdek et al., 1995; Ludd, 1990; Ludd & Price, 1987). Consequently, the system does not account for the dynamic that peers might bring into the system. This could possibly contribute to the problem of system incompleteness.

Systems theory suggests that it is not surprising that the parent-teacher-child system is not “all inclusive” in structure. A researcher’s primary intent is to predict the behavior of a system. However the more relations that are in the system, the more inconsistent the behavior of the system tends to be. For example, relationships with peers may contradict a child relationship with the teacher (e.g., peers may dislike child behaviors that are preferred by the teacher). When peers are added to the system, the relations in the system may become more contradictory and therefore inconsistent. Thus, contradiction is implied in multiplicity. However, every study strives for predictive power. Researchers may sacrifice multiplicity for consistency. As a result, the system pays the price of incompleteness for the sake of unity.

A systems approach suggests that when researchers design a study, they need to be mindful of the system being a “limited whole.” They also should be clear and precise on what they include and exclude from the study, and be logical in the rationale for such judgments. Variables that may be relevant, but excluded from the research, need to be explicitly addressed and incorporated into the study’s assumptions.

Dynamic relations. The final insight taken from a systems approach is in regard to dynamic relations within the parent-teacher-child system. It is possible that two kinds of causal feedback loops govern the relations within the system: a

reinforcing feedback loop and a counteracting feedback loop. Feedback loops are relationships that generate goal-seeking behavior within a system. Reinforcing feedback loops mean 'adding to'; they intensify change by promoting growth or decline of the system behavior. In counteracting feedback loops, the behavior of one component of the system offsets or opposes the behavior of another component.

The parent-teacher-child system could be dominated by reinforcing feedback loops. For example, hostile and coercive parenting could lead to declines in children's academic performance. Declines in children's performance may lead to more hostile and coercive parenting practices. As a result, children experience even further declines in academic performance. A similar reinforcing feedback loop may govern teacher-child relationships. Moreover, parent-child and teacher-child units can be linked by a reinforcing or by counterbalancing feedback loops.

An example of a reinforcing feedback loop is when non-supportive parents influence their children to be less competent and therefore disinterested in classroom activities. This, in turn, can influence the teacher to be less interested in this student and less supportive. As a result, the child's academic performance declines and parents respond to this decline with criticism and punishment, which only further decreases the child's competence. In a counterbalancing loop, given the same beginning of the scenario, instead of a non-supportive teacher this time the teacher pays attention to the student, encourages him, and positively reinforces the child. Such a supportive and involved teacher can offset the negative effects of non-supportive parenting, and as a result, the child's school engagement can increase.

Systems theory suggests that in real life social systems may have several feedback loops in various combinations of reinforcing and counterbalancing feedback. These loops may interact with one another, competing to influence the system. It may become very difficult to find which loop or which combinations of loops dominate the system. Not only the type, but also the strength of the feedback loop influences the system. Thus, it is not an easy task to predict a behavior of such dynamic systems. Researchers should always consider investigating the possibility of such feedback loops patterns in the system under study.

Although feedback loops may inform researchers about the general direction of change, the question remains: What are the mechanisms that allow the system to persist through time and what is the underlying principle of change? Systems theory suggests that a system responds to changes in the environment (e.g., the child is transitioning from a non-supportive home environment to a supportive school context or visa versa). This is achieved through self-reorganization or development of higher levels of complexity, allowing the system to adapt. Adaptive reorganization of the system is an outcome of learning and a system's continuous dealing with environmental changes, as well as internal and external tensions (Laszlo, 1972).

Summary of Insights from Systems Theory

Systems theory offers several insights into investigation of psychological phenomenon. It helps to define a system under study and its relevant attributes. Furthermore, systems approach suggests that a system does not exist independently from an observer and an observation takes place at multiple perceptual levels. Thus, researchers have to be clear and precise about what they include and exclude from

the system, being mindful about the whole and the level at which the observation takes place.

Despite its usefulness, systems theory does not intend to elaborate on specific substantive processes and mechanisms explaining the exact nature of parent-teacher-child relationships. The purpose of systems theory is to give a general perspective or approach to understanding a system, applicable across various disciplines. Thus, discipline-specific theories are needed to provide a more differentiated and detailed explanation of specific processes that conjoin the system as a whole. For example, the systems' science notion of reinforcing and counterbalancing feedback loops provides an insight into general mechanisms that may govern and reorganize a system. However, when applied to the parent-teacher-system, this notion is not specific enough to lead to empirically-testable hypotheses, and indeed it is not intended to provide specific types of interaction and describe its possible effects on the outcome. Thus, to guide empirical investigation, psychological theories are needed to provide specific descriptions of psychological constructs, processes, and mechanisms.

Moreover, change over time is one of the fundamental features of parent-teacher-child system. Although the notion of time is incorporated in a system definition, it does not offer specific models of contextual change over time, which could demonstrate how changing contexts and changing individuals reciprocally influence one another. To address the need for specific psychological theories, the following section presents 1) the Risk-Protective framework, which may be helpful in understanding the types of joint parent-teacher effects and 2) a set of

psychological theories explaining contextual change over time (the Weather, Co-adaptation, and Attunement models).

Risk and Protective Factor Framework

The Risk and Protective Factor theoretical framework originated from two traditionally independent approaches, a risk-factor and a protective-factor approach. These two distinct perspectives address the basis for positive and negative developmental outcomes. The risk-factor approach is focused primarily on individual and environmental stressors and vulnerabilities that have been shown to undermine a child's development. The protective-factor approach is focused primarily on factors that typically safeguard children against risks and adversities.

This section provides an overview of each perspective and briefly discusses their limitations. Furthermore, it presents the Risk-Protective Factor Theory that combines the risk-factor and protective-factor approaches. It suggests a more differential and comprehensive framework for understanding the joint effects of favorable and adverse conditions in children's lives.

The Risk-Factor Approach

The risk-focused approach is derived from an epidemiological model that investigates the causes of epidemics or diseases as well as their prevention. This approach is based on the proposition that identifying risk factors that trigger problems, and diminishing their associated effects, can prevent future negative outcomes. For example, encouraging people to exclude from their lifestyle such risk factors as smoking, a high-fat diet, and lack of exercise can reduce the risk of heart disease. Some psychologists suggest that this model, although not perfectly

analogous, can be used as a conceptual basis for understanding human development (Newcomb et al., 1986). Just like heart disease, child development can be influenced by multiple risks. Risk factors exist in multiple domains: the community (e.g., crime and violence in neighborhoods), family (e.g., lack of parental monitoring, parental hostility), school (e.g., unstructured classroom setting, lack of teacher support), and individual/peer (e.g., antisocial characteristics, mental or physical illness).

The accumulation of risk factors in a child's life increases the likelihood of negative developmental outcomes (Bogenschneider, 1996). It has been suggested that the effects of multiple risk factors are not always additive. An accumulation of negative effects is considered more detrimental than the sum of the negative effects of individual risk factors. A single risk factor may not be hazardous for a child, whereas multiple risks are more likely to produce a cumulative over time effect (Cowen, 1983; Sameroff et al., 1987). Thus, the effect of a specific risk factor is influenced by presence of other risk factors. According to this approach, identifying, preventing, reducing, or eliminating risk factors is beneficial for children's optimal development.

The most frequent criticism of the risk approach is that it focuses only on the development of maladaptive behaviors (Bogenschneider, 1996). Identifying potential problems and protecting against them provides no information on desired and adaptive processes, and factors that facilitate successful outcomes. Hence, focusing on risk factors alone provides a one-sided outlook on child development. In order to

achieve a more comprehensive and complete perspective, positive factors and conditions have to be considered.

The Protective Factor Approach

Although an accumulation of risk factors increases the likelihood of developmental problems, it does not make maladaptive behaviors inevitable. It has been shown that some children who live in adversity and encounter multiple risks are still able to develop as highly functional and successful individuals (Benard, 1993; Garmezy, 1983). Thus, compounded risks do not determine the development of social or psychological dysfunction. What allows these children to overcome hardships in their lives?

The protective factor approach attempts to answer this question by identifying events, circumstances, processes, and personal characteristics that may buffer or override the negative consequences of stressful life events. Even in the midst of adversity, if present, protective factors may foster adaptation, resilience, and competence. This perspective suggests that supporting and facilitating protective factors produce more positive outcomes compared to interventions that focus only on reducing risk factors.

Researchers have identified three categories of protective factors, or characteristics of children and their environments, that are associated with positive outcomes in the face of risk: (1) individual characteristics (e.g., gender, resilient temperament, intelligence); (2) family characteristics (e.g., parental involvement, high academic expectations, clear standards against criminal activity); and (3)

external support network characteristics (e.g., positive bonds with teachers or other significant adults and friends) (Garmezy, 1985).

It has been found that protective factors have a positive effect on children's outcomes and generally contribute to optimal development. However, protective factors are assumed to be even more effective in the presence of risk factors (Garmezy et al., 1984; Werner & Smith, 1982). When comparing the same protective factors for children whose lives are accompanied by stressful events versus children, whose lives are relatively free from adversity, these protective factors should have a stronger effect.

It follows that focusing on protective factors without consideration of how they interact with risk factors is likely to provide an incomplete account. Children whose lives are stressful and have a significant number of risks should be the greatest beneficiaries of these protective factors. One of the main criticisms of the protective factor perspective is that it addresses only protective processes and characteristics that may help children to overcome or avoid the negative outcomes associated with risk processes (as opposed to looking at simultaneous and interactive relationships between risk and protective factors).

The Risk-Protective Factor Theory

Both risk-factor and protective-factor models are distinct, yet interrelated approaches. Each is valid, but neither, if taken alone, fully captures how risk and protective factors combine together to shape development. Thus, these two models were eventually integrated in the research literature into a broader theoretical framework known as the Risk-Protective Factor approach. The Risk-Protective

Factor approach provides more comprehensive insights into the joint effects of risk and protective factors, suggesting that these factors interact with one another and that their effects are reciprocal in nature. Currently, this theory has gained widespread recognition in the social sciences.

The joint effects of risk and protective factors can be divided into two categories: additive and interactive effects (Kirby & Fraser, 1997). Additive joint effects are present when both risk and protective factors have a statistically significant main effect on the outcome and no interaction effect (Garmezy et al., 1984). This means that risk and protective effects are independent from one another and their joint influences can be aggregated by adding their individual effects. These effects are also known as a *compensatory model* (Garmezy et al., 1985).

Interactive effects between risk and protective factors suggest that one variable alters the effects of another variable on the outcome under study. Research indicates that, in general, interaction effects are less common and smaller than additive effects (Garmezy et al., 1984). Furthermore, interactive effects can be broken down into two types (Rutter, 1983; Kirby & Fraser, 1997).

The first type is a *synergistic interaction* that takes place among comparable factors (either within risk or protective factors). Synergistic interactions produce an effect on the outcome variable that is greater than the sum of their individual effects. This has been also referred to in the literature as an 'amplifying' effect or 'Matthew' effect in which "rich get richer and poor get poorer" (Coleman & Hoffer, 1987; Kindermann & Skinner, 1992; Skinner & Belmont, 1993). For example, the effect of non-supportive teachers depends on the extent to which parents are also non-

supportive parents. The effects of non-supportive teachers would be even more pronounced for children whose parents are non-supportive as well. Thus the effects of parents amplify the effects of teachers. Hence, as a result, children with both non-supportive parents and teachers have the lowest school performance.

The second type of interactive effects is *buffering effects* that take place among incongruent factors: risk and protective factors. Specifically, protective factors may interact with risk factors in such way that it changes the relationship between risk factors and outcomes. For example, a supportive teacher may buffer the effects of an uninvolved hostile parent. These effects are also known as the "*immunity model*" as proposed by Garmezy, Masten, and Tellegen (1984). This model suggests that protective factors provide a degree of immunity against stress and adversity.

An alternative way of explaining the nature of buffering effects is to describe them in statistical terms. Statistically, the presence of buffering effects has to meet two conditions (Gamezy et al, 1984; Kirby & Fraiser, 1997). First, there should be a significant interaction between risk and protective factors. Specifically, (a) there should be a weak relationship between risk factors and the outcome in the presence of protective factors or (b) there should be a strong relationship between risk factors and the outcome in the absence of protective factors. Second, protective factors have no measurable effect in the absence of the risk factor.

Summary of the Risk and Protective Factor Framework

Thus, both risk and protective factors play an important role in development. It has been suggested that influences of these factors should be considered

simultaneously rather than separately. The relationship between risk and protective factors may be not only additive but also interactive. Protective factors may alter the effects of risk factors by buffering their negative effects on outcome. In addition, effects of one risk factor can be amplified by another risk factor. These additive, buffering, and amplifying models can be used in testing the effects of parents and teachers on children's academic outcomes.

Models of Contextual Change Over Time

Although the Risk and Protective Factors approach specifies models of interaction among supportive and non-supportive contexts as they jointly influence a developing person, it does not explicitly take analysis of time into consideration. The purpose of this section is to demonstrate the importance of time as a factor in research by presenting three general models of contextual change: the Weather model, the Co-Adaptation model, and the Attunement model.

To understand individual development implies an explanation of how people change across time. Traditional research focuses on changes in a developing person and often ignores changes in the context within which the individual develops (Baltes, 1989). Context refers not only to various “things” in the environment, but other people as well, for example, parents and teachers. The effects of a context on a person are often considered to be stable over time. Even when contexts do change, many studies treat changes as if they are irrelevant to developmental outcomes. Thus, traditional psychological research assumes that developmental outcomes are shaped by previous contextual experiences, regardless of whether the context has been changing over time.

Skinner and Kindermann (1992) suggested that, although such traditional approaches to development may be useful and even informative, they are unequivocally restricting and incomplete. They argued that changes in contextual features and characteristics are essential to understanding changes in a developing person. Therefore, researchers should be aware of these contextual changes and account for them in their studies. Skinner and Kindermann (1992) proposed three general models as a framework for understanding possible dynamics in relationship between the changing context and the developing person: (1) The Weather model, (2) The Co-Adaptation model, and (3) The Attunement model.

The Weather Model

One kind of person-context model is the Weather model that describes relationships between the context and the person that are comparable to the weather. The weather is continuously changing. These changes affect people, but people themselves do not have control over the weather. In like fashion, the environment in which a person develops is continuously changing. These changes affect the person at any given time, but these changes (and their effects) are independent from the person or beyond one's control. Hence, the relationship between context and a person is uni-directional: a changing context influences changes in the person, producing the trajectory of development.

An example of such uni-directional contextual influences across time could be the birth of a sibling into a family, a divorce, a parent's terminal illness, or parental loss of employment. Although these contextual changes are beyond a child's control, the child is still affected by them, and over time these changes shape the

child's developmental outcomes. More specifically, the arrival of a new sibling or a divorce may lead to a decrease in the time that the child spends with his/her parents. It may also increase the responsibilities of both parent and child, and cause disruptions in well-established daily routines. These types of changes may be present at various times in a child's life, shaping the course of child's development. Hence, these contextual changes with their short- and long-term effects need to be understood and accounted for in developmental studies.

The Co-Adaptation Model

The Co-Adaptation model describes a second kind of relationship between a context and a person. Just like the Weather model, the Co-Adaptation model suggests that both context and person are continuously changing. However, the Co-Adaptation model describes the relationship between context and a person as reciprocal. As the context influences a person, at the same time, a person influences the context. It can be said that context and a person simultaneously adapt to one another. Thus, according to this model, the distribution of influences between a context and a person is not uni-directional but bi-directional.

Over time, these reciprocal relationships may form two cumulative patterns of influences: compensatory and magnifying. *Compensatory* effects take place when changes in a person compensate for changes in environment (or changes in context compensate for the changes in a person). For example, if parents stop helping their child with homework, over time, the child may feel less competent in his school performance. Noting these changes in the child, the teacher may become more responsive to the child's needs in the classroom or become more involved in the

child's schoolwork. Thus, over time, the teacher's involvement may compensate for the negative effects of parental disengagement. Due to these compensating changes, the child's trajectory of competence may remain relatively stable over time.

Magnifying effects take place when changes in the context amplify changes in the person (or changes in the person amplify changes in the context). An example of such magnifying influences is a situation in which teachers become more controlling and critical in response to students being bored and disengaged. Interestingly, in response to teachers' control and criticism, children may become even more withdrawn and disengaged. Hence, there is a magnifying reciprocity in this teacher-child relationship: children's behaviors increase teachers' responses and teachers' responses lead to an increase in children's behaviors.

The Attunement Model

The Attunement model, just like the Co-Adaptation model, is based on the supposition that both context and person are changing over time and reciprocally influence one another. However, the Attunement model differs in emphasizing the notion that the context has an agenda or a goal that the context pursues while shaping a person's development. According to this model, it is these contextual goals or agendas that direct the course of the developmental trajectory.

Thus, the reciprocal interactions between the context and the person are not only simultaneous, but they may be sequential. This means that, first the context should have a socializing goal for a developing person and second it has to be manifested in the context's behavior. Over time, this behavior would produce changes in the person. In turn, changes in the developing person will lead to changes

in the context. Hence, the continuous feedback mechanism takes place over sequential periods of time, shaping the developmental trajectory of both the context and the person.

An example of such trajectory could be sequences of parent-child interactions concerning the child's homework. The child may be failing academically in school, but his parents' goal is to ensure their child's academic success. As a result, parents may start spending more time with their child, helping him to understand his homework and complete it effectively. As time progresses, this parental involvement may lead to an increase in the child's competence and an improvement in his grades. In response to such improvements, parents may decrease their participation in the child's home work, and continue to monitor his academic progress more indirectly, positively reinforcing any advancement he makes. As the child continues to improve, parents may switch to more autonomy supportive agendas and corresponding parenting practices.

Summary of Models of Contextual Change Over Time

These three models provide important insights into the understanding of development. First, they emphasize that not only a person, but the context also develops across time. Researchers have to be aware of these changes and consider them when designing a study. Second, these context-person influences may come in various patterns that should be understood and distinguished. These influences could be (a) uni-directional: the context affects the person or (b) reciprocal: the context affects the person and the person affects the context. In addition, the *reciprocal* influences can be (a) simultaneous: occur at the same time or (b) sequential: the

context at time-1 affects the person at time-2 and the person at time-2 affects the context at time-3. An awareness and implementation of these various over time changes can enrich or provide an insight into conceptual, methodological, and statistical aspects of research.

Summary of General Conceptual Models

To develop the JMCI framework, several different theoretical models and approaches were employed to provide specific insights as well as a broader and deeper understanding of multiple contextual influences. Each of these conceptual models has own strengths and weaknesses. When integrated, the strengths of one model or approach often compensated for the limitations of another, cumulatively offering a more inclusive and explicit account of multiple contextual influences and providing a theoretical foundation for the development of the JMCI framework.

CHAPTER 3: THE PROPOSED JMCI FRAMEWORK

Empirical studies evaluating the joint effects of multiple contexts on a developing person are still rather rare. The few that have emerged in the area of parent and teacher influences on children's academic motivation and performance only begin to scratch the surface of the complex and dynamic processes that underlie joint effects. In these initial stages of exploration, it is not surprising that the models of joint effects are incomplete, inconsistent, and at times even contradictory. There is an evident need for a more comprehensive framework that can be (1) general enough to be applicable to various contexts and various developmental outcomes, and at the same time (2) specific enough that it can provide clear and detailed guidelines for future empirical investigations.

The purpose of this chapter is to (1) elaborate on the limitations of theoretical frameworks describing joint parents' and teachers' influences, (2) summarize the contributions derived from larger conceptual models namely of the Ecological model, Systems Science approach, Risk and Protective Factors approach, and Contextual Change Over Time models as they relate to the development of the JMCI framework, and (3) present four proposed models of the JMCI framework.

Conceptualization of Joint Effects Revisited

Although parents' and teachers' influences on children's academic performance have been extensively investigated in research, each context has been studied in isolation. As a result, very little is known about the combined contribution of both social relationships taken together. Many researchers have expressed the need to study the combined effects of social contexts in children's lives (Birch &

Ladd 1996; Fletcher et al., 1995; Gauze et al., 1996; Phelan et al., 1991; Ryan et al., 1994; Steinberg et al., 1995; Wentzel, 1998). However, current conceptual frameworks and emerging empirical findings on joint effects do not provide a comprehensive and unifying view of this phenomenon.

Critique of Conceptualizations of Joint Effects

The emerging work on joint effects suffers from several conceptual shortcomings. First, the literature introduces multiple ways of conceptualizing joint effects by using such terms as additive, interactive, combined, cumulative, amplifying, countermanding, immunity, compensatory, buffering, protective, and magnifying - just to name a few. Since so many different constructs describing joint effects are used in the literature it is difficult to obtain a comprehensive general understanding of what exactly is happening in the process of combined influences.

Second, although the joint effects appear under different names, there is much overlap in their meaning. Often, different constructs refer to the same effects. For example, buffering, protective, and immunity effects all refer to the same construct. Specifically, all these effects refer to the notion that disadvantaged or negative aspects of one social context can be compensated by positive factors that are present in the other social context. For example, an involved and autonomy-supportive teacher may be able to compensate for disadvantaged effects of hostile and permissive parents.

Third, in the literature on joint effects of social contexts on the developing person, sometimes the same constructs are used to refer to different effects. For example, compensatory effects in the risk and protective factors model (Garmezy et

al., 1984) have a different meaning than compensatory effects that are described in Paulson's and colleagues 1998 study. According to Garnezy and his colleagues, compensatory effects refer to additive influences, where each context has a significant main effect, but no interaction effects. Paulson refers to compensatory effects as interactive effects, where favorable aspects of one context can counteract unfavorable characteristics of another context. Such inconsistency in the meaning of constructs can create confusion in understanding the nature of the effects.

Fourth, the literature on joint parent and teacher effects does not take into consideration changes over time. The models on joint effects often assume that the effects of the contexts are stable over time or can be adequately assessed with a one-time measurement. Further, there is no known model on joint effects that incorporates the notion that both a person and the contexts are changing simultaneously. Some interactive influences in context-person relationships can be addressed only in designs that incorporate multiple time points and therefore must be considered. Thus, without specification of changes (e.g., within-person, within-context, between person-context) and time measurements (e.g., concurrent or sequential) the joint effects model is inaccurate and incomplete.

Finally, the existing models on joint contextual influences do not specify various directions of effects that are possible in the context-person relationship. On the one hand, the effects could be uni-directional. There are two possible variations of uni-directional effects: from context to a person or from a person to a context. On the other hand, the effects could be reciprocal: the context influences the person *and*

the person influences the context. These reciprocal influences can be concurrent or sequential. Without specification of these possible directions of effects, the models of joint influences cannot be considered comprehensive.

Contributions from General Conceptual Models

In this chapter, several general conceptual models and approaches (the Ecological model, Systems Science approach, Risk and Protective Factors approach, and Contextual Change Over Time models) were presented. Although each model and approach offers a specific insight into parent-teacher-child relations or can be utilized for a broader understanding of the phenomenon, each considered alone has its limitations. However, cumulatively these models provide a more comprehensive account of the parent-teacher-child system. The selection of these models is such that, when considered simultaneously, the strength of one model compensates for the limitations of another. The purpose of this section is to summarize insights and contributions that each general model provided for the development of the JMCI framework (see Table 6 for a summary of contributions p.95).

Contributions from the Ecological model. The Ecological model, the most general and well-developed contextual model in the current literature, provides an overarching view on the parent-teacher-child system and embraces the complexity and dynamics inherent in this social system. One of the most valuable contributions of this model is that it focuses on the unique experiences of a person within a sequence of *multiple nested environments* (microsystem, mesosystem, exosystem, and macrosystem) which are characterized by their own social settings and specific interactions. The current study is focused on two microsystems: (1) the parent-

Table 6
Contributions of General Conceptual Models to the JMCI Framework

<i>General Conceptual Models</i>	<i>Contributions to JMCI Framework</i>
1. Ecological	<ul style="list-style-type: none"> • Multiple nested environments (microsystem, mesosystem, exosystem, and macrosystem) • Proximal processes • Reciprocity in proximal processes shape proximal processes • Person characteristics • Time
2. Systems Approach	<ul style="list-style-type: none"> • Definition of a system • Levels of perception • Dynamic relations
3. Risk and Protective Factor	<ul style="list-style-type: none"> • Both risk and protective factors are important • Effects are not only independent but also interactive <ul style="list-style-type: none"> • Synergistic interaction: "rich get richer and poor get poorer" effect • Buffering effects: protective factors provide a degree of immunity against adversity
4. Contextual Change Over Time	<ul style="list-style-type: none"> • Both context and person are continuously changing • Relationship between context and a person is reciprocal <ul style="list-style-type: none"> • Compensatory: changes in a person compensate for changes in context and visa versa • Magnifying: changes in context amplify changes in the person and visa versa

child interactions at home and (2) the teacher-child interactions at school. The special interest of this study is at the level of mesosystem or at the level of the interconnection and interdependence between the two microsystems under study. The Ecological model is also helpful in understanding that the exclusion of exosystem's and macrosystem's factors (e.g., parents work and cultural or socioeconomic structures and parameters) from the study could be a significant potential limitation.

The second important contribution of the Ecological model is its notion of *proximal processes* as the primary mechanisms explaining the functionality within the

parent-child and teacher-child microsystems. The model defines proximal processes as face-to-face interactions between a developing person and social context (or individuals, objects, or symbols) and how they systematically optimize or undermine individuals' normative development. Even more importantly, the proximal processes are *reciprocal*, which is contrary to traditional research that looks at the parent-child and teacher-child relations as unidirectional (from the context to the child). Although the model does not specify the nature of the reciprocal effects, just the fact that it accentuates their importance is a valuable insight for this study.

The third contribution of the Ecological model is its focus on *person characteristics* (e.g., age, gender, personality, intelligence, self-system processes, skills, or temperament) that affect the quality and the effects of proximal processes within microsystems. Thus, when the parent-child and teacher-child microsystems are under study, children's unique characteristics should be considered since they may elicit differential reactions from their social partners. It is important to remember that these reactions, at least in part, relate to parents' and teachers' own unique set of person characteristics. Person characteristics that are not included in study could be a potential limitation.

Finally, the Ecological model emphasizes the importance of *time*. According to the model, time is also a system (chronosystem). The model differentiates multiple dimensions of time: 1) moment-to-moment time; 2) broader time intervals which encompass days and weeks or specific developmental time; and 3) time within or across generations and overarching historic time. Since, the parent-child and teacher-child microsystems change in real time, develop across the lifespan, across

individual normative and non-normative developmental time, as well as across the overarching and all-encompassing historic time, it is important to include multiple time measures, choosing a proper time measurement for each ecological system under study.

Contributions from Systems Science. Although the Ecological model suggests that an individual develops within complex systems, it does not specify how to identify the system under study and organize the hierarchy of nested contexts in which the system is embedded. The Systems Science approach counterbalances this limitation. The biggest contribution of Systems Science is that it provides clear guidelines for *defining* a system. It postulates that a system is a unit that has certain attributes perceived relative to its surrounding environment. The unit also contains sub-units, which operate together to manifest the attributes of the unit. In other words, the system is a whole and the whole is always greater than the sum of the parts. This definition of a system, although simple at first glance, when considered thoroughly and mindfully provides a rather specified and precise framework for defining a system, its boundary, and what to include and exclude from the system under study.

Another important contribution of Systems Science is its notion that a system is always *perceived*. This means that the system is observer dependent and that it exists in the mind of the beholder. Systems Science reminds researchers to be mindful of their *perceptual filters*, understanding how they can affect the course and outcome of their empirical investigations.

Moreover, *levels of perception* is yet another important insight of Systems Science. Since a system has multiple levels of organization, it can be examined from

different levels of perception. There are five levels of perception that are implicit in a system definition. Systems approach urges researchers to be very clear and specific about the levels at which they perceive, specify, and organize the system under study.

Finally, Systems Science suggests that the dynamics of the relationships within a system can be explained by a *feedback loops* mechanism. Two types of feedback loops are common in social systems: a reinforcing and a counteracting feedback loop. When applied to a parent-teacher-child system, the notion of feedback loops is helpful not only because it reveals the mechanism that binds components of the system together, but also because it underlines the sequences of effects: parents affect a child, the child affects teachers, and teachers affect parents (or it could be that a child affects teachers and teachers, in turn, affect parents). These possible sequences of effects are insightful and should be explored and tested empirically.

Contributions from the Risk and Protective Factor framework. The Risk and Protective Factor theoretical framework provides further elaboration on the dynamics of relationships within parent-teacher-child system. It brings forth a more detailed and specific description of factors (present within a context as well as within a developing person), which continuously interacting with one another, shaping development.

The most important contribution of the Risk and Protective Factor framework is that it suggests that *both* risk and protective factors have to be identified, because risk factors increase the likelihood of negative developmental outcomes, while protective factors (associated with positive development) buffer against negative consequences of risk factors. It also argues that the effects of these factors may not be

additive. They may *interact* with one another. Without identifying and investigating these interactions, the understanding of the functionality within the parent-teacher-child system is incomplete.

Furthermore, the Risk and Protective factor framework specifies two conceptual models of interacting effects: *amplifying* and *buffering* effect models. These models of interactions, although not widely validated empirically and not comprehensive (in that they do not account for all possible interactive influences), are an important step towards an understanding of the dynamical relationships within the parent-teacher-child system.

Finally, the Risk and Protective Factor framework, similar to the Ecological model, suggests that the context-person relationship is reciprocal in its nature. Instead of focusing exclusively on contextual risks (e.g., parental physical or mental illness or non-supportive parenting practices) and protective factors (parental affect or extended supportive networks) in examining how they affect children, this approach suggests that children themselves may possess risk factors (lack of self-restraint, low level of intelligence or self-esteem) and protective factors (attractiveness or resilience) that interact with contextual factors in a reciprocal manner.

Contributions from the models of Contextual Change Over Time: One of the important contributions of the Models of Contextual Change Over Time is that they suggest that the effects of a context on a person are not stable over time. They challenge research that traditionally has been focused on changes in a developing person and often ignored changes in the context, assuming that the context does not change or that changes are simply irrelevant to developmental outcomes.

Models of contextual change suggest that both context and person are continuously changing. Thus, multiple time measurements are needed in order to investigate these changes. Even more importantly, the models argue that the relationship between context and a person is *reciprocal*: as the context influences a person, simultaneously, the person influences the context. In order to test these reciprocal effects, designs including multiple times of measurement are required.

Finally, the contextual change models suggest that change over time between context and a person may form two cumulative patterns of influence: compensatory and magnifying. *Compensatory* effects take place when changes in a person compensate for changes in the environment (or changes in context compensate for the changes in a person) and *Magnifying* effects take place when changes in the context amplify changes in the person (or changes in the person amplify changes in the context). Since no study examined these conceptual patterns, their soundness should be validated empirically.

Bringing together these separate conceptual models and drawing upon each of their relevant values, a more comprehensive and systemic framework of joint multiple contexts influences (JMCI framework) was developed, which is described in the next section. Thus, the presented set of general conceptual models was a theoretical foundation upon which the JMCI framework evolved.

Four Joint Effects Models of the Proposed JMCI Framework

One of the purposes of this project is to integrate and organize the existing models of joint effects in a more comprehensive and systemic framework. Keeping

in mind the critiques of the existing joint effects models and contributions from empirical work and general conceptual models described above, four categories of joint effects are proposed: (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential. Each category can be thought of as a discrete level of analyses under study with corresponding sub-categories of models. Figure 3 (see p. 103) represents a hierarchy of possible joint effects models, that includes all the possible modes described in the literature to date.

Given that the term 'effects' may have multiple interpretations, it is important to clarify the meaning with which it used in the proposed framework. The term 'effects' was selected because it satisfied the framework's aim to find a word that successfully linked both causal influences and statistically testable associations. Conceptually, 'effects' typically refers to causal influences. For example, "the effects of parents on children's academic performance" refers to the causal influence parents exert on children's performance. Statistically, 'effects' typically refers to statistical associations or difference. For example, "the effects of parents on changes in children's engagement" refers to a significant association between a parent variable at one time and change in a child variable from one time to the next. The framework uses 'effects' in order to be able to describe conceptual influences and link them to a narrow range of specific corresponding statistical tests.

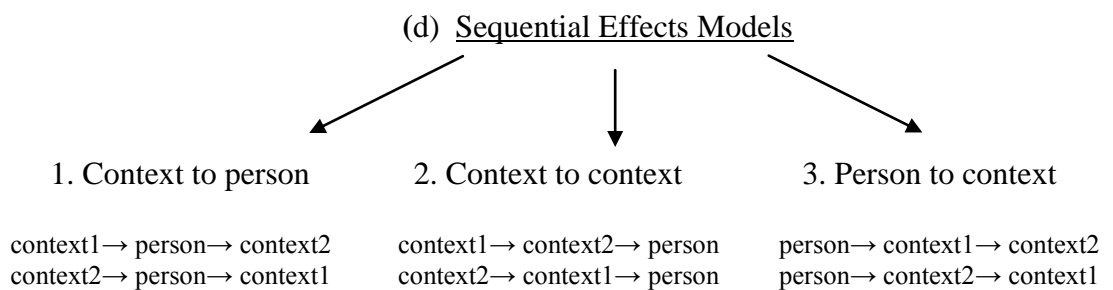
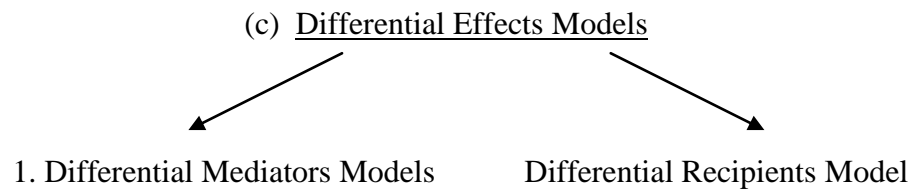
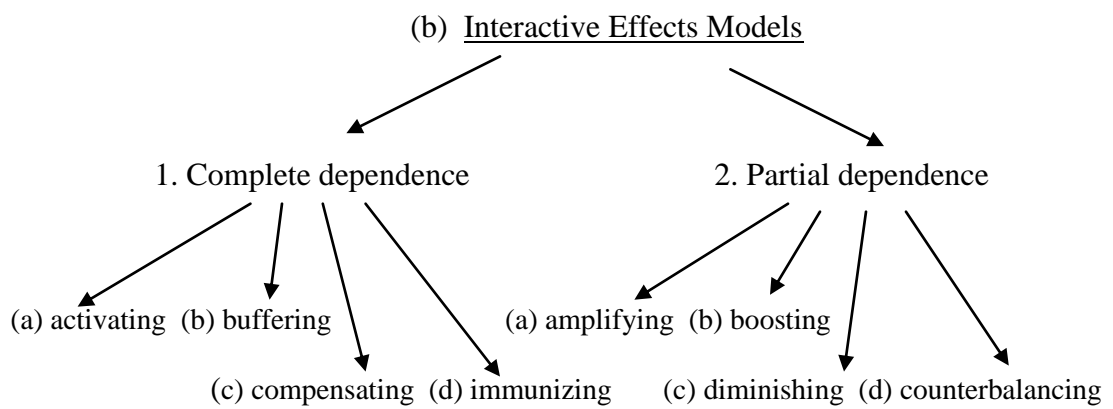
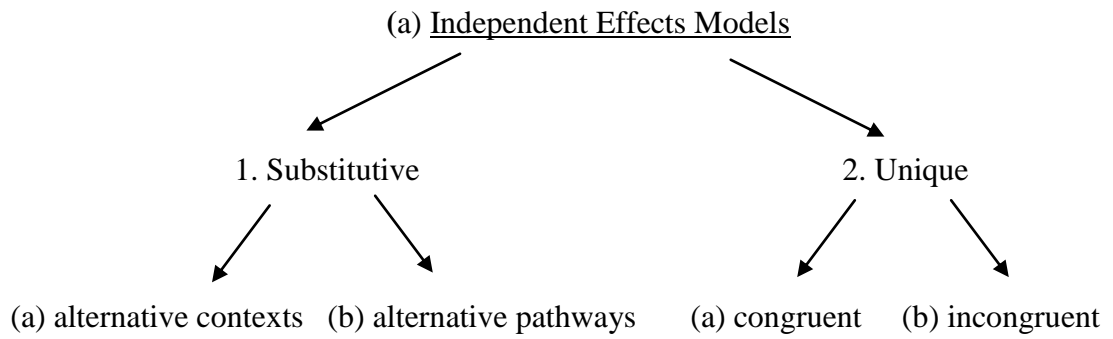


Figure 3. Four joint effects models of the proposed JCMi framework

I. Independent Effects Models

According to Independent Effects Models, each social context has its own influences on a developing person. However, the effects of these multiple social contexts are not related. They are independent from one another. Independent effects of social contexts can be divided into two categories: 1) substitutive and 2) unique.

Figure 4 represents a hierarchy of possible Independent Effects Models.

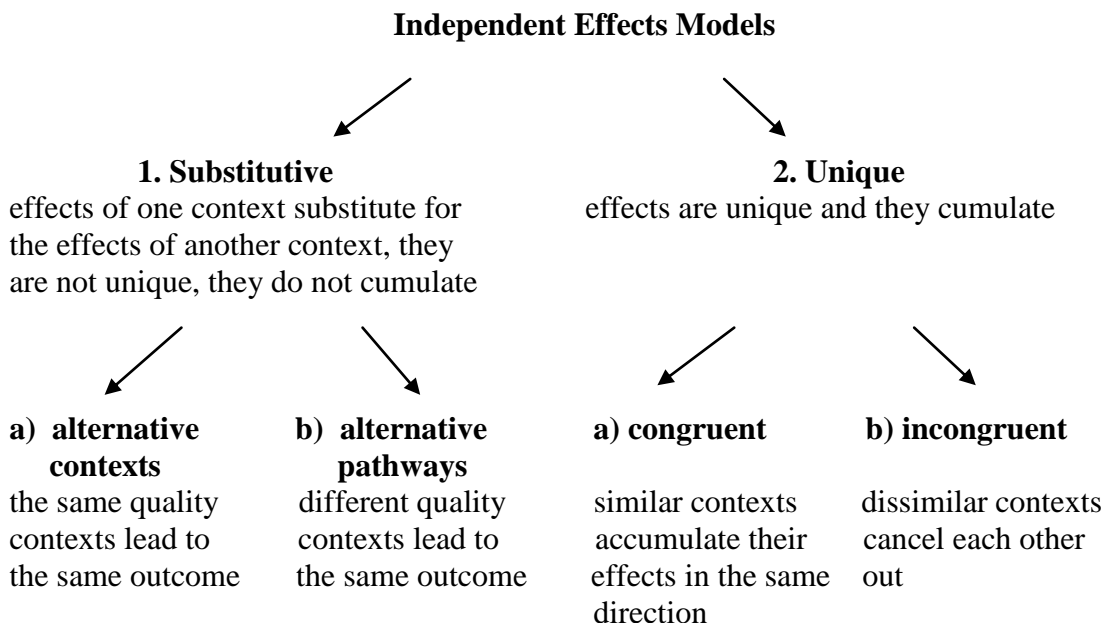


Figure 4. Independent Effects Models

1. Substitutive Effects Models. In substitutive models, the effects of one context can replace the effects of the other context. That is, the effects are not unique and they do not cumulate. Further, the influences of one context can substitute for the influences of another context without losing or distorting the information about the outcome. When multiple types of proximal processes are under study (e.g.,

warmth vs. hostility, provision of structure vs. chaos, and autonomy support vs. coercion), two possible models should be considered: (a) alternative contexts, and (b) alternative pathways.

In the *alternative contexts* model, the effects of the same proximal processes would lead to the same developmental outcome regardless of what the social context is. For example, it would not matter if it is parents or teachers who provide autonomy support for children. What matters is the quality of the parent-child or teacher-child interactions and not which social context generates the interaction. In the *alternative pathways* model, different kinds of proximal processes from each social context could lead to the same developmental outcome. For example, parental autonomy support and teacher warmth could both facilitate children's sense of competence.

In terms of analysis, in order to determine if the effects are substitutive, both contexts have to be tested simultaneously in a multiple regression. If no unique effects are found, substitutive effects could be investigated further using correlations (at the same time measurement) or correlations over time (using at least two time measurements).

2. Unique Effects Models. The unique effects model is a type of Independent Effects Models in which each social context has its own unique influences on a developing person. These contextual influences are cumulative. In other words, the effects of social contexts could be simply added in order to understand joint influences on the outcome. Depending on the quality of social contexts, two types of cumulative unique effects are suggested: (a) congruent and (b) incongruent.

According to the *unique-congruent* effects model, social contexts that operate in the same direction (e.g., both parents and teachers are supportive or both non-supportive) accumulate their effects in the same direction. For example, the more supportive a child's parents and teachers are, the better the child performs academically; and the more non-supportive the child's parents and teachers are, the poorer the child performs academically. According to the *unique-incongruent* effects model, if social contexts are working in opposite directions (e.g., parents are supportive and teachers are non-supportive), the effects of such contexts may cancel each other out. Specifically, the effects of non-supportive parenting can be canceled out by supportive teacher's practices. These are sometimes called compensatory effects.

In term of measurement, the unique effects models can be analyzed concurrently using simultaneous multiple regression (at the same time measurement) or over time (using at least two time measurements).

II. Interactive Effects Models

Interactive effects models suggest that the effects of social contexts are not independent. They interact with one another as they exert their influences on a developing person: the magnitude of effect of one context depends on the level of the other context. In comparison to Independent Effects Models, Interactive Effects Models suggest that the combined effects of social contexts cannot be understood unless considered simultaneously and that their joint effects are greater than the sum of their individual influences. Although each context may have its own unique effects on the outcome, this is not a requirement for the interactive models. In

addition, some social contexts may have no effect in the presence or absence of other social contexts. Two categories of Interactive Effects Models are proposed: (1) complete dependence and (2) partial dependence models. Figure 5 represents a hierarchy of possible Independent Effects Models.

1. Complete Dependence Models. In the complete dependence models, one context does not have an effect on its own, but it does have effects at certain level of the other social context. Specifically, supportive or non-supportive influences of one social context might be turned "on" or "off" depending on whether another context is supportive or non-supportive. To define it in statistical terms, when complete dependence models are found in regression analyses they have at least one main effect that is not significant but a significant interaction.

Taking into consideration various combinations of positive and negative qualities of social contexts, four types of Interactive Effects Models are proposed: (a) activating, (b) buffering, (c) compensating, and (d) immunizing. In an *activating* interactive model, the supportive effects of one context are present only if the other context is also supportive. For example, supportive parenting can only have an effect on a child's academic performance if the child's teacher is also supportive. In the *buffering* interactive model, the supportive effects of one social context are present only if the quality of another social context is non-supportive. For example, supportive parenting practices do not have an effect on child's academic performance

Interactive Effects Models

the magnitude of effect of one context depends on the level of the other context

1. Complete dependence

one context does not have an effect on its own, but it does have effects at certain level of the other (no main effects but a significant interaction term)

2. Partial dependence

effects of one context can be increased or decreased depending on the quality of another context (main effects and an interaction term are significant)

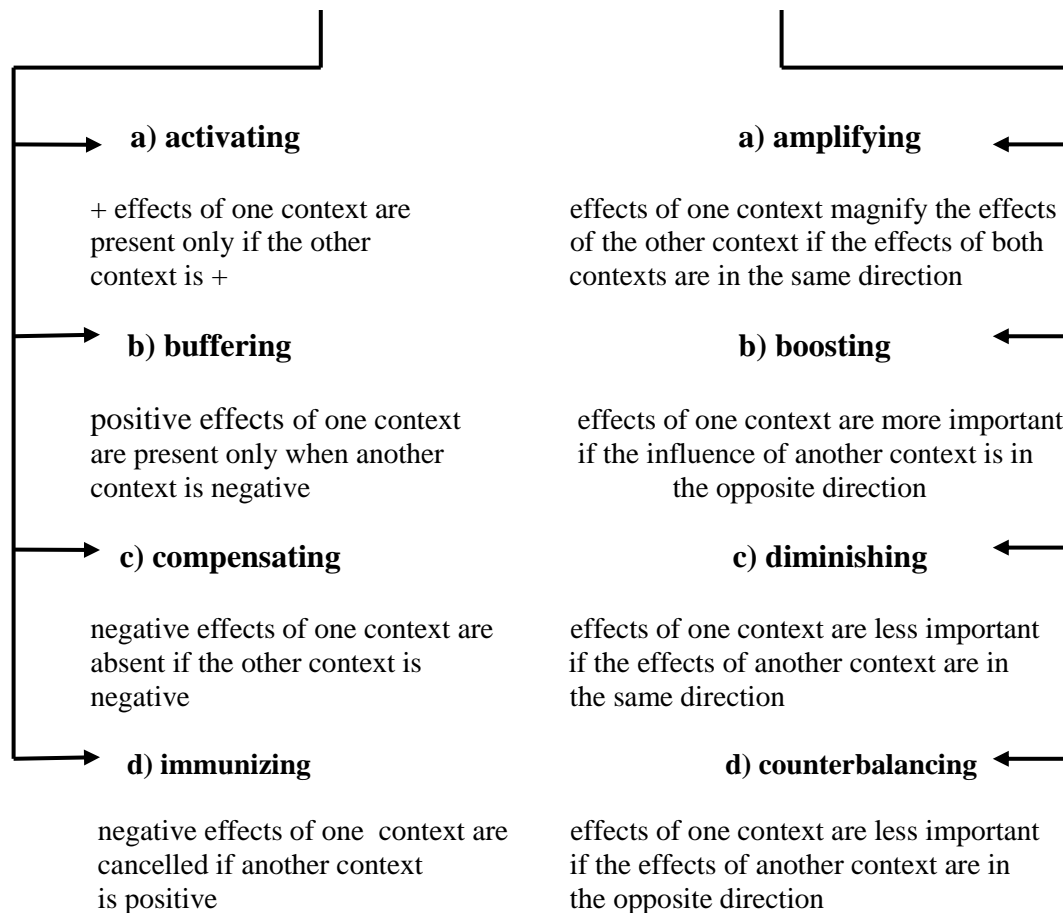


Figure 5. Interactive Effects Models

if a child's teachers are also supportive, but they do have a positive influence if teachers are non-supportive.

In the *compensating* interactive model, the effects of non-supportive social context are absent if the other context is supportive. For example, the effects of non-supportive parenting would have no effect on a child if the child has a supportive teacher. Finally, in the *immunizing* interactive model, the influences of one non-supportive context are cancelled when another context is also non-supportive. For example, if a child has a non-supportive teacher, the effects of a non-supportive parent do not matter.

2. Partial Dependence Models. The second category of interactive joint effects models is partial dependence models. In contrast to complete dependence models, these models suggest only partial dependence between the influences of social contexts. Specifically, supportive or non-supportive effects of one context can be increased or decreased depending on the quality of another context, but not turned "on" or "off." To define it in statistical terms, when partial dependence models are found in regression analyses they have both significant main effects and a significant interaction. Considering various combinations of contexts' positive and negative qualities, four types of partial dependence models are suggested: (a) amplifying, (b) boosting, (c) diminishing, and (d) counterbalancing.

The *amplifying* effects model refers to an interaction in which the effects of one context magnify the effects of the other context when the influences of both social contexts operate in the same direction. These effects are also known in the literature as "the rich get richer" and "the poor get poorer" effects. To elaborate, the influences of supportive parenting can be amplified if a child has a supportive teacher. Similarly, negative effects of non-supportive parents could be amplified if

the child also has a non-supportive teacher.

The *boosting* effects model refers to an interaction in which effects of one context are present, but they are even more important if the influence of another context is in the opposite direction. For example, children who have non-supportive parents (compared to children who have supportive parents) benefit more from supportive teachers. Thus, in the absence of the support at home, the support at school may have a stronger effect. Similarly, the influences of supportive teaching could be more noticeable in children who have non-supportive parents.

The *diminishing* effects model refers to an interaction in which the effects of one context are less important if the effects of another context are in the same direction. For example, non-supportive teaching may have a smaller effect on children who already experience negative parenting at home. Similarly, the effects of supportive teachers could be less noticeable if children have supportive parents at home.

Finally, the *counterbalancing* effects model refers to an interaction in which the effects of one context are less important if the effects of another context operate in the opposite direction. For example, non-supportive teaching may have a lesser effect on children who experience supportive parenting at home. Similarly, the effects of non-supportive parenting could be less noticeable if children have supportive teachers at school.

In term of measurement, all partial dependence models can be analyzed concurrently using simultaneous multiple regression. Some contextual features could have significant main effect and some may not. Various forms of interaction terms

have to be created and tested for significance with hierarchical regression.

Significant interactions have to be tested with follow up analyses to determine its exact nature. Over time changes in significant interactions should be tested using at least two time measurements.

III. Differential Effects Models

According to the Differential Effects Models, the effects of social contexts on a developing person may depend on (1) the type of mediator who links the context and the outcome and (2) the characteristics of a target person himself or herself. Thus, two Differential Effects Models are suggested: differential mediators and differential recipients. Figure 6 represents two types of Differential Effects Models.

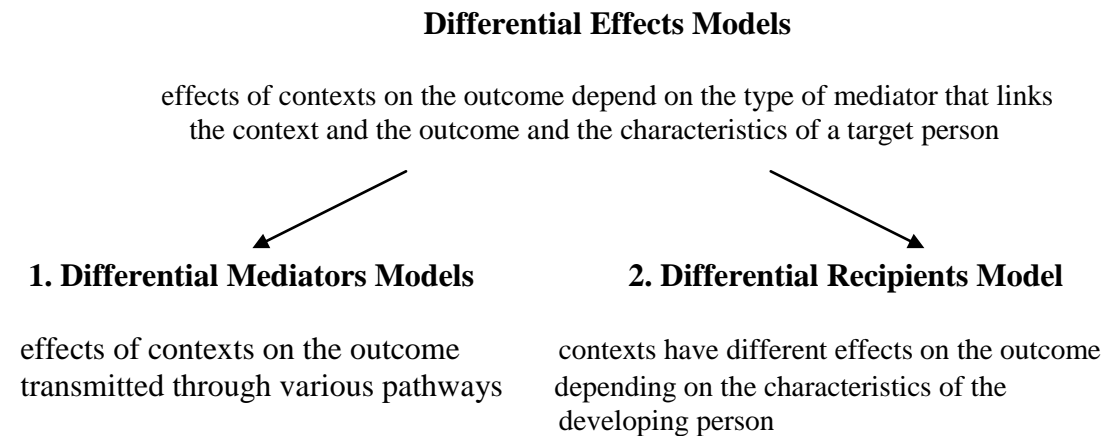


Figure 6. Differential Effects Models

1. Differential Mediators Models. Differential Mediator Models suggest that the effects of social contexts on developmental outcomes could be transmitted through various pathways. For example, children's self-system processes (e.g., relatedness, competence, and autonomy) could mediate the relationship between

social contexts and children's engagement in school. It is possible that each social context affects different self-system processes, which in turn could lead to the same developmental outcome.

For example, supportive parents may affect children's sense of relatedness, which in turn affect children's quality of engagement in school. However supportive teachers may affect children's competence, which leads to increase in children's engagement in the classroom. Thus, the same qualities of social contexts could have a different pathway to the same developmental outcome.

2. Differential Recipients Model. According to a Differential Recipients Model, social contexts could have different effects on a developing person, depending on the characteristics of the developing person himself or herself. For example, the effects of supportive or non-supportive parents and teachers may differ depending on child's age or sex. Specifically, parental influences may be more important for elementary school children, while teachers' influences are more important for middle school children.

These various differential combined effects of social contexts can be tested concurrently or with multiple time measurements.

VI. Sequential Effects Models

Sequential effects refer to various time-graded links between the social contexts and a developing person. Social contexts and a developing person could have three possible sequences of influences: 1) context to person to context, 2) context to context to person, and 3) person to context to context. Figure 7 represents tree types of Differential Effects Models.

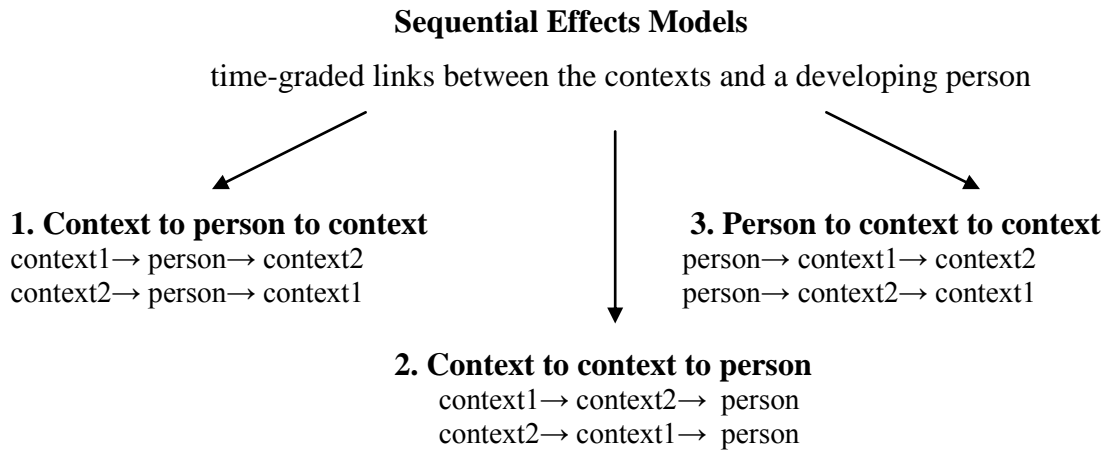


Figure 7. Proposed Sequential Effects Models

1. Context to Person to Context Model. In the *context to person to context* model, one social context (e.g., parent) affects the developing person (e.g., child) and, over time, the developing person affects another social context (e.g., teacher). Similarly, a teacher could affect the child and the child, over time, could influence the parent. The following diagram represents these two possible sequences: *context 1 → person → context 2* and *context 2 → person → context 1*.

2. Context to Context to Person Model. In the *context to context to person* model, one context (e.g., parent) could influence another context (e.g., teacher). Over time, the second context (teacher), in turn, influences the developing person (e.g., child). Similarly, a teacher could affect the parent and the parent, in turn, could affect the child. The following diagram represents these two possible sequences: *context 1 → context 2 → person* and *context 2 → context 1 → person*.

3. Person to Context to Context Model. In the *person to context to context* model, the developing person (e.g., child) effects one of the social context (e.g.,

parent) and this context, over time, affects the other social context (e.g., teacher).

Alternatively, a child could also affect the teacher and the teacher, in turn, could affect the parent. The following diagram represents these two possible sequences:

person → *context 1* → *context 2* and *person* → *context 2* → *context 1*.

Time. All these sequential models can be thought of as mediator models.

Depending on the model, a person or a context plays the part of a mediator. These mediating effects take place over a period of time. In fact, "effects" in sequential models imply changes over time. Therefore, the sequential effects could best be examined through multiple time measurements and they cannot be fully addressed within a concurrent time design. Sequential effects are probably one of the most ignored effects in research on joint influences of multiple contexts.

Summary of the Four Proposed Joint Effects Models

Although in the last several decades much discussion has been generated about the joint effects of multiple social contexts, surprisingly, few studies have examined these effects. The findings in these studies are often inconsistent and even contradictory, and the conceptual models that have been guiding empirical investigations are rather disjointed and incomplete. The four proposed models on joint multiple contexts influences (JMCI framework) integrate and organize the models that have been described in the research literature as well as those depicted in several general theories and overarching approaches, and incorporate into a more comprehensive and coherent framework. In addition to their theoretical contributions to the field, the proposed models are useful in guiding and organizing future empirical investigations.

CHAPTER 4: THE PURPOSE OF THE STUDY

The dissertation had three goals. The first goal was to develop a more comprehensive framework of joint multiple contextual influences (JMCI framework). The second goal was to test empirically the four proposed sets of models (*independent, interactive, differential, and sequential*) of joint effects of parents and teachers on children's academic motivation. The third goal was to use the feedback from the statistical analyses and the empirical findings of the study to reevaluate and modify the proposed JMCI framework, thus improving its comprehensibility and utility.

The study was based on the theoretical framework of the self-system model of motivational development also known as the Motivational model. This section presents the Motivational model, highlighting its usefulness in application to parents' and teachers' influences on children's motivation and performance. Research questions for the current study are also introduced.

The Motivational Model

The Motivational model originated from the collaborative work of researchers at the University of Rochester who were interested in explaining the role of self-system processes in intentional or motivated actions. The theorists assumed an organismic perspective, suggesting that motivation for action comes not only from rewards and incentives that can be externally provided, but also is already present in every individual (Connell, 1990; Connell & Wellborn, 1991; Deci & Ryan, 1985; Deci et al., 1991; Ryan & Powelson, 1991). In other words, human

beings are intrinsically motivated, they have an innate and natural tendency to explore and assimilate new information and internalize new values and practices.

In a very broad sense, the Motivational model suggests a functional explanation of intrinsically motivated action. It attempts to explain how and why people show various patterns of engagement and disaffection. Specifically, the model explains why some people derive great pleasure and satisfaction from their activities, have commitment to the goals they set for themselves, and, in general, are creative and enthusiastic in their participation while others are withdrawn, bored, rebellious, burned out, or simply conform to their tasks.

The model postulates that all human beings are born with three basic and essential psychological needs (relatedness, competence, and autonomy) that persist throughout their life span. Depending on the quality of the interactions that children experience with their social partners, their psychological needs can be satisfied or undermined. The quality of interactions is characterized by the extent to which children are given opportunities to experience themselves as connected to others, competent, and autonomous.

For children, their parents and teachers are primary figures who can promote as well as impair these experiences. When children interact with their parents and teachers, they continuously appraise ongoing activity and form beliefs about themselves in relation to the activity and the context in general. In the model, these beliefs are called self-system processes. The Motivational model argues that variations in self-system processes predict differences in individuals' attitudes, motivation, and

behaviors (Ryan & Powelson, 1991; Connell, 1990). Conceptual component of the Motivational theory are captured in Figure 8.

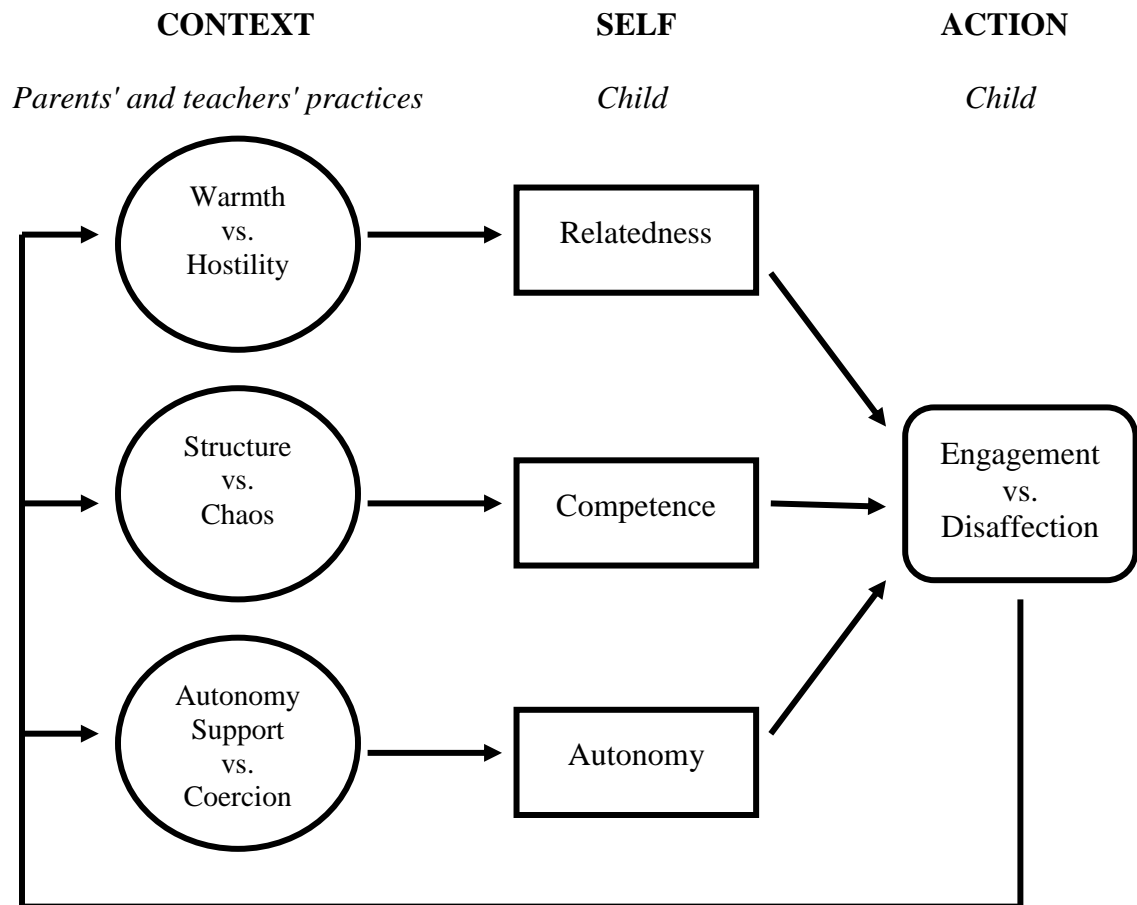


Figure 8. Motivational model of context, self and action

Self

Self-system processes are defined as “appraisals of self in relation to activities within particular cultural enterprises” (Connell, 1990, p.69). The Motivational model suggests three self-system processes (SSPs) that are of most motivational significance: relatedness, competence, and autonomy. According to the model, these three self-system processes are linked to the three psychological needs (relatedness,

competence, and autonomy). If children's psychological needs are supported by their caregivers, children experience themselves as worthy of love from others, as competent, and as autonomous. Over time, these experiences become internal resources that children carry with them to various settings (e.g., school) and which energize children's actions.

The self-system of *relatedness* refers to an individual's experience of oneself in relation to social partners. This construct is rooted in attachment theories (Ainsworth, 1979; Bowlby, 1969) which suggest that starting early in life, children form "internal working models" of the self and their social partners based on the quality of relations provided by their caregivers. Relatedness, as a self-system process, is defined by appraisals that children make about themselves as being worthy and capable of love and their sense of security and connectedness to others, that they experience when interacting with their parents, teachers, siblings, and friends.

Competence refers to individuals' experience of control over desired outcomes, or knowing what to do to produce desired and prevent undesired events, as well as believing in their own ability to carry out the necessary actions (Patrick et al., 1993; Connell, 1990). Decades of research have established that children's perceptions of self-efficacy, control, and academic competence are proximal predictors of their engagement in school and their academic performance (Boggiano et al., 1988; Dweck, 1999; Eccles, Adler, & Meece, 1984; Skinner et al., 1998).

Autonomy refers to children's experience of their actions as self-determined or freely chosen and endorsed by the authentic self. In the last two decades, researchers have become convinced that a sense of autonomy is a primary source of

children's intrinsic motivation and active engagement in learning. Mainly, the construct of autonomy is rooted in self-determination theory (Deci & Ryan, 1985), according to which individuals have an inherent desire to set their own goals and experience themselves as the origin of own actions.

Since the self-systems of relatedness, competence, and autonomy are linked to the social context (the quality of a social context predicts self-system processes) and to engagement and disaffection (self-system process predict engagement and disaffection), they provide one focus for empirical investigation of mediating processes. Specifically, the model suggests, that many of the variables found as mediators in research on the effects of parents on children's school performance, can be thought of as analogous to one or more of these three self-system processes. For example, the operational definition of psychological maturity (Steinberg et al., 1989) closely corresponds to the definitions of the three self-system processes suggested by the model; definitions of attributions (Glasgow et al., 1997), social competence and exploratory tendencies (Estrada et al., 1987) correspond to *competence* and *autonomy*; self-restraint corresponds to *autonomy*, and self-worth corresponds to *relatedness* (Wentzel, 1994; Wentzel & Feldman, 1993,); intrinsic motivation (Ginsburg & Bronstein, 1993) corresponds to *autonomy*. This overlap in constructs can be taken as an indication of the central importance of these self-systems in describing the processes of influence taking place.

Action

All three self-system processes have been found to be strong predictors of students' emotional and behavioral engagement in the classroom. Researchers

characterize behaviorally engaged children as being actively involved in schoolwork, being persistent, trying hard when challenged with difficult tasks, and, in general, demonstrating strong effort and concentration. Emotionally engaged children express such positive emotions during school activities as enthusiasm, optimism, and curiosity. In contrast, disaffected children demonstrate very little interest in participating in class activities and they may experience boredom, depression, anxiety, or anger about classroom assignments and school in general (Skinner & Belmont, 1993; Wellborn, 1991).

Context

The Motivational model suggests that intra- and inter-individual variation in the three self-system processes depends on quality of interactions and relationships that children form with their caregivers and social partners (Skinner et al., 2005). When children interact with their parents and teachers, they make attributions about themselves and the context. Over time, children form relatively stable beliefs about themselves, which they use as internal resources to initiate their actions.

The relationship between parent and teacher practices and children's self-systems can be described as follows: If parents and teachers are actively interested in their children and students and provide affection, emotional support, and positive regard, children begin to experience themselves as loveable and deserving of love. That is, parental *warmth* and teacher *involvement* facilitate children's sense of relatedness. Parents and teachers who establish consistent rules, set limits and closely monitor children and guide them through challenging situations, have children and students who perceive themselves as effective agents in interactions with their social

and physical environments. That is, parents' and teachers' provision of *structure* facilitates children's sense of competence. Further, parents and teachers who are flexible and accepting and encourage freedom of expression, have children and students with higher levels of self-regulation and the ability to make their own choices and decisions. That is, parental provision of *autonomy support* facilitates children's sense of autonomy.

There are also three features of parenting and teaching that could have negative effects on children's self-system processes. Uninvolved, indifferent or hostile parents and teachers create an experience of unworthiness in children and an inability to relate to others. Parents and teachers who are unpredictable and non-contingent undermine children's experience of effectiveness and confidence in their beliefs about their own capabilities. Finally, coercive and over-controlling parents and teachers inhibit children's sense of independence and uniqueness and restrict their experience of self-determined actions.

In addition to simultaneous parents' and teachers' effects, the Motivational model suggests the possibility of sequential effects. Specifically, it explains how and why children's experiences in one social context could affect their performance in another social context. For example, experiences provided by parents at home cumulatively affect children's beliefs about the self (e.g., whether they can connect and relate to others and experience themselves as competent and autonomous individuals). Children carry these beliefs into other social contexts, like school, and utilize them as inner motivational resources for academic activities. Subsequently,

children may be perceived and treated differently by their teachers depending on children's engagement and disaffection in the classroom.

Experiences provided by teachers at school also affect children's beliefs about the self and children's behaviors with parents at home may originate from these self-beliefs. Hence, the self-system processes and engagement and disaffection are the central mechanism of transference of parents' and teachers' influences on children's academic outcomes.

Advantages in Application of the Motivational Model

As discussed previously in the section titled Critique of the Literature on Parents' and Teachers' Joint Effects on Academic Outcomes, current research on joint effects of parents and teachers on children's academic performance has noticeable flaws and limitations. In that section, limitations and suggestions to counteract these limitations were introduced and summarized.

Three of these limitations have been addressed earlier in this study. The Motivational model, presented in this section, can be used to deal with the remaining limitations (see Table 3 on p.45). First, the Motivational model will be used to address the limitation 5, by suggesting a possible mechanism or process through which parents' and teachers' influences are transferred to a child. Second, the Motivational model will be used to address the problem of inconsistency of general findings in studies on joint effects (limitation 1), by illustrating how to achieve across studies comparability of constructs and equivalence of measurement. Finally, the Motivational model will be used to address the limitation 2, by explaining how to insure within-studies comparability of constructs and the equivalence of

measurement.

Process account of context effects on motivation. Although researchers agree that parents and teachers play an important role in children's academic successes, they are only beginning to understand *how* such influences take place and to identify the mechanisms underlying this process. As a result, the field of psychology is still lacking explicit and unified theoretical frameworks aimed at explaining the processes and mechanisms that bind together the relationships within the parent-child and teacher-child systems.

The Motivational model offers a comprehensible process that describes how environmental influences are internalized by children, thus motivating their school performance (Connell et al., 1994; Grolnick & Ryan, 1989; Grolnick, et al. 1991; Grolnick & Slowaiaczek, 1994; Leung & Kwan, 1998; Patrick, et al., 1993; Skinner & Belmont, 1993). This model has been widely applied in the educational and parenting literatures. The Motivational model can be also useful for understanding processes that underlie the joint effects of parent-child and teacher-child interactions.

Increasing comparability between studies. In the literature on combined parents' and teachers' effects on children's academic outcomes, the constructs *between studies* were often not comparable. In most studies, parent, teacher, and child constructs were conceptualized and measured differently. As a result, the findings across studies are not unified or consistent. In studying joint parents' and teachers' effects, it is desirable that constructs between studies are comparable. This should include both social contexts and children's outcome constructs.

The Motivational model can provide an integrative framework for conceptualization and assessment of parents, teachers, and child's constructs. The model describes a common process of motivated action that originates from universal psychological needs. The Model specifies and defines various dimensions of social contexts as they may support or undermine these needs. In addition, the model describes a process of contextual influence on a person as well as an outcome of this influence. The model suggests that the process of influence is the same for various contexts and diverse groups of people (gender, age, race, occupation etc.). Thus, the Motivational model includes most, if not all of the constructs from studies and theories that account for parents' and teachers' influences. Therefore, the Motivational model provides a general theoretical framework for organizing and guiding research, increasing the between-studies comparability of constructs.

Within-study comparability. In addition to the issue of comparing constructs between studies, there is also the issue of comparability of constructs within studies in the current research that addresses the joint parent and teacher effects. Often, one set of constructs was used to describe parents and a completely different set of constructs was used to describe teachers. Moreover, constructs' psychometric quality and equivalence were questionable in many studies. It is important to conceptualize and measure within-study constructs consistently when the effects of multiple social contexts are compared. Otherwise, it is difficult to determine whether the findings are due to actual effects or due to differences between constructs and differences in psychometrics.

Summary of the Motivational Model. The strength of the Motivational models is in the universality of its application to various social systems. The model postulates that the six features of social context (warmth vs. hostility, structure vs. chaos, and autonomy support vs. coercion) are universal and not specific or unique to a particular social context. Hence, both parenting and teaching practices could be conceptualized and measured along these dimensions, establishing comparability between social contexts under study.

In regards to the current study, the Motivational model makes three important contributions: (1) it provides a general framework for understanding the mechanism of transmission of contextual effects on the developing person and it facilitates (2) between-studies and (3) within-studies construct comparability and measurement equivalence. The next section summarizes the overall objectives of the current study by way of series of research questions.

Research Questions

The overall objectives of the research project were to explore four proposed models of joint teachers' and parents' effects (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential on children's self-system processes or SSPs (*relatedness, competence, and autonomy*) as well as children's classroom engagement. Because the current study was exploratory by nature, no specific hypotheses were formulated. Instead, this section presents four sets of research questions in relation to each model.

Overview of Constructs

For each model, parents' and teachers' practices were evaluated. Originally, six contextual dimensions were considered for evaluation: warmth, provision of structure, autonomy support, hostility, chaos, and coercion. It is known from prior analyses that these dimensions of parent and teacher context are moderately or highly correlated. To avoid the multicollinearity problem in statistical models, positive and negative dimensions of each context were aggregated into two factors that were called Supportive and Non-Supportive practices.

Furthermore, it was also known from prior analyses, that positive and negative dimensions are moderately correlated. Nevertheless, structurally, they were found to be better represented by two dimensions (Skinner et al., 2005). Thus, the aggregates of positive and negative dimensions should not be misunderstood for a bi-polar construct. In this study Supportive and Non-Supportive practices refer to distinct features of a social context and they do not imply two polarities of a continuous construct.

In addition to statistical reasons for the aggregation of positive and negative constructs, there was also a theoretical justification. According to the Risk and Protective Factors approach, both positive and negative contextual factors are predictive of developmental outcomes. Functionally they are distinct: the presence of negative factors indicates a potential risk for the outcomes, while the presence of positive factors indicates a potential support or protection. Without differentiating Supportive and Non-Supportive contexts, the richness and dynamic nature of developmental interactions within multiple contexts can not be identified.

The effects of Supportive and Non-Supportive parenting and teaching practices were tested separately for every SSPs (*relatedness, competence, and autonomy*) and for engagement. Moreover, all suggested models were tested twice: 1) within concurrent time and 2) predicting change over two-time point. It was expected that over time effects would be small. Variables under study have been found to be relatively stable, hence not much inter-individual change was predicted. The over time change in variance, if found were expected to be even smaller and therefore less likely to be statistically significant.

Interactive Effects Models

The key issue of these models is whether the effects of parents and teachers interact with one another as they exert their influences on children's SSPs. If the interaction effects are present, it is important to understand what kinds they are. In general, interactive effects could be summarized under various categories of the complete and partial dependence models.

According to complete dependence effects models, one context does not have an effect on its own, but it does have an effect at certain levels of the other context. There are four possible complete dependence effects. Research questions for all four models are summarized in Table 7.

Table 7
Research Questions for the Complete Dependence Model

<i>Type of Effect</i>	<i>Description</i>
Activating	<p>Do supportive parent practices only have an effect on children's SSPs when the teacher is highly supportive?</p> <p>Do supportive teacher practices only have an effect on children's SSPs when the parent is highly supportive?</p>
Buffering	<p>Do supportive parent practices only have an effect on children's SSPs when the teacher is highly non-supportive?</p> <p>Do supportive teacher practices only have an effect on SSPs when the parent is highly non-supportive?</p>
Compensating	<p>Do non-supportive parent practices only have no effect on children's SSPs when the teacher is highly supportive?</p> <p>Do non-supportive practices only have no effect on children's SSPs when the parent is highly supportive?</p>
Immunizing	<p>Do non-supportive parent practices have no effect on children's SSPs when the teacher is highly non-supportive?</p> <p>Do non-supportive teacher practices have no effect on children's SSPs when the parent is highly non-supportive?</p>

According to partial dependence models, the effects of one social context will be increased or decreased depending on the quality of another social context. There are four possible partial dependence effects. Research questions for all four partial dependence models are summarized in Table 8.

Table 8
Research Questions for the Partial Dependence Model

<i>Type of Effect</i>	<i>Description</i>
Amplifying	<p>Are the effects of supportive parent practices on children's SSPs heightened when teacher practices are supportive?</p> <p>Are the effects of supportive teacher practices on children's SSPs heightened when parent practices are supportive?</p> <p>Are the effects of non-supportive parent practices on children's SSPs heightened when teacher practices are non-supportive?</p> <p>Are the effects of non-supportive teacher practices on children's SSPs heightened when parent practices are non-supportive?</p>
Boosting	<p>Are the effects of supportive parent practices on children's SSPs heightened when teacher practices are non-supportive?</p> <p>Are the effects of supportive teacher practices on children's SSPs heightened when parent practices are non-supportive?</p> <p>Are the effects of non-supportive parent practices on children's SSPs heightened when teacher practices are supportive?</p> <p>Are the effects of non-supportive teacher practices on children's SSPs heightened when parent practices are supportive?</p>
Diminishing	<p>Are the effects of supportive parent practices on children's SSPs not as strong when teacher practices are supportive?</p> <p>Are the effects of supportive teacher practices on children's SSPs not as strong when parent practices are supportive?</p> <p>Are the effects of non-supportive parent practices on children's SSPs not as strong when teacher practices are non-supportive?</p> <p>Are the effects of non-supportive teacher practices on children's SSPs not as strong when parent practices are non-supportive?</p>
Counter- balancing	<p>Are the effects of supportive parent practices on children's SSPs not as strong when teacher practices are non-supportive?</p> <p>Are the effects of supportive teacher practices on children's SSPs not as strong when parent practices are non-supportive?</p> <p>Are the effects of non-supportive parent practices on children's SSPs not as strong when teacher practices are supportive?</p> <p>Are the effects of non-supportive teacher practices on children's SSPs not as strong when parent practices are supportive?</p>

Statistically, when a *complete* dependence model is tested in regression analysis it would have no statistical significance for main effects, but it would have a statistically significant interaction term. When a *partial* dependence model is tested in regression analysis it would have significant main effects and a significant interaction term. Based on the conceptual framework of the Motivational model and previous research, it was expected that the current data would support amplifying effects described in the partial dependence interactive model.

Question 1. Do the effects of parents and teachers interact as they influence children's academic self-perceptions?

- 1a. Are there interactive effects between parent and teacher influences on children's SSPs?
- 1b. If so, what is the exact nature of the interactive effects?
- 1c. Can interactive effects be found in predicting changes in children's SSPs from fall to spring?

Independent Effects Models

The key issue in these models is whether Supportive and Non-Supportive parent and teacher practices have an effect on each of children's SSPs and whether the patterns of effects are similar across contexts as well as whether the practices cumulate or are redundant in their effects. There are two possible Independent Effects Models that are addressed in this section: Substitutive Effects Model and Unique Effects Model.

Independent Substitutive Effects Model.

Question 2. Do parent and teacher contexts have distinct or overlapping effects on children's academic self-perceptions?

- 2a. Do parent and teacher practices have an independent effect on each SSP?
- 2b. Do parent and teacher contexts have similar patterns of effects on children's SSPs?
- 2c. Can the effects of one social context substitute for the similar effects of the other context?
- 2d. Do social contexts have effects on change in children's SSPs from fall to spring?

Independent Unique Effects Model. The key issue is whether Supportive and Non-Supportive parents and teachers have unique effects on each SSP. It is expected that, when parents' and teachers' congruent practices are considered simultaneously (e.g., both parents and teachers are Supportive or both parents and teachers are Non-Supportive), their joint effects would be greater than when considered alone. It is also expected that some aspects of social contexts (e.g., Non-Supportive) could be more important than others (e.g., Supportive). It is also possible that negative influences of Non-Supportive context could be canceled out by Supportive context, or vice versa.

Question 3: Do parents and teachers have cumulative effects on children's academic self-perceptions?

- 3a. Do parent and teacher practices have unique effects on children's SSPs?
- 3b. Are the unique effects of one social context more important to children's

SSPs than the effects of the other social context?

- 3c. Do parents and teachers have unique effects on changes in children's SSPs from fall to spring?

Unique effects models are subdivided further onto congruent effects model and incongruent effects model.

Unique Effects Models: Congruent effects.

Question 4. Do the effects of parents and teachers on children's academic self-perceptions accumulate in the same direction?

- 4a. When congruent effects of parents and teachers on children's SSPs are considered simultaneously, will they have more influence than when considered alone?
- 4b. Can congruent effects be found in predicting changes in children's SSPs from fall to spring?

Unique Effects Models: Incongruent effects.

Question 5. Do the effects of parents and teachers on children's academic self-perceptions that operate in opposite directions cancel each other out?

- 5a. Are the effects of supportive parents on children's SSPs cancelled if the effects of non-supportive teachers are considered simultaneously?
- 5b. Are the effects of supportive teachers on children's SSPs cancelled if the effects of non-supportive parents are considered simultaneously?
- 5c. Are the effects of non-supportive parents on children's SSPs cancelled if the effects of supportive teachers are considered simultaneously?
- 5d. Are the effects of non-supportive teachers on children's SSPs cancelled if the

effects of supportive parents are considered simultaneously?

- 5e. Can incongruent effects be found in predicting changes in children's SSPs from fall to spring?

Differential Effects Models

The key issues of these models were whether the effects of parents and teachers on children's classroom engagement are mediated by different SSPs. Moreover, the role of person characteristic (child's age) was investigated to see if the effects of parents and teachers on children's SSPs depend on the age of a target person.

Differential Mediator Models.

Question 6. Are the process mechanisms that link social contexts to children's motivation different for parents vs. teachers?

- 6a. Are the SSPs that mediate the effects of context on engagement different for parent vs. teachers?
- 6b. Are the SSPs that mediate the effects of a social context on changes in children's classroom engagement from fall to spring, different for parents vs. teachers?
- 6c. When the effects of parents and teachers on children's engagement are considered simultaneously, are these effects mediated by different SSPs?
- 6d. When the effects of parents and teachers on changes in children's engagement from fall to spring are considered simultaneously, are these effects mediated by different SSPs?

Differential Recipient Models.

Question 7. Do the effects of parents and teachers differ based on the developmental level of a target children?

7a. Could the effects of parents and teachers on children's SSPs depend on the age of the target children?

7b. Could the joint effects of both social contexts on children's SSPs depend on the age of the target children?

7c. Could effects of social contexts on changes in children's SSPs from fall to spring depend on the age of the target children?

Sequential Effects Models

When multiple social contexts are under study, in addition to their simultaneous effects, the possibility of sequential effects should be investigated. Traditionally, the direction of the effects considered to be uni-directional: parents and teachers effect children. It is rare that the effects that children may have on their parents and teachers are investigated. If children do affect their social partners, then there is a possibility of three types of sequential links that describe a possible relationship between parents, teachers, and children: (1) *context to person to context* (e.g., parents influence children's engagement, which over time influences teachers' quality of interaction with children or teachers influence children's engagement, which over time influences parents' quality of interaction with children); (2) *context to context to person* (e.g., parents influence teachers, this over time changes the quality of the teacher-child relationship, and in turn the child's school engagement or how teachers influence parents, this over time changes the quality of the parent-child

relationship, and in turn the child's school engagement); and (3) *person to context to context* (e.g., the child influences teachers and this over time leads to teachers influencing parents or the child influencing parents this over time leads to parents influencing teachers).

Although all three of these models are theoretically possible only a *context to person to context* model was tested in this study. The reason for this is that, although measures of parent and teacher relate to one another, they are not predictive of one another. The measurements of parent and teacher contexts were developed to predict only children's outcomes and therefore they cannot be used in testing *context to context to person* or *person to context to context* models.

Sequential Effects Models.

Question 8. Do children's experiences with one social context influence their engagement, which, over time, influences children's experiences in the other social context?

- 8a. Do more supportive parents' interactions with their children at home lead to children's higher engagement, which, over time, leads to more supportive teachers' interactions with children in school?
- 8b. Do more non-supportive parents' interactions with their children at home lead children to be more disaffected, which, over time, result in more non-supportive teachers' interactions with children in school?
- 8c. Do more supportive teachers' interactions with students at school lead to children's higher engagement, which, over time, leads to more supportive parents' interactions with children at home?

8d. Do more non-supportive teachers' interactions with students at school lead to children being more disaffected, which, over time, results in more non-supportive parents' interactions with children at home?

CHAPTER 5: METHOD AND PROCEDURES

The purpose of this chapter is to describe the data that was used in the study. First, a general description of the data is provided and justifications for its use in the current study. Then, a description of the participants is given, followed by the elaboration on procedures used to collect the data and information on the constructs' measurement.

Data Used for this Project

The current study was based on data from a larger longitudinal project that was conducted from the fall of 1988 to the spring of 1992. The purpose of this project was to evaluate the effects of multiple social partners on children's self-systems processes and classroom engagement. In this project, two measurements were collected each academic year (one in the fall and one in the spring) for four years. All measurements of teacher context, children's self-system processes, and classroom engagement were consistent from one year to the next. These constructs were measured by the teacher and student reports.

The measurement of parent context was inconsistent over the years of data collection. For example, sometimes measurement of parenting was centered on the academic domain, and at other times on general parent practices in day to day interactions with the child. Furthermore, parenting was measured by the child's report. However, one year parents were also reporters of parenting. Out of the entire data set, only one year (the fall of 1990 and the spring of 1991) had comparable measurement of parent and teacher context. Since one of the criteria for data

selection in this study was the maximal comparability of the constructs, only the data from the academic year 1990 to 1991 were selected to be used.

Justifications for Use of the Data for this Project

Since data were collected prior to development of the JMCI framework, it is important to evaluate whether the data are suitable for the current study. Several justifications are considered. First, the data were collected during the preliminary attempts to understand joint influences of multiple social contexts on the child's outcomes. Thus, both measurements of parent and teacher contexts are in the data set.

Second, the constructs in the original project were selected based upon the theoretical framework of the Motivational model, the same model that is used for the selection of the constructs for the current study. Thus, constructs of this study are the same as the data's constructs. Furthermore, since the data were collected based on the Motivational model, it has all the constructs needed for the evaluation of a possible mechanism that mediates the influences of the contexts on children's outcomes. One of the purposes of the current study was to test this mediating mechanism and the data has all the measurements needed for such testing.

Third, the constructs comparability is one of the criteria for the testing of joint effects. The measurements of parent and teacher contexts are comparable in the data (fall of 1990 and spring of 1991), and therefore meet this important criterion. Moreover, the data have two measurement points, which allows testing of changes over time as well as testing models that require at least two time measurements for their empirical validation (e.g., Sequential Effects Models).

Finally, if the newly developed JMCI framework can be tested on previously collected data, it is even more likely that the framework would be suitable for the data that are collected with all the requirements and propositions of the JMCI framework in mind. In addition, if the framework is supported by the pre-existing data, then it would illustrate its further utility. Specifically, some of the data from existing studies on joint effects can potentially be reused to test the joint effects according to the JMCI framework (given that the measurements of contexts in those studies were comparable).

Limitations of the Data for Testing the JMCI Framework

One of the limitations of the data for testing the JMCI framework is that the data have only two time measurements. In order to test the Sequential Effects Models as mediator models, three measurements points are desired. Another limitation of the data is that parent and teacher constructs were measured in such ways that they cannot be tested as possible predictors of one another. As a result, two types of sequential models (*context* → *context* → *person* and *person* → *context* → *context*) can not be tested in the proposed study.

Participants

The participants consisted of 1242 students in grades 3 to 7 and their teachers in the fall of 1990 and 1103 students in the spring of 1991. The age of the students ranged from 7 to 12 years old and they were approximately equally divided by sex. Students' socioeconomic status was lower middle to middle class, as defined by parents' occupation and educational attainment. All participants were from a rural-

suburban school district in upstate New York. The participants were predominantly Caucasian. The most prominent minority group was Hispanic (fewer than 3 percent).

Procedure

Questionnaires were administered to students by pairs of trained interviewers. All questions were read aloud by one interviewer, while a second interviewer monitored understanding and answered students' questions. Students completed the questionnaires in three 40-minute sessions in their regular school setting. Teachers were not present in the classrooms during the sessions. While their students were being tested, the teachers usually completed their questionnaires.

Measures

Parenting and Teaching Practices

Parenting and teaching practices in this study are represented by two general constructs: Supportive and Non-Supportive practices. Supportive practices, is an aggregate of three dimensions: warmth, provision of structure, and autonomy support. These three dimensions are well-researched in parent and teacher literature and each has been linked to children's higher academic motivation and school performance. The *warmth* dimension is conceptualized as a parent or teacher's ability to facilitate the experience of relatedness, respect, and love and take an active interest in the child's life. The *structure* dimension was conceptualized as a parent or teacher's ability to promote in children the experience of competence and efficacy, by creating a predictable environment for children's development. The dimension of *autonomy* was defined as the extent to which a parent or a teacher acknowledges and

respects children's individuality and encourages independence and freedom of expression.

Similarly, parent and teacher Non-Supportive practices were an aggregate of three dimensions that were found to undermine children's academic motivation and performance: rejection, chaos, and coercion. The *rejection* dimension was defined as parent or teacher dislike or indifference towards the child, along with criticism, negative feelings, or hostility. The *chaos* dimension was defined by parent or teacher unpredictability, inconsistency, and lack of rules and contingencies. The *coercion* dimension was defined by parent or teacher negative control, inflexibility, and pressure for the child's obedience and conformity.

These Supportive and Non-Supportive parent and teacher practices were measured by children's report Parents as Social Context Questionnaire (PASCQ) (Skinner, Regan, & Welborn, 1986) and Teachers as Social Context Questionnaire (TASCQ) (Belmont, Skinner, Wellborn & Connell, 1991). The questionnaire was designed to tap three bi-polar dimensions of parent and teacher practices (warmth vs. rejection, structure vs. chaos, and autonomy support vs. coercion). High scores on each item indicated greater presence of particular parenting or teaching practice as perceived by children. From a previously conducted study it is known that measurement of teacher's warmth vs. rejection had $\alpha = .79$, structure vs. chaos had $\alpha = .84$, and autonomy support vs. coercion had $\alpha = .84$ (Skinner & Belmont, 1993). Since items were targeting both poles of each dimension, they could also be separated into sets that tapped each of six uni-polar dimensions (e.g., warmth: " *My parents enjoy the time they spend with me.*" and " *My teacher really cares about me;*"

structure: "My parents make clear what they expect of me." and "I know what to expect from my teacher;" autonomy support: "My parents encourage me to make decisions for myself." and " My teacher listens to my ideas;" rejection: "Sometimes I wonder if my parents like me." and "My teacher does not seem to enjoy having me in class;" chaos: "My parents keep changing the rules." and "My teacher does not make it clear what she expects of me in class;" and coercion: " My parents try to control everything I do." and "My teacher makes me do everything her way". All items measuring parent and teacher practices were generally equivalent. For more item examples refer to Appendix A.

Self-System Processes

Three self-system processes are investigated in this study in relation to Supportive and Non-Supportive quality of the social contexts: *relatedness*, *competence*, and *autonomy*. The self-system factor of *relatedness* refers to children's experience of themselves as being worthy and capable of love and their sense of security and connectedness to others. *Competence* refers to children's experience of control over desired outcomes, or knowing what to do to produce desired and prevent undesired events, as well as believing in their own ability to carry out the necessary actions. *Autonomy* refers to children's experience of their actions as self-determined or freely chosen and endorsed by the authentic self.

Children's sense of *relatedness* was measured by their responses to the Relatedness to Parents, Teachers, and Peers Questionnaire (Lynch & Wellborn, 1987). The relatedness to parents, teachers, and self sub-scale was used in this study containing 16 items (e.g., *When I am with my parents/teacher I feel like someone*

special) $\alpha = .86$ (Furrer & Skinner, 2003). Children's sense of *control* in the academic domain was measured by their responses to the 6 items from the Control Beliefs scale of the Student Perceptions of Control Questionnaire (e.g., *I can do well in school if I want to*) (Skinner et al., 1990). Children's sense of *autonomy* in the academic domain was measured by their responses to 17 items from the Autonomy Orientations Questionnaire (e.g., *Why do I do my classwork? Because I want to learn new things*) (Ryan & Connell, 1989). Internal consistency for the measurement of *control* was $\alpha = .79$ and for *autonomy* was $\alpha = .78$ (Patrick et al., 1993). All responses ranged from 1 "not at all true" to 4 "very true" on 4-point answer format. High scores indicated a greater sense of each self-system process as perceived by the children. For more item examples refer to Appendix B.

Student Engagement

Often engagement refers to "the intensity and emotional quality of children's involvement in initiating and carrying out learning activities" (Skinner & Belmont, 1993). There are two components of engagement: behavioral and emotional. Behavioral engagement refers to children's active involvement in school work, being persistent, trying hard when challenged with difficult tasks, and, in general, by demonstrating strong effort and concentration. Emotionally engaged children express positive emotions during school activities such as enthusiasm, optimism, curiosity, and interest. In contrast disaffected children may experience boredom, anxiety, or anger about classroom assignments and school in general.

Student engagement was measured by students' responses to 16 questionnaire items that were concerned with both behavioral (e.g., *I participate in class*

discussions) and emotional engagement in the classroom (*When we start something new in school, I feel interested*) (see Appendix D more item examples).

The scale included both positive and negative items and had a 4-point answer format ranging from 1 “not at all true,” to 4 “very true.” High scores on positive items indicated greater emotional and behavioral engagement as perceived by the students; high scores on negative items indicated more disengagement.

CHAPTER 6: RESULTS

The goal of this project was to test empirically the newly developed joint multiple context influence (JMCI) framework. The JMCI framework consists of four conceptual models: (a) Interactive, (b) Independent, (c) Differential, and (d) Sequential Effects Models. Eight sets of research questions were proposed to test these models. This section presents the results of testing each research question. The section starts with descriptive statistics, internal consistency reliabilities, and overall correlations between variables. Next, the results of testing for Interactive and Independent Effects Models are presented, followed by the results of testing for Differential and Sequential Effects Models.

Descriptive Statistics

Means, standard deviations, internal consistency reliabilities, and correlations were calculated to obtain a general overview of the data and to evaluate the suitability of variables for subsequent analyses. First, the descriptive statistics for social contexts are presented (parents' and teachers' Supportive and Non-Supportive practices), followed by the outcome variables (children's self-system processes: *relatedness*, *competence*, and *autonomy* and children's classroom engagement). All testing was conducted for Time 1 and Time 2 data points. As recommended by Shafer and Graham, the data were imputed using maximum likelihood (ML) estimation with an estimation maximization (EM) algorithm (2002). The imputation was completed using the Missing Values module for SPSS 16. All further analyses were completed using the imputed dataset. Sample size was 1242 for all the analyses.

Social Contexts

Table 9 presents the means, standard deviations, and internal consistency reliabilities (Cronbach's alphas) for Supportive and Non-Supportive parents and teachers at Time 1 and Time 2. According to the mean values, the majority of the parents and teachers were perceived by children to be high on Supportive practices and low on Non-Supportive practices. In comparison to parents, teachers had a lower mean for Supportive practices and a higher mean for Non-Supportive practices for both data points.

Internal consistency reliabilities were satisfactory for all variables. The lowest reliability was for Supportive parenting practices (.86 for both time measurements). The highest reliability was for Non-Supportive teachers' practices (.94 and .95 at Time 1 and Time 2 respectively).

Table 9
Internal Consistency Reliabilities, Means, and Standard Deviations for Social Contexts

Context	<u>n</u> of items	Time 1			Time 2		
		α	<u>M</u>	<u>SD</u>	α	<u>M</u>	<u>SD</u>
<u>Parents</u>							
Supportive	15	.86	3.24	.47	.86	3.19	.43
Non-Supportive	24	.93	1.84	.56	.92	1.89	.53
<u>Teachers</u>							
Supportive	21	.92	3.00	.52	.91	2.91	.49
Non-Supportive	27	.94	1.96	.57	.95	2.06	.54

Note. Scale means could range from 1(not at all true for me) to 4 (very true for me)

Table 10 presents the zero-order correlations among the Supportive and Non-Supportive parents and teachers. All correlations within Time 1 and within Time 2 measurement were significant at $p < .001$ level and in the hypothesized direction.

Table 10
Correlations among Social Contexts at Time 1 and Time 2

Context	<u>Parents</u>		<u>Teachers</u>	
	Supportive	Non-Supportive	Supportive	Non-Supportive
<u>Parents</u>				
Supportive	--	-.66**	.48**	-.35**
Non-Supportive	-.66**	--	-.28**	.59**
<u>Teachers</u>				
Supportive	.49**	-.33**	--	-.67**
Non-Supportive	-.36**	.60**	-.70**	--

Note. ** $p < .001$, $N = 1242$. Correlations for Fall are below the diagonal; for Spring are above the diagonal.

Correlations among social contexts within each time measurement were low to moderate and ranged from .33 to .70. The highest correlations were between Supportive and Non-Supportive practices within each social context for both time measurements (for Supportive and Non-Supportive parents the average correlation was -.66 and for Supportive and Non-Supportive teachers the average correlation was -.67). The lowest correlations were between parents' and teachers' incongruent practices (for Supportive parents and Non-Supportive teachers the average correlation .36 and for Supportive teachers and Non-Supportive parents the average

correlation was .31). The remaining correlations between parents' and teachers' congruent practices (Supportive parents and teachers and Non-Supportive parents and teachers) ranged from .48 to .60.

Table 11 presents the zero-order cross times correlations among the Supportive and Non-Supportive parents and teachers. All correlations were significant at $p < .001$ level and in the hypothesized direction. They were low to moderate and ranged from .24 to .71. The highest cross time correlations were within each social context and among congruent practices. Non-Supportive parents had the highest correlation (.71), followed by Non-Supportive teachers (.68), Supportive parents (.63), and Supportive teachers (.62). The average correlation among congruent practices within each social context was .66. The lowest cross time

Table 11
Correlations for Social Contexts between Time 1 and Time2 Data Points

Context		<u>Time 2</u>			
		Parents		Teachers	
		Supportive	Non-Supportive	Supportive	Non-Supportive
<u>Time 1</u>	<u>Parents</u>				
	Supportive	.63**	-.51**	.34**	-.29**
	Non-Supportive	-.51**	.71**	-.24**	.44**
	<u>Teachers</u>				
Supportive	.36**	-.27**	.62**	-.50**	
Non-Supportive	-.30**	.48**	-.50**	.68**	

Note. ** $p < .001$.

correlations were between incongruent social contexts and among all incongruent practices, with the average value of .28.

Children's Outcomes

The means, standard deviations, and internal consistency reliabilities of the self-system process variables (*relatedness*, *competence*, and *autonomy*) and engagement appear in Table 12. On average, children's perceptions of self and teachers' perceptions of students' classroom *engagement* were high, with the highest mean for *competence* (3.45 and 3.41 at Time 1 and Time 2 respectively) and the lowest mean for *autonomy* (2.63 and 2.58 at Time 1 and Time 2 respectively). As indicated by Cronbach's alphas, internal consistency reliabilities for self-system processes and engagement were satisfactory (.7 or above). The lowest reliability was for *competence* (.71 at Time 1 and .73 at Time 2). The highest reliability was for *engagement* (.89 at Time 1 and .87 at Time 2) and for *relatedness* (.87 at Time 2).

Table 12
Internal Consistency Reliabilities, Means, and Standard Deviations for SSPs and Engagement

Children's Outcome	<u>n</u> <i>of items</i>	Time 1			Time 2		
		α	<u>M</u>	<u>SD</u>	α	<u>M</u>	<u>SD</u>
Relatedness	16	.85	3.35	.48	.87	3.33	.46
Competence	6	.71	3.45	.51	.73	3.41	.48
Autonomy	17	.80	2.63	.46	.81	2.58	.42
Engagement	15	.89	3.16	.48	.87	3.12	.45

Note. Scale means could range from 1(not at all true for me) to 4 (very true for me)

Table 13 presents the zero-order correlations among the three self-system processes and engagement. All correlations were significant at $p < .001$ level and in the hypothesized direction. Correlations were low and moderate and they ranged from .31 to .67. The highest correlation was between *engagement* and *relatedness* (.66 and .67 for Time 1 and Time 2 measurements respectively). The lowest correlation was between *competence* and *autonomy* (.32 for Time 1 measurement and .31 for Time 2 measurement).

Table 13
Zero-Order Correlations among Self-System Processes and Engagement

Children's Outcome	Time 1			Time 2		
	1	2	3	1	2	3
1. Relatedness						
2. Competence				.46**		.45**
3. Autonomy	.39**	.32**		.36**	.31**	
4. Engagement	.66**	.53**	.63**	.67**	.54**	.60**

Note. ** $p < .001$.

Correlations between social contexts (Supportive parents, Non-Supportive parents, Supportive teachers, and Non-Supportive teachers) and children's outcomes (relatedness, competence, autonomy, and engagement) are presented in Table 14. All correlations were significant at $p < .001$ level and in the hypothesized direction. They were low to moderate and ranged from .29 to .66. The highest correlations were

Table 14
Correlations between Social Contexts and Children's SSPs

Social Context	Time 1			Time 2		
	Relatedness	Competence	Autonomy Engagement	Relatedness	Competence	Autonomy Engagement
<u>Parents</u>						
Supportive	.61**	.39**	.31**	.47**	.48**	.48**
Non-Supportive	-.61**	-.47**	-.39**	-.54**	-.39**	-.55**
<u>Teachers</u>						
Supportive	.55**	.36**	.44**	.58**	.46**	.56**
Non-Supportive	-.56**	-.50**	-.54**	-.66**	-.52**	-.66**

Note. ** $p < .001$, $N = 1242$.

between Non-Supportive teachers and children's *engagement* (-.66 at both time points), followed by the correlations between children's perceived *relatedness* and parental context (.61 and .62 for Supportive parents and -.61 and -.61 for Non-Supportive parents at Time 1 and Time 2 respectively). The lowest correlations were between Supportive parents and children's perceived *autonomy* (.31 and .29 at Time 1 and Time 2 respectively) followed by the correlations between Supportive teachers and children's perceived *competence* (.36 and .34 at Time 1 and Time 2 respectively).

Overall, Non-Supportive parents' and teachers' practices (compare to Supportive practices) had a higher correlation with every developmental outcome. The average correlation for Non-Supportive parents was .50 and for Non-Supportive teachers .56. The average correlation for Supportive parents was .46 and for Supportive teachers .47. Furthermore, Supportive and Non-Supportive parents had the highest correlation with children's perceived *relatedness* and the lowest correlation with children's perceived *autonomy* for both time measurements. Supportive and Non-Supportive teachers had the highest correlation with children's perceived *relatedness* and the lowest correlation with children's perceived *competence* at both time points.

Children's *relatedness*, *competence*, and *engagement* had similar values and an overall pattern of correlations for congruent contexts (both parents and teachers were Supportive or both were Non-Supportive). This was consistent at Time 1 and Time 2. However, for children's *autonomy* the correlations had a larger gap for congruent practices between parent and teacher context: Supportive teachers had a higher correlation with children's *autonomy* in comparison to Supportive parents (at both

time points); similarly, Non-Supportive teachers had a higher correlation with children's *autonomy* in comparison to Non-Supportive parents (at both time points).

Summary

The first set of analyses indicated that almost all constructs under study had satisfactory internal consistency reliabilities. Descriptive analysis revealed that, on average, children perceived parents and teachers as being *high* on supportive practices and *low* on non-supportive practices. Children also perceived themselves as being *high* on all three self-system processes (relatedness, competence, and autonomy). Correlational analyses indicated that all variables under study were significantly interrelated and in the hypothesized direction. The correlations ranged from low to moderate.

Finally, it is important to note that most of the variables were not normally distributed, indicating possible biases in selection of the sample and therefore a possible restriction in generalizing findings to broader populations.

Interactive and Independent Effects Models

The purpose of the study was to test empirically four proposed models: (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential Effects Models. In this section independent and interactive effects will be investigated. This section starts with an overview of the research questions for testing Interactive and Independent models. Then, an outline of specific steps followed for testing of Interactive and Independent Effects Models is presented. The main body of this section elaborates on the results of statistical testing for interactive and independent effects of social contexts on children's self-system processes (SSPs) of *relatedness*,

competence, and *autonomy*. The section concludes with an overall summary of all

Interactive and Independent Effects Models found in the data.

Research Questions for Testing Interactive and Independent Effects Models

Interactive Effects Models were addressed by the Research Question 1 and its subset of three questions:

Question 1. Do the effects of parents and teachers interact as they influence children's academic self-perceptions?

- 1a. Are there interactive effects between parent and teacher influences on children's SSPs?
- 1b. If so, what is the exact nature of the interactive effects?
- 1c. Can interactive effects be found in predicting changes in children's SSPs from fall to spring?

The Independent Effects Models were addressed by the Research Questions 2, 3, 4 and 5 and their respective subset questions:

Question 2. Do parent and teacher contexts have distinct or overlapping effects on children's academic self-perceptions?

- 2a. Do parent and teacher practices have an independent effect on each SSP?
- 2b. Can the effects of one social context substitute for the similar effects of the other context?
- 2c. Do social contexts have effects on change in children's SSPs from fall to spring?

Question 3: Do parents and teachers have cumulative effects on children's academic self-perceptions?

- 3a. Do parent and teacher practices have unique effects on children's SSPs?
- 3b. Are the unique effects of one social context more important to children's SSPs than the effects of the other social context?
- 3c. Do parents and teachers have unique effects on changes in children's SSPs from fall to spring?

Question 4. Do the effects of parents and teachers on children's academic self-perceptions accumulate in the same direction?

- 4a. When congruent effects of parents and teachers on children's SSPs are considered simultaneously, will they have more influence than when considered alone?
- 4b. Can congruent effects be found in predicting changes in children's SSPs from fall to spring?

Question 5. Do the effects of parents and teachers on children's academic self-perceptions that operate in opposite directions cancel each other out?

- 5a. Are the effects of supportive parents on children's SSPs cancelled if the effects of non-supportive teachers are considered simultaneously?
- 5b. Are the effects of supportive teachers on children's SSPs cancelled if the effects of non-supportive parents are considered simultaneously?
- 5c. Are the effects of non-supportive parents on children's SSPs cancelled if the effects of supportive teachers are considered simultaneously?
- 5d. Are the effects of non-supportive teachers on children's SSPs cancelled if the effects of supportive parents are considered simultaneously?
- 5e. Can incongruent effects be found in predicting changes in children's SSPs from fall to spring?

Steps for Testing Interactive and Independent Effects Models

Testing for Interactive and Independent Effects Models followed the *decision tree*, developed by the study (see Figure 9). The *decision tree* suggests distinct steps for testing the models. The sequence of steps is determined by whether the interaction effects are found or not found in statistical testing. The hierarchy of Interactive Effects Models is also depicted in Figure 5 (see p. 108).

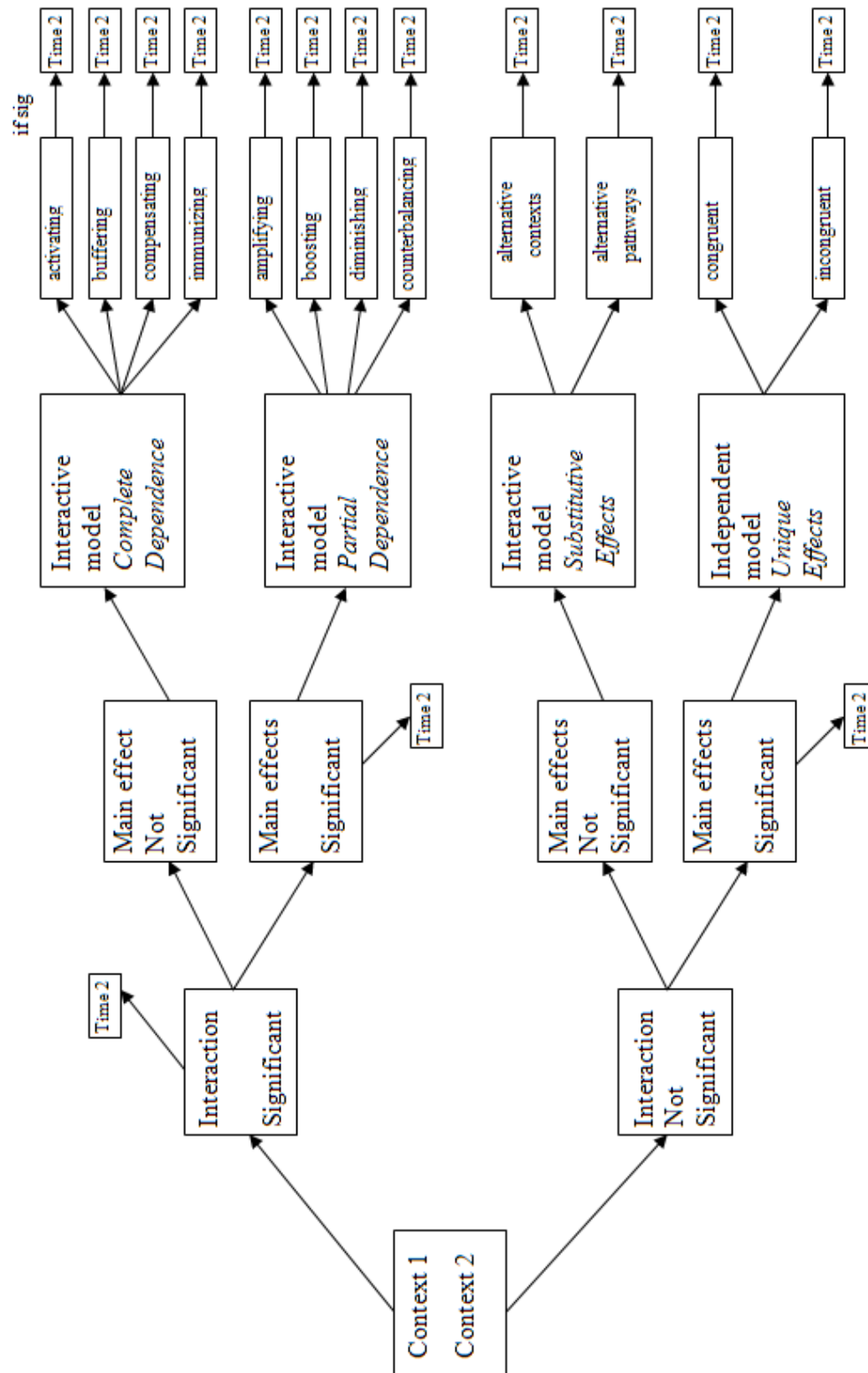


Figure 9. Decision Tree

Significant interaction. A set of hierarchical regressions was conducted to test for interaction effects. If the interaction was significant (1) it indicated that the effects were not *independent* but *interactive* and (2) of further interest was whether (a) both main effects were significant or (b) at least one or both main effects were not significant (Research Question 1a). If the interaction was significant and both main effects were significant this suggested the presence of *partial dependence* interactive effects. However, when the interaction was significant and at least one main effect was not significant, this indicated the presence of *complete dependence* interactive effects. The follow up analyses were conducted to verify the specific nature of interactive effects and the findings were compared to conceptual interactive models suggested in the JMCI framework (Research Question 1b). In addition, if interaction was found significant, influences on changes over time in children's outcomes were tested, using hierarchical regression (Research Question 1c).

If interactive models were found, they would have to meet the following criteria for the interpretation of the effects: (1) their sizable variance, (2) they have to appear in both time points, and (3) effects in both time points have to be comparable.

Non-significant interaction. If an interaction was not significant in regression analyses (1) it indicated that the effects of parents and teachers on children's outcomes were not *interactive* but *independent* (Research Question 2a) and (2) of further interest was to find out whether (a) main effects were significant or (b) main effects were not significant. If main effects were not significant, it suggested the presence of *substitutive* effects (Research Question 2b). If main effects were not significant, influences on changes over time in children's outcomes were

tested (Research Question 2c), using a hierarchical regression. However, if main effects were significant, this would indicate the presence of *unique* effects (Research Question 3a). In that case, the testing proceeded to further investigation of the precise nature of those effects. For the hierarchy levels of Independent Effects Models refer to Figure 4 on p.103.

If unique effects were found, and the amount of variance in every SSP accounted for by one predictor was different from the amount of variance accounted for by the other predictor, a comparison analysis was performed to test if the difference was statistically significant. The AMOS program was used to compare two models: 1) a model in which regression coefficients were freely estimated and 2) a model in which regression coefficients were constrained to be equal. If these two models were significantly different from one another, it meant that the difference in variance accounted for by each context was statistically significant and that one social context was a more important predictor of children's outcomes than the other (Research Question 3b). In addition, if unique effects for both parents and teachers were found, a hierarchical multiple regression was used to test changes in children's SSPs from fall to spring due to unique combined contextual influences (Research Question 3c).

At this point, testing was subdivided into unique *congruent* effects (Research Question 4) or unique *incongruent* effects (Research Question 5). Congruent effects were tested for the following combinations of social contexts: 1) Supportive parents and Supportive teachers and 2) Non-Supportive parents and Non-Supportive teachers. If congruent unique effects were found in predicting children's SSPs, a

hierarchical regression was conducted to test whether the difference in variance accounted for by one versus two social contexts was statistically significant (Research Question 4a). If the difference in variance was significant, the effects were *additive*. Finally, if congruent effects were found, hierarchical regression analyses were conducted to test if congruent effects were present in predicting changes on children's SSPs from fall to spring (Research Question 4b).

Incongruent effects were tested for the following combinations of social contexts: 1) Supportive parents and Non-Supportive teachers and 2) Non-Supportive parents and Supportive teachers. For incongruent effects to be present, a social context, previously found significantly correlated with a SSP, had to become non-significant when combined in a multiple regression with a social context of opposite quality (Research Question 5 a-d). If incongruent effects were found, then whether they predict changes in children's SPP's from fall to spring were tested, using hierarchical regression (Research Question 5e).

Results for Interactive and Independent Effects Models

To test whether the effects of parents and teachers were interactive or independent, four interaction terms were created: (1) Supportive parents and Supportive teachers, (2) Non-Supportive parents and Non-Supportive teachers, (3) Supportive parents and Non-Supportive teachers, and (4) Non-Supportive parents and Supportive teachers. Each interaction term was a cross-product of the two independent variables. Hierarchical regression analyses were conducted for every created interaction term and repeated for every SSPs (relatedness, competence, and autonomy) for both time measurements.

It is important to note that all regression analyses were performed on centered data. The data were centered with intent to 1) reduce potential problems associated with multicollinearity (if the predictors are not centered, their product may be highly correlated with the original predictors) and to 2) improve interpretability of such parameter estimates as regression coefficients and betas (DeMaris, 2004). To center data, the mean scores were subtracted from each data-point of corresponding variables.

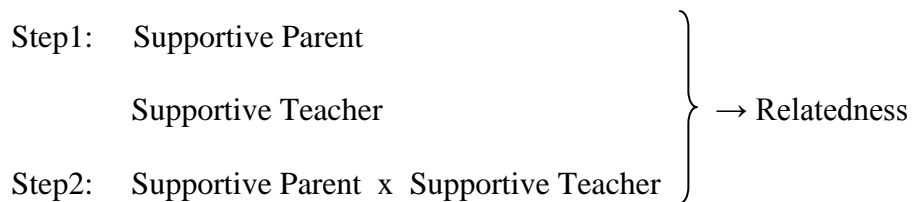
A total of *twenty-four* regression analyses was conducted as the first step in testing for interactive and independent effects. First, the findings for congruent contexts are presented, starting with Supportive congruent contexts (Supportive parents/Supportive teachers), followed by Non-Supportive congruent contexts (Non-Supportive parents/ Non-Supportive teachers). Then, the findings for non-congruent contexts are presented (Supportive and Non-Supportive contexts are intermixed), starting with a Supportive parents/Non-Supportive teachers combination, followed by a Non-Supportive teachers/Supportive parents combination. In addition, all findings for congruent and non-congruent social contexts were organized by children's SSPs (relatedness, competence, and autonomy) as well as Time 1 and Time 2 measurements.

Congruent contexts: Supportive parents and Supportive teachers. In this section the findings for congruent Supportive contexts are presented (Supportive parents and Supportive teachers), elaborating on how they possibly influence children's self-perception of *relatedness*, *competence*, and *autonomy*.

Supportive parents, Supportive teachers, and children's relatedness, at

Time 1.

Research question 1a. Are there interactive effects between Supportive parents' and Supportive teachers' influences on children's relatedness? A hierarchical regression was performed testing whether the effects of Supportive parents and Supportive teachers interact in their influences on children's relatedness at Time 1. Supportive parents and Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.



R^2 for the overall model was significant [$R^2 = .45$, $F(2,1239) = 513$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived relatedness. Semi-partial correlations indicated that Supportive parents uniquely accounted for 14.9 percent of variance in children's sense of relatedness while Supportive teachers accounted for 8.6 percent of the variance.

R^2 Change was not significant (R^2 Change = .001, n.s.), suggesting that the interaction did not account for an additional variance in children's perceived relatedness over and above Supportive parents and teachers. The results of the test for significance of β values are presented in Table 15.

Research question 2a. Do parents and teachers have an independent effect on children's relatedness? Since the interaction was not significant in regression analyses, the effects of Supportive parents and Supportive teachers on children's relatedness were independent. In addition, both main effects were significant, therefore testing proceeded to the research question 3a.

Table 15

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Relatedness at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.44*	18.37
Supportive Teachers	.34*	13.89
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.31	-1.43

Note. * $p < .000$.

Research question 3a. Do parents' and teachers' practices have unique effects on children's relatedness? Since both main effects were significant, this indicated that the independent effects were unique.

Research question 3b. Are the unique effects of one social context more important to children's relatedness than the effects of the other social context? Since unique effects were found, and the amount of variance in children's relatedness accounted for by Supportive parents (14.9 percent) was different from the amount of

variance accounted for by Supportive teachers (8.6 percent), a comparison analysis was performed to test if the difference is statistically significant.

The AMOS program was used to compare two models: 1) a model in which regression coefficients were freely estimated and 2) a model in which regression coefficients were constrained to be equal. It was found that these two models were significantly different from one another, suggesting that the difference in variance accounted for by each context is statistically significant ($X^2_{dif} = 28.01$, $DF=2$, $p < .001$). Data suggested that parents were a more important predictor of children's relatedness than teachers.

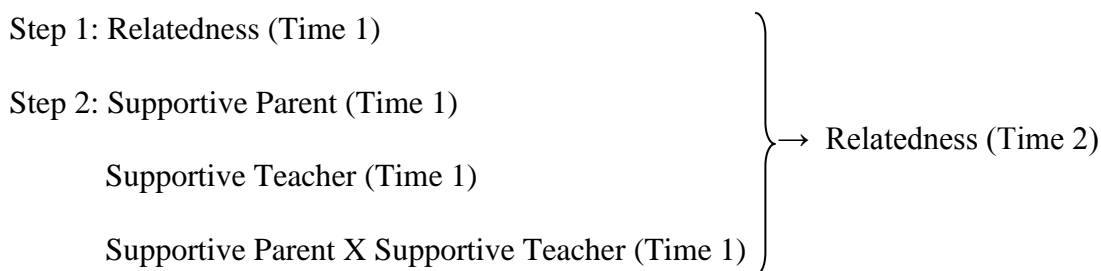
Research question 4a. When congruent effects of Supportive parents and Supportive teachers on children's relatedness are considered simultaneously, will they have more influence than when considered alone? To test this research question, a hierarchical regression was conducted to verify if the difference in variance accounted for by one versus two social contexts was statistically significant. In the first step of the hierarchical regression, Supportive parents were entered. In the second step, Supportive teachers were entered.

Step 1: Supportive Parent	}	→ Relatedness
Step 2: Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .45$, $F(2,1239) = 718$, $p < .000$]. R^2 Change was significant [R^2 Change = .086, $F(1,1239) = 196$, $p < .000$], suggesting that the Supportive teachers accounted for a significant 8.6 percent of variance in children's perceived relatedness over and above Supportive parents. Thus, R^2 change

indicated that the difference in variance accounted for by Supportive parents versus both Supportive parents and Supportive teachers was significant. Since the difference in variance was significant, the effects were additive.

Research question 4b. Can unique and interactive effects of Supportive parents and Supportive teachers be found in predicting changes in children's perceived relatedness from fall to spring? Since congruent effects were found, hierarchical regression analyses were conducted to test if congruent effects are present in predicting changes on children's relatedness from fall to spring. In the first step of the regression relatedness at Time 1 was entered. Supportive parents and Supportive teachers at Time 1 and their interaction term were entered in the second step. Relatedness at Time 2 was the dependent variable.



R^2 for the overall model was significant [$R^2 = .39$, $F(2,1239) = 722.1$, $p < .000$]. R^2 Change was also significant [R^2 Change = .02, $F(1,1238) = 11.2$, $p < .000$], indicating that variables in the second step of the regression accounted for a significant 2 percent of variance in children's relatedness at Time 2. The results of the test for significance of β values are presented in Table 16. Only β for Supportive parents was significant in the second step of the hierarchical regression. Thus, unique

effects of Supportive parents were found in predicting changes in children's perceived relatedness from fall to spring over and above the unique effects of children's relatedness in Time 1.

Table 16

Summary of Hierarchical Regression for Supportive Parents and Teachers and Relatedness at Time 1 Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Relatedness Time 1	.61**	26.87
<u>Step 2</u>		
Supportive Parents	.28*	2.47
Supportive Teachers	.23	1.52
Supportive Parent X Supportive Teacher	-.29	-1.26

Note. * $p < .000$.

Summary. In regards to the research questions 2 through 4, concerning effects of Supportive parents and Supportive teachers on children's relatedness at Time 1, the findings indicated that:

(2a) Effects of Supportive parents and Supportive teachers on children's relatedness were significant and independent.

(3a) Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

(3b) Parents accounted for significantly more variance in children's relatedness than teachers did.

(4a) The specific nature of unique independent effects was additive:

Supportive teachers accounted for a significant amount of variance in children's relatedness, over and above Supportive parents.

(4b) Only unique effects of Supportive parents were found in predicting changes in children's relatedness from fall to spring.

Supportive parents, Supportive teachers, and children's relatedness at Time

2. The same set of analyses was conducted to answer the same set of questions for relatedness at Time 2. The results, presented in Table 17, can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting relatedness at Time 2 (R^2 Change = 0.00, n.s.).

Research question 2a. Effects of Supportive parents and Supportive teachers on children's relatedness were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Parents accounted for significantly more variance in children's relatedness than teachers did (20.1 percent versus 8.2 percent, $X^2_{dif} = 146.6$, $DF=2$, $p<.001$)

Research question 4a. The specific nature of unique independent effects was additive: Supportive teachers accounted for a significant 5.1 percent of variance in children's relatedness, over and above Supportive parents, (R^2 Change = .51, $F(1, 1239) = 110.1$, $p <.001$).

Table 17

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.50*	20.28
Supportive Teachers	.26*	10.50
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.00	-.00
Overall Model	$R^2 = .43$, $F(2,1239) = 471.4$, $p < .000$	

Note. * $p < .000$.

Supportive parents, Supportive teachers, and children's competence at Time 1. The results for supportive parents, supportive teachers, and children's competence at time 2 are presented in Table 18 and can be summarized as follows:

Research question 1a. The effects of Supportive parents and Supportive teachers possibly interacted in their influence on children's competence [R^2 Change = .004, $F(1,1238) = 6.10$, $p < .01$]. However, the effect size was small (interactions accounting for only .4 percent of variance in children's competence) and the model was not replicated in both time points. Thus, presentation of the exact form of the interaction is relegated to Appendix D.

Research question 2a. Effects of Supportive parents and Supportive teachers on children's relatedness were significant and independent.

Table 18

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Competence at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.27*	9.82
Supportive Teachers	.23*	8.1
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.64*	-2.49
Overall Model	$R^2 = .19, F(2,1239) = 145.3, p < .000$	

Note. * $p < .000$.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Supportive parents did not account for significantly more variance in children's competence than Supportive teachers did (5.7 percent versus 4.1 percent, $X^2_{dif} = 1.60, DF=2, n.s$).

Research question 4a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Supportive teachers accounted for a significant 4.1 percent of variance in children's competence, over and above Non-Supportive parents (R^2 Change = .041, $F(1, 1239) = 62.2, p < .000$).

Research question 4b. Significant interactive effects of Supportive parents and Supportive teachers were found in predicting changes in children's competence from

fall to spring over and above the unique effects of children's competence in Time 1 (R^2 Change = .02, $F(1, 1238) = 10.2$ $p < .000$). Values for β 's are reported in Table 19.

Table 19

Summary of Hierarchical Regression for Supportive Parents and Teacher, and Competence Time 1 Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Competence Time 1	.48**	18.37
<u>Step 2</u>		
Supportive Parents	-.18	-1.48
Supportive Teachers	-.27	-1.64
Supportive Parents X Supportive Teachers	.52*	2.16
Overall Model	$R^2 = .31$, $F(2,1239) = 506,1$, $p < .000$	

Note. ** $p < .000$, * $p < .05$.

Supportive parents, Supportive teachers, and children's competence at

Time 2. The results for Supportive parents, Supportive teachers, and children's competence at Time 2 are presented in Table 20 and can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting competence at Time 1 (R^2 Change = 0.00, n.s.).

Research question 2a. Effects of Supportive parents and Supportive teachers on children's competence were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's competence.

Research question 3b. Parents accounted for significantly more variance in children's competence than teachers did (6.6 percent versus 3.0 percent, $X^2_{dif} = 7.46$, $DF=2$, $p < .05$)

Research question 4a. The specific nature of unique independent effects was additive: Supportive teachers accounted for a significant 3 percent of variance in children's competence, over and above Supportive parents (R^2 Change = .03, $F(1, 1239) = 45.5$, $p < .000$).

Table 20

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.29*	9.88
Supportive Teachers	.20*	6.75
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	.33	1.36
Overall Model	$R^2 = .18$, $F(2, 1239) = 135.4$, $p < .000$	

Note. * $p < .000$.

Supportive parents, Supportive teachers, and children's autonomy at Time

1. The results for Supportive parents, Supportive teachers, and children's autonomy at Time 1 are presented in Table 21 and can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting autonomy at Time 1 (R^2 Change = 0.00, n.s.).

Research question 2a. Effects of Supportive parents and Supportive teachers on children's autonomy were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Table 21

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.12*	4.23
Supportive Teachers	.38*	13.26
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	.09	.35
Overall Model	$R^2 = .21, F(2,1239) = 163, p < .000$	

Note. * $p < .000$.

Research question 3b. Supportive teachers account for significantly more variance in children's autonomy than Supportive parents did (11.3 percent versus 1.1 percent, $X^2_{dif} = 13.34, DF=2, p < .001$).

Research question 4a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Supportive parents accounted for a significant 1 percent of variance in children's autonomy, over and above Supportive teachers (R^2 Change = .01, $F(1, 1239) = 17.9, p < .000$).

Research question 4b. No unique or interactive effects of Supportive parents and Supportive teachers were found in predicting changes in children's autonomy from fall to spring over and above the unique effects of children's autonomy in Time 1 (R^2 Change = .002, $F(1, 1238) = 1.35$, n.s.).

Supportive parents, Supportive teachers, and children's autonomy at Time

2. The results for Supportive parents, Supportive teachers, and children's autonomy at Time 2 are presented in Table 22.

Table 22

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.09*	3.16
Supportive Teachers	.42**	14.56
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	.39	1.65
Overall Model	$R^2 = .22, F(2,1239) = 172.1, p < .000$	

Note. * $p < .01$. ** $p < .000$.

The results can be summarized as follows:

Research question 1a. The effects of parents and teachers did not interact in predicting autonomy at Time 2 (R^2 Change = 0.002, ns).

Research question 2a. Effects of Supportive parents and Supportive teachers on children's autonomy were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Teachers accounted for significantly more variance in children's autonomy than parents did (13.4 percent versus .6 percent, $X^2_{dif} = 35.44$, $DF=2$, $p<.000$)

Research question 4a. The specific nature of unique independent effects was additive: Supportive teachers accounted for a significant .6 percent of variance in children's autonomy, over and above Supportive parents (R^2 Change = .006, $F(1, 1239) = 10$, $p <.001$).

Summary for congruent Supportive contexts. A total of six hierarchical regressions were conducted to test the effects of Supportive parents and Supportive teachers on children SSPs. An overall summary of the findings is presented in Table 23 (p.174).

Only one significant interaction was found for the Supportive parents/Supportive teachers combination and *competence* at Time 1 (See Appendix D for more information on this interaction). However, the effect size of the interaction was very small. Thus, the practical significance of the found interactive effects may be insubstantial. Furthermore, on the profile plot of the follow up analyses, the lines for low and high on Support parents were almost parallel, indicating weak or even absent interactions. In addition, the model was not replicated across two measurement points. Inability to replicate data across time undermined even further the validity of the model. For these reasons, the model considered to have independent effects.

Table 23

Summary of the Findings for Interactive and Independent Joint Effects of Supportive Parents and Supportive Teachers

	Relatedness	Competence	Autonomy
Time 1	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 14.9% Teachers 8.6 %</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Interaction sig (.4%)</p> <p>Parents 5.7% Teachers 4.1 % Difference: ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 11.2 % Parents 1.1%</p>
Time 2	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 20.1% Teachers 8.2 %</p> <p>Change: Fall to Spring Parents - sig Teachers - ns Interaction - ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 6.6% Teachers 3 %</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - sig</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 13.4 % Parents .6%</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - ns</p>

Thus, every model for the Supportive parents/Supportive teachers combination supported Independent Effects Model. All effects were unique, suggesting that each social context accounted for unique variance in children's SSPs. Supportive parents accounted for significantly more variance in children's perceived *relatedness*, while Supportive teachers accounted for significantly more variance in children's perceived *autonomy*. For *competence* in Time 1, there was no statistical difference in amount of variance accounted by parents and teachers. For competence in Time 2, parents accounted for significantly more variance than teachers did, but the difference in variance was not as pronounced as it was for relatedness.

The specific nature of all joint effects was additive, indicating that the variance accounted for by two Supportive contexts in children's outcomes was significantly different from the variance accounted by just one Supportive context. Furthermore, although teachers accounted for a smaller amount of variance in children's *relatedness* and *competence* than parents did, that amount of variance was over and above the effects of parents. Similarly, although parents accounted for a smaller amount of variance in children's *autonomy* than teachers did, that amount of variance was still significantly over and above the effects of teachers.

In addition, significant unique effects of Supportive parents and significant interactive effects of Supportive parents and Supportive teachers were found in predicting changes in children's *relatedness* from fall to spring. Non unique or interactive effects of Supportive parents and Supportive teachers were found for *autonomy*.

Congruent contexts: Non-Supportive parents and Non-Supportive teachers. In this section the findings for congruent Non-Supportive contexts are presented (Non-Supportive parents and Non-Supportive teachers), elaborating on how they possibly influence children's self-perception of *relatedness*, *competence*, and *autonomy*.

Non-Supportive parents, Non-Supportive teachers, and children's relatedness at Time 1. The results for Non-Supportive parents, Non-Supportive teachers, and children's relatedness at Time 1 are presented in Table 24 and can be summarized as follows:

Table 24
Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Relatedness at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.42*	-15.65
Non-Supportive Teachers	-.31*	-11.43
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	-.01	-1.11
Overall Model	$R^2 = .43$, $F(2,1239) = 464.2$, $p < .000$	

Note. * $p < .000$.

Research question 1a. Effects of parents and teachers did not interact in predicting relatedness at Time 1 (R^2 Change = 0.00, n.s.).

Research question 2a. Effects of Non-Supportive parents and Non-Supportive teachers on children's relatedness were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Non-Supportive Parents accounted for significantly more variance in children's relatedness than Non-Supportive teachers did (11.3 percent versus 6.1 percent, $X^2_{dif} = 24.74$, $DF=2$, $p<.000$).

Research question 4a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive teachers accounted for a significant 6 percent of variance in children's relatedness, over and above Non-Supportive parents (R^2 Change = .06, $F(1, 1239) = 131.1$, $p <.000$).

Research question 4b. No significant unique or interactive effects of Non-Supportive parents and Non-Supportive teachers were found in predicting changes in children's relatedness from fall to spring over and above the unique effects of children's relatedness in Time 1. Although R^2 Change was significant [R^2 Change = .04, $F(1,1238) = 27.1$, $p < .000$], all β 's were not significant in the second step of the hierarchical regression (see Table 25).

Non-Supportive parents, Non-Supportive teachers, and children's relatedness at Time 2. The results for Non-Supportive parents, Non-Supportive teachers, and children's relatedness at Time 2 are presented in Table 26.

Table 25

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, and Relatedness Time 1, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Relatedness Time 1	.61*	26.87
<u>Step 2</u>		
Non-Supportive Parents	-.05	-.65
Non-Supportive Teachers	.04	.60
Non-Supportive Parents X Non-Supportive Teachers	-.24	-1.90
Overall Model	$R^2 = .41, F(2,1239) = 721.2, p < .000$	

Note. * $p < .000$

Table 26

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.45*	-16.87
Non-Supportive Teachers	-.21*	-10.55
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.05	.41
Overall Model	$R^2 = .43, F(2,1239) = 423.1, p < .000$	

Note. * $p < .000$.

The results can be summarized as follows:

Research question 1a. The effects of parents and teachers did not interact in predicting relatedness at Time 2 (R^2 Change = 0.000, ns).

Research question 2a. Effects of Non-Supportive parents and Non-Supportive teachers on children's relatedness were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Parents accounted for significantly more variance in children's relatedness than teachers did (13.1 percent versus 5.2 percent, $X^2_{dif} = 60.91$, $DF=2$, $p < .000$)

Research question 4a. The specific nature of unique independent effects was additive: Supportive teachers accounted for a significant 5.1 percent of variance in children's relatedness, over and above Supportive parents (R^2 Change = .051, $F(1, 1239) = 110.8$, $p < .000$).

Non-Supportive parents, Non-Supportive teachers, and children's competence at Time 1. The results for Non-Supportive parents, Non-Supportive teachers, and children's competence at Time 1 are presented in Table 27.

The results can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Non-Supportive teachers possibly interacted in their influence on children's competence [R^2 Change = .010, $F(1,1238) = 17.7$, $p < .000$]. However, the effect size was small (interactions accounting for only 1 percent of variance in children's competence)

Table 27

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Competence at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.26*	-8.72
Non-Supportive Teachers	-.34*	-11.51
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	-.58*	-4.30
Overall Model	$R^2 = .30, F(2,1239) = 258.3, p < .000$	

Note. * $p < .000$.

and the model was not replicated in both time points. Thus, presentation of the exact form of the interaction is relegated to Appendix E.

Research question 2a. Because the effect size was small and the model was not replicated in both time points it considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's competence.

Research question 3b. Non-Supportive teachers did not account for significantly more variance in children's competence than Non-Supportive parents did (7.6 percent versus 4.3 percent, $X^2_{dif} = 1.11, DF=2, n.s.$).

Research question 4a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a

significant 4.3 percent of variance in children's competence, over and above Non-Supportive teachers (R^2 Change = .043, $F(1, 1239) = 75.9$, $p < .000$).

Research question 4b. Significant interactive effects of Non-Supportive parents and Non-Supportive teachers were found in predicting changes in children's competence from fall to spring over and above the unique effects of children's competence in Time 1 [R^2 Change = .03, $F(1,1238) = 19.1$, $p < .000$]. Values for β are reported in Table 28.

Table 28

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Competence Time 1 Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Competence Time 1	.54**	22.49
<u>Step 2</u>		
Non-Supportive Parents	-.11	-1.23
Non-Supportive Teachers	-.18*	-2.47
Non-Supportive Parents X Non-Supportive Teachers	.06	.40
Overall Model	$R^2 = .32$, $F(2,1239) = 506.2$, $p < .000$	

Note. * $p < .01$, ** $p < .000$.

Non-Supportive parents, Non-Supportive teachers, and children's competence at Time 2. The results for Non-Supportive parents, Non-Supportive teachers, and children's competence at Time 2 are presented in Table 29 and can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting competence at Time 2 (R^2 Change = 0.000, n.s.).

Research question 2a. Effects of Supportive parents and Supportive teachers on children's competence were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's competence.

Research question 3b. Teachers accounted for significantly more variance in children's competence than parents did (8.8 percent versus 3.3 percent, $X^2_{dif} = 5.57$, $DF=2$, $p < .02$)

Table 29

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.23*	-7.57
Non-Supportive Teachers	-.37*	-12.30
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.02	.17
Overall Model	$R^2 = .28$, $F(2,1239) = 243.8$, $p < .000$	

Note. * $p < .000$.

Research question 4a. The specific nature of unique independent effects was additive: Non-Supportive parents accounted for a significant 3.3 percent of variance

in children's competence, over and above Non-Supportive teachers (R^2 Change = .03, $F(1, 1239) = 57.0$, $p < .000$).

Non-Supportive parents, Non-Supportive teachers, and children's autonomy at Time 1. The results for Non-Supportive parents, Non-Supportive teachers, and children's autonomy at Time 1 are presented in Table 30.

Table 30

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Perceived Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.11**	-4.03
Non-Supportive Teachers	-.47**	-15.71
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.48*	4.11
Overall Model	$R^2 = .30$, $F(2, 1239) = 258.7$, $p < .000$	

Note. * $p < .001$, * $p < .000$.

The results can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Non-Supportive teachers possibly interacted in their influence on children's competence [R^2 Change = .007, $F(1, 1238) = 12.16$, $p < .001$]. However, the effect size was small (interactions accounting for only .7 percent of variance in children's competence). Although the model was not replicated in both time points, the effects were not

comparable. Thus, presentation of the exact form of the interaction is relegated to Appendix F.

Research question 2a. Because the effect size was small and the model was not comparable in both time points, found effects considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Non-Supportive teachers accounted for significantly more variance in children's autonomy than Non-Supportive parents did (14.1 percent versus .8 percent, $X^2_{dif} = 44.98$, $DF=2$, $p<.000$).

Research question 4a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a significant .8 percent of variance in children's autonomy, over and above Non-Supportive teachers (R^2 Change = .008, $F(1, 1239) = 13.2$, $p <.000$).

Research question 4b. No significant unique or interactive effects of Non-Supportive parents and Non-Supportive teachers were found in predicting changes in children's autonomy from fall to spring over and above the unique effects of children's autonomy in Time 1 (R^2 Change = .001, $F(1, 1238) = .75$, n.s.).

Non-Supportive parents, Non-Supportive teachers, and children's autonomy at Time 2. The results for Non-Supportive parents, Non-Supportive teachers, and children's autonomy at Time 1 are presented in Table 31 and can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Non-Supportive teachers possibly interacted in their influence on children's autonomy [R^2 Change = .02, $F(1,1238) = 33.31$, $p < .000$]. However, the effect size was small (interactions accounting for only 2 percent of variance in children's autonomy) and, although replicated in both time points, the effects were not comparable. Thus, presentation of the exact form of the interaction is relegated to Appendix G.

Table 31

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.13*	-4.18
Non-Supportive Teachers	-.44*	-14.77
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.76*	5.97
Overall Model	$R^2 = .28$, $F(2,1239) = 236.4$, $p < .000$	

Note. * $p < .000$.

Research question 2a. Because the effect size was small and the model was not comparable in both time points, found effects considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Teachers accounted for significantly more variance in children's autonomy than parents did (12.7 percent versus 1 percent, $X^2_{dif} = 30.04$, $DF=2$, $p<.000$)

Research question 4a. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a significant 1 percent of variance in children's autonomy, over and above Non-Supportive teachers, (R^2 Change = .01, $F(1, 1239) = 17.5$, $p <.000$).

Summary for congruent Non-Supportive contexts. A total of six hierarchical regressions were conducted to test the effects of Non-Supportive parents and Non-Supportive teachers on children SSPs. An overall summary of the findings is presented in Table 32.

Three significant interactions were found for the Non-Supportive parents/Non-Supportive teachers combination: *competence* at Time 1 and *autonomy* at Time 1 and Time 2 (See Appendix E, F, and G for more information on these interactions). However, the effect size of the interaction was very small. Thus, the practical significance of the found interactive effects may be insubstantial.

Furthermore, on the profile plot of the follow up analyses, the lines for low and high on Non-Support parents were almost parallel in *autonomy* model at Time 1, indicating weak or even absent interactions. The interaction for *competence* was not replicated in Time 2. The interactions for *autonomy* models were replicated across two measurement points, but the effects were not comparable. For these reasons, these interactive effects were considered to be independent.

Table 32

Summary of the Findings for Interactive and Independent Joint Effects of Non-Supportive Parents and Non-Supportive Teachers

	Relatedness	Competence	Autonomy
Time 1	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 11.3% Teachers 6.1 %</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Interaction sig (.4%)</p> <p>Teachers 7.6% Parents 4.3% Difference: ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Interaction sig (.7%)</p> <p>Teachers 14.1% Parents .8%</p>
Time 2	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 13.1% Teachers 5.2 %</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 8.8 % Parents 3.3%</p> <p>Change: Fall to Spring Parents - ns Teachers - sig Interaction - ns</p>	<p><i>Independent Model</i> Effects: Unique Additive Interaction sig (2%)</p> <p>Teachers 12.7% Parents 1%</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - ns</p>

Thus, every model for the Non-Supportive parents/ Non-Supportive teachers combination supported Independent Effects Model. All effects were unique, suggesting that each social context accounted for unique variance in children's SSPs. Non-Supportive parents accounted for significantly more variance in children's perceived *relatedness*, while Non-Supportive teachers accounted for significantly more variance in children's perceived *autonomy*. For *competence* in Time 1, there was no statistical difference in amount of variance accounted by parents and teachers. For competence in Time 2, teachers accounted for significantly more variance than parents did, but the difference in variance was not as pronounced as it was for autonomy.

The specific nature of all joint effects was additive, indicating that the variance accounted for by two Non-Supportive contexts in children's outcomes was significantly different from the variance accounted by just one Non-Supportive context. Furthermore, although teachers accounted for a smaller amount of variance in children's *relatedness* than parents did, that amount of variance was over and above the effects of parents. Similarly, although parents accounted for a smaller amount of variance in children's *autonomy* and *competence* (Time 2) than teachers did, that amount of variance was still significantly over and above the effects of teachers.

In addition, only significant unique effects of Non-Supportive teachers were found in predicting changes in children's *competence* from fall to spring. No unique or interactive effects of Non-Supportive parents and Non-Supportive teachers were

found for *relatedness* or *autonomy* in predicting changes in children's *competence* from fall to spring.

Non-congruent contexts. In this section the findings for Non-Congruent social contexts and how they influence children's SSPs (relatedness, competence, and autonomy) are presented. First, the findings for the Supportive parents/Non-Supportive teachers combination are presented, followed by the findings for the Non-Supportive parents/Supportive teachers combination.

Supportive parents, Non-Supportive teachers, and children's relatedness at Time 1. The results for Supportive parents, Non-Supportive teachers, and children's relatedness at Time 1 are presented in Table 33 (p. 193) and can be summarized as follows:

Table 33

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Relatedness at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.46*	21.49
Non-Supportive Teachers	-.39*	-18.27
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	.22	1.71
Overall Model	$R^2 = .50, F(2,1239) = 622.1, p < .000$	

Note. * $p < .000$.

Research question 1a. Effects of parents and teachers did not interact

in predicting relatedness at Time 1 (R^2 Change = 0.001, n.s.).

Research question 2a. Effects of Supportive parents and Non-Supportive teachers on children's relatedness were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Supportive Parents accounted for significantly more variance in children's relatedness than Non-Supportive teachers did (18.5 percent versus 13.5 percent, $X^2_{dif} = 818.7$, $DF=2$, $p<.000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive teachers accounted for a significant 13.4 percent of variance in children's relatedness, over and above Supportive parents (R^2 Change = .13, $F(1, 1239) = 334$, $p <.000$).

Research question 5b. Unique effects of Supportive parents were found in predicting changes in children's relatedness from fall to spring over and above the unique effects of children's relatedness in Time 1 [R^2 Change = .03, $F(1,1238) = 21.3$, $p <.000$]. All values for β 's are presented in Table 34.

Supportive parents, Non-Supportive teachers, and children's relatedness at Time 2. The results for Supportive Parents, Non-Supportive Teachers, and Children's Relatedness at Time 2, presented in Table 35 and can be summarized as follows:

Research question 1a. The effects of Supportive parents and Non-Supportive teachers possibly interacted in their influence on children's relatedness

Table 34

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers and Relatedness at Time, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Relatedness Time 1	.61**	26.87
<u>Step 2</u>		
Supportive Parents	.04	.55
Non-Supportive Teachers	-.36*	-2.36
Supportive Parent X Non-Supportive Teacher	.20	1.40
Overall Model	$R^2 = .40, F(2,1239) = 721.4, p < .000$	

Note. * $p < .01$, ** $p < .000$.

Table 35

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.49*	22.72
Non-Supportive Teachers	-.37*	-17.47
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	.08*	3.85
Overall Model	$R^2 = .51, F(2,1239) = 627, p < .000$	

Note. * $p < .000$.

[R^2 Change = .006, $F(1,1238) = 14.8$, $p < .000$]. However, the effect size was small (interactions accounting for only .6 percent of variance in children's relatedness) and the interaction was not replicated in both time points. Thus, presentation of the exact form of the interaction is relegated to Appendix H.

Research question 2a. Because the effect size was small and the model was not replicated in both time points, found effects considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Parents accounted for significantly more variance in children's relatedness than teachers did (20.8 percent versus 12.3 percent, $X^2_{dif} = 823.39$, $DF=2$, $p < .000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive teachers accounted for a significant 1.2 percent of variance in children's relatedness, over and above Supportive parents, (R^2 Change = .012, $F(1, 1239) = 306.5$, $p < .000$).

Supportive parents, Non-Supportive teachers, and children's competence at Time 1. The results for Supportive parents, Non-Supportive teachers, and children's competence at Time 1 are presented in Table 36 and can be summarized as follows:

Research question 1a. The effects of Supportive parents and Non-Supportive teachers possibly interacted in their influence on children's competence [R^2 Change = .01, $F(1,1238) = 18.3$, $p < .000$]. However, the effect size was small (interactions accounting for only 1 percent of variance in children's competence) and the model

was not replicated in both time points. Thus, presentation of the exact form of the interaction is relegated to Appendix I.

Research question 2a. Because the effect size was small and the model was not replicated in both time points it considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's competence.

Table 36

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Competence for Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.27*	9.82
Non-Supportive Teachers	.23*	8.1
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	-.64*	-2.49
Overall Model	$R^2 = .31, F(2,1239) = 264.1, p < .000$	

Note. * $p < .000$.

Research question 3b. Non-Supportive teachers accounted for significantly more variance in children's competence than Supportive parents did (15.1 percent versus 4.8 percent, $X^2_{dif} = 364.8, DF=2, p < .000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Supportive parents accounted for a significant 13.4

percent of variance in children's competence, over and above Non-Supportive teachers (R^2 Change = .048, $F(1, 1239) = 84.4$, $p < .000$).

Research question 5b. Unique effects of Supportive parents were found in predicting changes in children's competence from fall to spring over and above the unique effects of children's competence in Time 1 [R^2 Change = .03, $F(1,1238) = 20.4$, $p < .000$]. All values for β 's are presented in Table 37.

Table 37

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers and Competence at Time 1 Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Competence Time 1	.54**	22.49
<u>Step 2</u>		
Supportive Parents	.19*	2.23
Non-Supportive Teachers	.05	.31
Supportive Parent X Non-Supportive Teacher	-.22	-1.43
Overall Model	$R^2 = .32$, $F(2,1239) = 506.9$, $p < .000$	

Note. * $p < .05$, ** $p < .000$.

Supportive parents, Non-Supportive teachers, and children's competence at Time 2. The results for Supportive parents, Non-Supportive teachers, and children's competence at Time 2 are presented in Table 38 and can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting competence at Time 2 (R^2 Change = 0.002, n.s.).

Research question 2a. Effects of Supportive parents and Non-Supportive teachers on children's competence were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's competence.

Research question 3b. Teachers accounted for significantly more variance in children's competence than parents did (15.1 percent versus 5 percent, $X^2_{dif} = 369.63$, $DF=2$, $p<.000$)

Research question 5a. The specific nature of unique independent effects was additive: Supportive parents accounted for a significant 5 percent of variance in children's competence, over and above Non-Supportive teachers, (R^2 Change = .05, $F(1, 1239) = 89.0$, $p <.000$).

Table 38

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.24*	9.88
Non-Supportive Teachers	-.42*	-16.35
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	.28	1.83
Overall Model	$R^2 = .30$, $F(2,1239) = 265$, $p < .000$	

Note. * $p < .000$.

Supportive parents, Non-Supportive teachers, and children's autonomy

at Time 1. The results for Supportive parents, Non-Supportive teachers, and children's autonomy at Time 1 are presented in Table 39 and can be summarized as follows:

Table 39

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.13*	5.20
Non-Supportive Teachers	-.49*	-19.11
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	.09	.61
Overall Model	$R^2 = .30, F(2,1239) = 267.2, p < .000$	

Note. * $p < .000$.

Research question 1a. Effects of parents and teachers did not interact in predicting autonomy at Time 2 (R^2 Change = 0.00, n.s.).

Research question 2a. Effects of Supportive parents and Non-Supportive teachers on children's autonomy were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Non-Supportive teachers accounted for significantly

more variance in children's autonomy than Supportive parents did (20.6 percent versus 1.5 percent, $X^2_{dif} = 19.57$, $DF=2$, $p<.000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Supportive parents accounted for a significant 1.5 percent of variance in children's autonomy, over and above Non-Supportive teachers (R^2 Change = .015, $F(1, 1239) = 27$, $p <.000$).

Research question 5b. Non unique or interactive effects of Supportive parents and Non-Supportive teachers were found in predicting changes in children's autonomy from fall to spring over and above the unique effects of children's relatedness in Time 1 [R^2 Change = .002, $F(1,1238) = 1.3$, n.s.].

Supportive parents, Non-Supportive teachers, and children's autonomy at Time 2. The results for Supportive parents, Non-Supportive teachers, and children's autonomy at Time 2 are presented in Table 40 and can be summarized as follows:

Research question 1a. The effects of parents and teachers did not interact in predicting autonomy at Time 2 (R^2 Change = 0.002, ns).

Research question 2a. Effects of Supportive parents and Non-Supportive teachers on children's autonomy were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Teachers accounted for significantly more variance in children's autonomy than parents did (19.5 percent versus 1.4 percent, $X^2_{dif} = 31.28$, $DF=2$, $p<.000$).

Research question 5a. The specific nature of unique independent effects was additive: Supportive parents accounted for a significant 1.4 percent of variance in children's autonomy, over and above Non-Supportive teachers (R^2 Change = 0.14 $F(1, 1239) = 23.5, p < .000$).

Table 40

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.13*	4.85
Supportive Teachers	-.47*	-18.32
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	-.26	-1.66
Overall Model	$R^2 = .28, F(2,1239) = 240.1, p < .000$	

Note. * $p < .000$.

Summary for incongruent contexts: Supportive parents and Non-Supportive teachers. A total of six hierarchical regressions were conducted to test the effects of Supportive parents and Non-Supportive teachers on children SSPs. An overall summary of the findings is presented in Table 41.

Two significant interactions were found for the Non-Supportive parents/ Non-Supportive teachers combination: *relatedness* at Time 2 and *competence* at Time 1 (See Appendix H and I for more information on these interactions).

Table 41

Summary of the Findings for Interactive and Independent Joint Effects of Supportive Parents and Non-Supportive Teachers

	Relatedness	Competence	Autonomy
Time 1	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 18.5% Teachers 13.5 %</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Interaction sig (1%)</p> <p>Teachers 15.1 % Parents 4.8%</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 20.6 % Parents 1.5%</p>
Time 2	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Interaction sig (.6%)</p> <p>Parents 20.8% Teachers 12.3 %</p> <p>Change: Fall to Spring Parents - ns Teachers - sig Interaction - ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 15.1 % Parents 5%</p> <p>Change: Fall to Spring Parents - sig Teachers - ns Interaction - ns</p>	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Teachers 19.5 % Parents 1.4%</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - ns</p>

However, the effect size of the interaction was very small. Thus, the practical significance of the found interactive effects may be insubstantial. Furthermore, on the profile plot of the follow up analyses, the lines for low and high on Support parents were positioned close to one another and almost parallel in *relatedness* model at Time 2, indicating weak or even absent interactions. In addition, both interactions were not replicated in Time 2. For these reasons, these interactive effects were considered to be independent.

Thus, every model for the Supportive parents/Non-Supportive teachers combination supported Independent Effects Model. All effects were unique, suggesting that each social context accounted for unique variance in children's SSPs. Supportive parents accounted for significantly more variance in children's perceived *relatedness*, while Non-Supportive teachers accounted for significantly more variance in children's perceived *autonomy* and *competence*.

The specific nature of all joint effects was additive, indicating that the variance accounted for by two contexts in children's outcomes was significantly different from the variance accounted by just one context. Furthermore, although teachers accounted for a smaller amount of variance in children's *relatedness* than parents did, that amount of variance was over and above the effects of parents. Similarly, although parents accounted for a smaller amount of variance in children's *autonomy* and *competence* than teachers did, that amount of variance was still significantly over and above the effects of teachers.

In addition, (1) significant unique effects of Non-Supportive teachers were found in predicting changes in children's *relatedness* from fall to spring, (2)

significant unique effects of Supportive parents were found in predicting changes in children's *competence* from fall to spring, and (3) no unique or interactive effects of Supportive parents and Non-Supportive teachers were found in predicting changes in children's *autonomy* from fall to spring.

Non-congruent contexts. This section presents the findings for the Non-Supportive parents/Supportive teachers combination.

Non-Supportive Parents, Supportive Teachers, and Children's Relatedness at Time 1. The results for Non-Supportive parents, Supportive teachers, and children's relatedness at Time 1 are presented in Table 42 and can be summarized as follows:

Table 42

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Relatedness at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.48**	-22.68
Supportive Teachers	.40**	18.80
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.29*	2.82
Overall Model	$R^2 = .51, F(2,1239) = 639.9, p < .000$	

Note. ** $p < .000$, * $p < .01$.

Research question 1a. The effects of Non-Supportive parents and Supportive teachers possibly interacted in their influence on children's relatedness

[R^2 Change = .003, $F(1,1238) = 53.9$, $p < .01$]. However, the effect size was small (interactions accounting for only .3 percent of variance in children's relatedness) and the model was not replicated in both time points. Thus, presentation of the exact form of the interaction is relegated to Appendix J.

Research question 2a. Because the effect size was small and the model was not replicated in both time points it was considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Non-Supportive parents accounted for significantly more variance in children's relatedness than Supportive teachers did (20.4 percent versus 14 percent, $X^2_{dif} = 780.2$, $DF=2$, $p < .000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a significant 4.8 percent of variance in children's relatedness, over and above Supportive teachers (R^2 Change = .048, $F(1, 1239) = 84.4$ $p < .000$).

Research question 5b. Unique effects of Non-Supportive parents and interactive effects of Non-Supportive parents and Supportive teachers were found in predicting changes in children's relatedness from fall to spring over and above the unique effects of children's relatedness in Time 1 [R^2 Change = .04, $F(1,1238) = 27.7$, $p < .000$]. All values for β 's are presented in Table 43.

Table 43

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers and Relatedness at Time 1 Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Relatedness Time 1	.61**	26.87
<u>Step 2</u>		
Non-Supportive Parents	-.13*	-2.28
Supportive Teachers	.04	1.41
Non-Supportive Parent X Supportive Teacher	-.13*	-2.05
Overall Model	$R^2 = .37, F(2,1239) = 722.0, p < .000$	

Note. * $p < .05$, ** $p < .000$.

Non-Supportive parents, Supportive teachers, and children's relatedness at Time 2. The results for Non-Supportive parents, Supportive teachers, and children's relatedness at Time 2 are presented in Table 44 and can be summarized as follows:

Research question 1a. Effects of parents and teachers did not interact in predicting relatedness at Time 2 (R^2 Change = 0.01, n.s.).

Research question 2a. Effects of Non-Supportive parents and Supportive teachers on children's relatedness were significant and independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Table 44

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	.50*	20.28
Supportive Teachers	.26*	10.50
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.00	-.00
Overall Model	$R^2 = .49$, $F(2,1239) = 591.3$, $p < .000$	

Note. * $p < .000$.

Research question 3b. Parents accounted for significantly more variance in children's relatedness than teachers did (24.4 percent versus 11.2 percent, $X^2_{dif} = 669.33$, $DF=2$, $p < .000$)

Research question 5a. The specific nature of unique independent effects was additive: Supportive teachers accounted for a significant 11.1 percent of variance in children's relatedness, over and above Non-Supportive parents, (R^2 Change = .11, $F(1, 1239) = 268.1$, $p < .000$).

Non-Supportive Parents, Supportive Teachers, and Children's Competence at Time 1. The results for Non-Supportive parents, Supportive teachers, and children's competence can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Supportive teachers interacted in their influence on children's competence [R^2 Change = .040,

$F(1,1238) = 70.85, p < .000$]; the interaction accounted for a significant 4 percent of variance in children's perceived competence over and above the unique effects of parents and teachers. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 13.7 percent of variance in children's sense of competence while Supportive teachers accounted for 5 percent of the variance. All β 's were significant. The results of the test for significance of β values are presented in Table 45.

Table 45

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Competence at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.39*	-15.22
Supportive Teachers	.24*	9.22
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.56*	-8.42
Overall Model	$R^2 = .31, F(2,1239) = 227.8, p < .000$	

Note. * $p < .000$.

It is important to note that the effect size of the interaction was very small. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a

substantial size sample. In addition, the interactive effects were replicated in Time 2. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research Question 1(b.) What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's competence and plotted on a graph (see Figure 10).

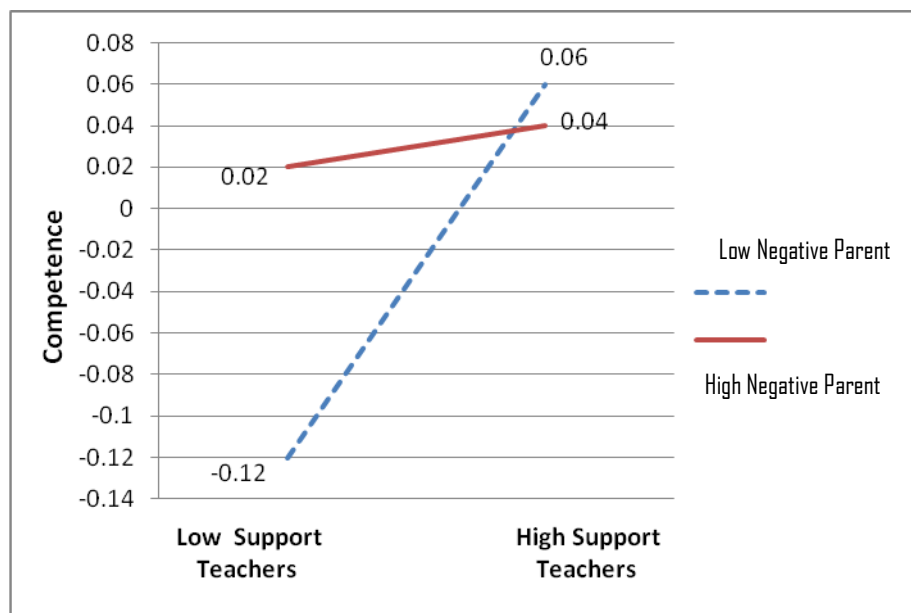


Figure 10. Interactive effects of Negative parents and Supportive teachers on children's competence at Time 1

It is important to note that using the “Non-Supportive” label in interpretations of interactive effects is problematic. The “low on Non-Support parents” is a double negative expression and it can confuse the explanation of the findings. Subsequently, the “Non-Supportive” label was changed to *Negative* in the interpretations of interactive effects. This change had no implications about the overall quality of the parents and teachers.

Both lines on the graph represent parents. One line represents low Negative parenting (parents who were one standard deviation below the mean) and the other line represented high Negative parenting (parents who were one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Support and one standard deviation above the mean for teachers who were high on Support). The Y-axis represented children’s scores on competence.

Follow up testing revealed that the lines were not parallel on the profile plot, confirming the presence of interactive effects. The interactive effects were *counterbalancing* in their nature:

1. When parents were Negative, Supportive teaches boosted children's competence: the higher on Support teachers were, the more competent children’s were.
2. Supportive teachers had a stronger buffering effect on children's competence if parents were low on Negative parenting practices. The higher on Support teachers were, the less buffering effect they had on children whose parents were highly Negative.

Research question 1(c). Interactive effects of Non-Supportive parents and Supportive teachers were found in predicting changes in children's competence from fall to spring over and above the unique effects of children's competence in Time 1 [R^2 Change = .029, $F(1,1238) = 17.5$, $p < .000$]. All values for β 's are presented in Table 46.

Table 46

Summary of Hierarchical Regression for Non- Supportive Parents and Supportive Teachers and Competence Time 1, Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Competence Time 1	.54**	22.49
<u>Step 2</u>		
Non-Supportive Parents	.03	.56
Supportive Teachers	.04	1.15
Non-Supportive Parents X Supportive Teachers	-.21*	-3.12
Overall Model	$R^2 = .32$, $F(2,1239) = 506.2$, $p < .000$	

Note. * $p < .01$, ** $p < .000$.

Non-Supportive Parents, Supportive Teachers, and Children's Competence at Time 2. The same set of analyses was conducted to answer the same set of questions for autonomy at Time 2. The results, presented in Table 47, can be summarized as follows:

Research question 1(a). The effects of Non-Supportive parents and Supportive teachers interacted in their influence on children's autonomy [R^2 Change

Table 47

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Competence at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.38*	-14.60
Supportive Teachers	.23*	8.97
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.47*	-7.28
Overall Model	$R^2 = .28, F(2,1239) = 200, p < .000$	

Note. * $p < .000$.

=.031, $F(1,1238) = 53.05, p < .000$], suggesting that the interaction accounted for a significant 3.1 percent of variance in children's perceived competence over and above the unique effects of parents and teachers.

Research question 1(b). The interactive effects were partial dependence and counterbalancing in their nature (see Figure 11).

For the purpose of clarification of the effects, instead of Non-Supportive parenting, Negative parenting was used for the interpretation of this interaction.

Follow up testing revealed that the lines were not parallel on the profile plot, confirming the presence of interactive effects. The interactive effects were *counterbalancing* in their nature:

1. When parents were Negative, Supportive teaches boosted children's

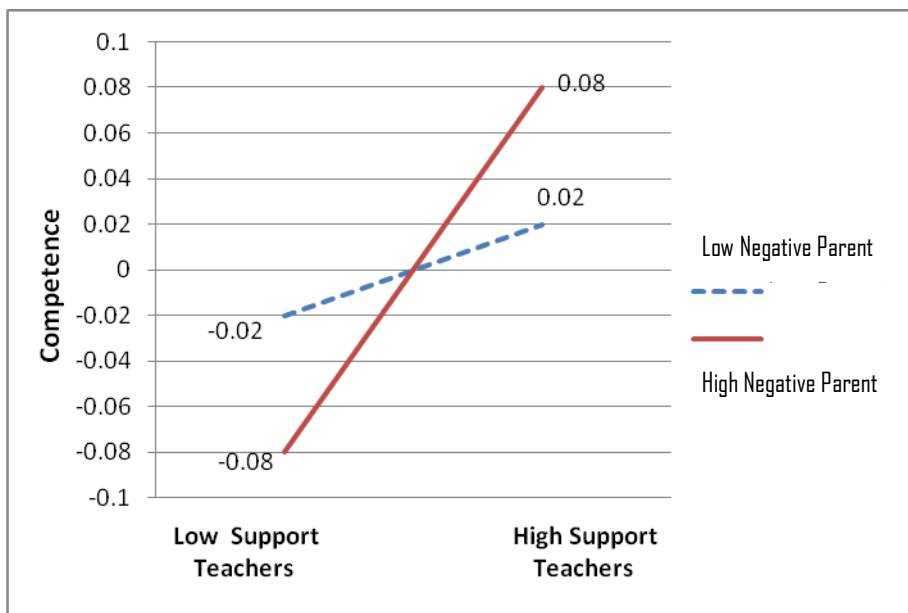


Figure 11. Interactive effects of Negative parents and Supportive teachers on children's competence at Time 2

competence: the higher on Support teachers were, the more competent children's were.

- Supportive teachers had a stronger buffering effect on children's competence if parents were highly Negative. The higher on Support teachers were, the less buffering effect they had on children whose parents were not so Negative.

Non-Supportive parents, Supportive teachers, and children's autonomy at Time 1. The results for Non-Supportive parents, Supportive teachers, and children's autonomy at Time 1 are presented in Table 48.

Table 48

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.28*	-10.74
Supportive Teachers	.35*	13.72
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.41*	-6.06
Overall Model	$R^2 = .29, F(2,1239) = 265.0, p < .000$	

Note. * $p < .000$.

Results can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Supportive teachers possibly interacted in their influence on children's autonomy [R^2 Change = .012, $F(1,1238) = 36.68, p < .000$]. However, the effect size was small (interactions accounting for only 2.1 percent of variance in children's autonomy) and, although the model was replicated in both time points, the effects were not comparable. Thus, presentation of the exact form of the interaction is relegated to Appendix K.

Research question 2a. Because the effect size was small and the model was not comparable in both time points, found effects considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's autonomy.

Research question 3b. Supportive teachers accounted for significantly more variance in children's autonomy than Non-Supportive parents did (11.2 percent versus 6.8 percent, $X^2_{dif} = 226.9$, $DF=2$, $p<.000$).

Research question 5a. The specific nature of unique independent effects was additive. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a significant 6.8 percent of variance in children's autonomy, over and above Supportive teachers (R^2 Change = .07, $F(1, 1239) = 115.3$, $p <.000$).

Research question 5b. No unique or interactive effects of Non-Supportive parents were found in predicting changes in children's autonomy from fall to spring over and above the unique effects of children's relatedness in Time 1 [$R^2 = .39$, $F(2,1239) = 799.2$, n.s.].

Non-Supportive parents, Supportive teachers, and children's autonomy at Time 2. The results for Non-Supportive parents, Supportive teachers, and children's autonomy at Time 2 are presented in Table 49.

The results can be summarized as follows:

Research question 1a. The effects of Non-Supportive parents and Supportive teachers possibly interacted in their influence on children's autonomy [R^2 Change = .007, $F(1,1238) = 11.82$, $p < .000$]. However, the effect size was small (interactions accounting for only .7 percent of variance in children's autonomy) and, although replicated in both time points, the effects were not comparable. Thus, presentation of the exact form of the interaction is relegated to Appendix L.

Table 49

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.28**	-11.07
Supportive Teachers	.38**	15.22
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.22*	-3.44
Overall Model	$R^2 = .29, F(2,1239) = 244.3, p < .000$	

Note. * $p < .001$, ** $p < .000$.

Research question 2a. Because the effect size was small and the model was not comparable in both time points, found effects considered to be independent.

Research question 3a. Independent effects were unique in their nature: each social context accounted for unique variance in children's relatedness.

Research question 3b. Teachers accounted for significantly more variance in children's autonomy than parents did (13.4 percent versus 7 percent, $X^2_{dif} = 30.1, DF=2, p < .000$)

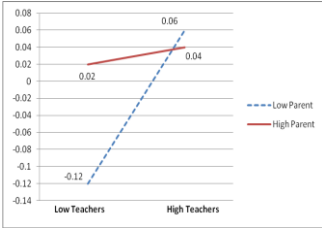
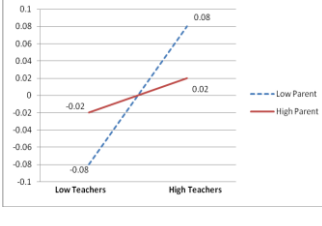
Research question 5a. The difference in variance accounted for by one versus two social contexts was statistically significant: Non-Supportive parents accounted for a significant 1 percent of variance in children's autonomy, over and above Supportive teachers, (R^2 Change = .071, $F(1, 1239) = 122.4, p < .000$).

Summary for Incongruent contexts: Non-Supportive parents and Supportive teachers. A total of six hierarchical regressions were conducted to test the effects of Non-Supportive parents and Supportive teachers on children SSPs. An overall summary of the findings is presented in Table 50.

Significant interactions were found for *autonomy* and *competence* in both time points. For *relatedness*, the interaction was found only at Time 1 but not at Time 2. The effect size of every interaction was very small. Thus, the practical significance of the found interactive effects may be insubstantial. Furthermore, for *relatedness*, the model was not replicated. For *autonomy*, although models were replicated in both time points, they were not comparable (See Appendix J, K, and L for more information on these interactions). For these reasons, the effects of Non-Supportive parents and Supportive teachers on children's *relatedness* and *autonomy* were considered to be independent.

Interactive Effects models. It is important to note that for clarity of the interpretation of the effects, Non-Supportive parents were called Negative for this interaction. Two Interactive Effects Models were found for the incongruent Negative parents/Supportive teachers combination. These models were for children's *competence* at Time 1 and Time 2. Both interactive effects were partial dependence models, indicating that both social contexts had significant main effects on children's SSPs. However, Negative parents accounted for significantly more variance in children's *competence* than teachers did.

Table 50
Summary of the Findings for Interactive and Independent Joint Effects of Non-Supportive Parents and Supportive Teachers

	Relatedness	Competence	Autonomy
Time 1	<p><i>Independent Model</i> Effects: Unique Additive Interaction sig (.3%)</p> <p>Parents 20.4% Teachers 14%</p>	<p><i>Interactive Model</i> (4%)</p>  <p>Parents 13.7% Teachers 5%</p> <p>Partial Dependence Disordinal Effects</p>	<p><i>Independent Model</i> Effects: Unique Additive Interaction sig (2.1%)</p> <p>Teachers 11.2% Parents 6.8%</p>
Time 2	<p><i>Independent Model</i> Effects: Unique Additive</p> <p>Parents 24.4% Teachers 11.2 %</p> <p>Change: Fall to Spring Parents - sig Teachers - ns Interaction - sig</p>	<p><i>Interactive Model</i> (3.1%)</p>  <p>Parents 13% Teachers 5%</p> <p>Partial Dependence Disordinal Effects</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - sig</p>	<p><i>Independent Model</i> Effects: Unique Additive Interaction sig (.7%)</p> <p>Parents 7% Teachers 13.4%</p> <p>Change: Fall to Spring Parents - ns Teachers - ns Interaction - ns</p>

Furthermore, of great interest to this study was to identify the specific nature of interactive effects. The interactive effects were counterbalancing in both time points, suggesting that, when parents were Negative, Supportive teachers boosted children's competence - the higher on Support teachers were, the more competent children's were. However the effects of Supportive teachers were slightly different in the fall in compare to the spring. At the beginning of the academic year Supportive teachers had a stronger buffering effect on children's competence if parents were low on Negative parenting practices - the higher on Support teachers were, the less buffering effect they had on children whose parents were highly Negative. At the end of the academic year, the effects were reversed: Supportive teachers had a stronger effect on children who had highly Negative parent - the higher on Support teachers were, the less buffering effect they had on children whose parents were not so Negative

Finally, significant interactive effects of Negative parents and Supportive teachers were found in predicting changes in children's *competence relatedness* from fall to spring.

Independent Effects models. Independent Effects Models were found for the Non-Supportive parents/ Supportive teachers combination and *relatedness* and *autonomy*. All effects were unique, suggesting that each social context accounted for unique variance in children's SSPs. Non-Supportive parents accounted for significantly more variance in children's perceived *relatedness*, while Supportive teachers accounted for significantly more variance in children's perceived *autonomy*.

The specific nature of all joint effects was additive, indicating that the variance accounted for by two contexts in children's outcomes was significantly different from the variance accounted by just one context. Furthermore, although teachers accounted for a smaller amount of variance in children's *relatedness* than parents did, that amount of variance was over and above the effects of parents. Similarly, although parents accounted for a smaller amount of variance in children's *autonomy* than teachers did, that amount of variance was still significantly over and above the effects of teachers.

In addition, significant unique effects of Non-Supportive parents and significant interactive effects of Non-Supportive parents and Supportive teachers were found in predicting changes in children's *relatedness* from fall to spring. No significant unique or interactive effects of Non-Supportive parents Supportive teachers were found in predicting changes in children's *autonomy* from fall to spring.

Overall summary for Interactive and Independent Effects models. Twenty-four hierarchical regression analyses were conducted to test for interactive and independent joint effects of parents and teachers on children's SSPs. Twelve hierarchical regressions were conducted to test the effects of congruent social contexts (Supportive parents/Supportive teachers and Non-Supportive parents/Non-Supportive teachers) on children's SSPs. Another twelve hierarchical regressions were conducted to test the effects of incongruent social contexts (Supportive parents/Non-Supportive teachers and Non-Supportive parents/Supportive teachers) on children's SSPs.

In all combinations, both parents and teachers were significant predictors

of children's SSP's. Most effects were unique, independent, and additive, indicating that the variance accounted for by two social contexts in children's SSPs was significantly different from the variance accounted for by just one context. In addition, when parents accounted for a smaller amount of variance in children's SSPs than teachers did, that amount of variance was over and above the effects of parents. Similarly, when teachers accounted for a smaller amount of variance in children's SSPs than parents did, that amount of variance was still significantly over and above the effects of parents.

Only one model had interactive counterbalancing effects: the model for Non-Supportive parent/Supportive teacher combination and children's *competence*, suggesting that Supportive teachers at school can safeguard for the negative effects of Non-supportive parenting at home. Furthermore, the interactive effects were partial dependence models, indicating that, in addition to the interactive influences, both social contexts had significant main effects on children's *competence*.

In all tested models, parents accounted for more variance in children's *relatedness*, while teachers accounted for more variance in children's *autonomy*. For *competence*, the amount of variance accounted for by the contexts depended on (1) whether the contexts were Supportive or Non-Supportive and (2) whether they were congruent or non-congruent. For the congruent combinations, parents and teachers were not significantly different in the amount of variance that they accounted for in children's *competence*. For the non-congruent combinations, it was the Non-Supportive contexts that accounted for more variance in children's *competence*, suggesting that the Non-Supportive context was more important to children's

perceived *competence* than the Supportive.

Finally, in several models, unique and interactive effects of parents and teachers predicting changes in children's *relatedness* and *competence* from fall to spring were found. These influences were not uniform or consistent across contextual combinations or SSPs. No unique or interactive effects of parents and teachers were found in predicting changes in children's *autonomy*. The findings can be summarized as following: (1) Unique effects of Supportive parents were found for (a) the Supportive parent/Supportive teachers combination predicting changes in children's *relatedness* from fall to spring, and (b) the Supportive parent/Non-Supportive teachers combination predicting changes in children's *competence* from fall to spring; (2) Unique effects of Non-Supportive teachers were found for (a) the Non-Supportive parent/Non-Supportive teachers combination predicting changes in children's *competence* from fall to spring, and (b) the Supportive parent/Non-Supportive teachers combination predicting changes in children's *relatedness* from fall to spring; (3) Interactive effects of (a) Supportive parents and Supportive teachers were found in predicting changes in children's *competence* from fall to spring, (b) Non-Supportive parents and Supportive teachers in predicting changes in children's *relatedness* from fall to spring, and (c) Non-Supportive parents and Supportive teachers in predicting changes in children's *competence* from fall to spring. These findings are summarized in Table 51.

Table 51
*Summary of Findings for Social Contexts Predicted Changes in Children's SSPs
 from Fall to Spring*

Social Contexts Combinations	<u>Significant Effects</u>	
	Relatedness	Competence
Supportive Parents Supportive Teachers	Supportive Parents	Interaction
Non-Supportive Parents Non-Supportive Teachers		Non-Supportive Teachers
Supportive Parents Non-Supportive Teachers	Non-Supportive Teachers	Supportive Parents
Non-Supportive Parents Supportive Teachers	Non-Supportive Parents Interaction	Interaction

Differential Effects: Differential Mediators Models

The purpose of the study was to test empirically four proposed conceptual models: (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential Effects Models. Differential Effects Models have two subcategories: (1) Differential Mediator Models and (2) Differential Recipients Models (see Figure 6 on p.111). This section investigates only differential mediator models, while the Differential Recipient Models will be discussed in the next section.

This section starts with an overview of the research questions and an outline of specific steps followed for testing mediator effects. The main body of this section elaborates on the results of statistical testing for the effects of social contexts on children's classroom engagement, investigating children's perceived relatedness,

competence, and autonomy as possible mediators. The section concludes with an overall summary of the findings.

Research Questions and Steps for Testing Differential Mediators Models

The differential effects analyses investigated whether the effects of parents and teachers on children's outcome depend on the type of mediator that linked the context and the outcome. SSPs were proposed by the study as a possible link between parents' and teachers' context and children's classroom engagement. The research question 6 and its subset of questions addressed the differential mediator models.

Question 6. Are the process mechanisms that link social contexts to children's motivation different for parents versus teachers?

- 6a. Are the SSPs that mediate the effects of context on engagement different for parent versus teachers?
- 6b. Are the SSPs that mediate the effects of a social context on changes in children's classroom engagement from fall to spring, different for parents versus teachers?
- 6c. When the effects of parents and teachers on children's engagement are considered simultaneously, are these effects mediated by different SSPs?
- 6d. When the effects of parents and teachers on changes in children's engagement from fall to spring are considered simultaneously, are these effects mediated by different SSPs?

In a set of analyses testing these questions, Supportive and Non-Supportive parenting and teaching practices were the independent variables (IV), students' engagement was the dependent variable (DV), and children's SSPs were the mediators. All parenting and teaching practices, which were unique predictors of SSPs in the previous analyses, were included in the models tested.

Confirming that the mediator model is superior to the direct effects model required four conditions: (1) a significant relationship between the quality of social context and children's engagement (IV and DV), (2) a significant relationship between social context and a SSP (IV and mediators), (3) a significant relationship between SSP and engagement (mediator and DV), and (4) that the previously significant relationship between social context and children's engagement (IV and DV) is not longer significant (or is significantly reduces) when the mediator is included in the model (Baron & Kenny, 1986). Thus, testing for differential effects models, which were addressed in research question 6, followed this sequence of four distinct steps.

First, the mediation effects for every single social context were investigated. For these analyses, the first and second requirements for a mediator model were already confirmed by prior correlational tests. A test for the third requirement for the mediator model was conducted using a hierarchical regression. A hierarchical regression was conducted for every link between social context and every SSP (Research Question 6a).

Second, if significant mediation effects were found within each individual context, mediation effects on changes in children's classroom engagement from fall to spring for that context were investigated. These over time mediation effects were tested separately for each social context, using a set of hierarchical regression analyses (Research Question 6b).

Third, if the mediation effects were found for both parents and teachers,

these effects were combined in the same model. All three requirements for joint mediation effects were tested with simultaneous regression analyses (Research Question 6c).

Fourth, if mediation effects for joint parent and teacher contexts were found, the effects of joint contexts on changes in children's engagement from fall to spring were investigated next (Research Question 6d). These effects were tested by using a set of hierarchical regressions.

Research Findings for Differential Mediators Models in a Single Context

Differential Mediators models for a single context: Supportive parents.

The first through third requirements for a mediator model were addressed by previous analyses for both time points: (1) Supportive parents were significant predictors of children's engagement, (2) there was a significant correlation Supportive parents and each of the three SSPs, and (3) there was a significant correlation between each SSPs and children's engagement.

A test for the fourth requirement for the mediator model was conducted using hierarchical regression analyses. The dependent variable was children's engagement. In the first step of the regression, Supportive parents were entered. In the second step, one of the SSPs was entered (relatedness, competence, or autonomy), testing whether the previously significant association between Supportive parents and engagement becomes not significant when mediator variance is taken into account. These analyses were conducted at Time 1 and Time 2. Findings are summarized in Table 52 and Figure 12.

Table 52
Summary of Hierarchical Regression Analysis Testing for SSPs as Mediators of the Effects of Supportive Parents on Engagement

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	347.0*	.44			16.8*
<i>Step one:</i> Supportive Parents				<u>.47*</u>	<u>18.63</u>
<i>Step two:</i> Supportive Parents Relatedness				.11*	4.10
				.59*	22.13
Overall model	347.1*	.36			11.1*
<i>Step one:</i> Supportive Parents				<u>.47*</u>	<u>18.63</u>
<i>Step two:</i> Supportive Parents Competence				.31*	12.58
				.41*	16.70
Overall model	347.1*	.48			10.3*
<i>Step one:</i> Supportive Parents				<u>.47*</u>	<u>18.63</u>
<i>Step two:</i> Supportive Parents Autonomy				.30*	14.00
				.53*	24.57
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	371.1	.45			17.4*
<i>Step one:</i> Supportive Parents				<u>.48*</u>	<u>19.27</u>
<i>Step two:</i> Supportive Parents Relatedness				.11*	4.10
				.60*	22.43
Overall model	371.1	.38			11.1*
<i>Step one:</i> Supportive Parents				<u>.48*</u>	<u>19.27</u>
<i>Step two:</i> Supportive Parents Competence				.32*	13.20
				.41*	16.96
Overall model	371.1	.47			9.6*
<i>Step one:</i> Supportive Parents				<u>.48*</u>	<u>19.27</u>
<i>Step two:</i> Supportive Parents Autonomy				.33*	15.34
				.51*	23.31

Note. * $p < .000$.

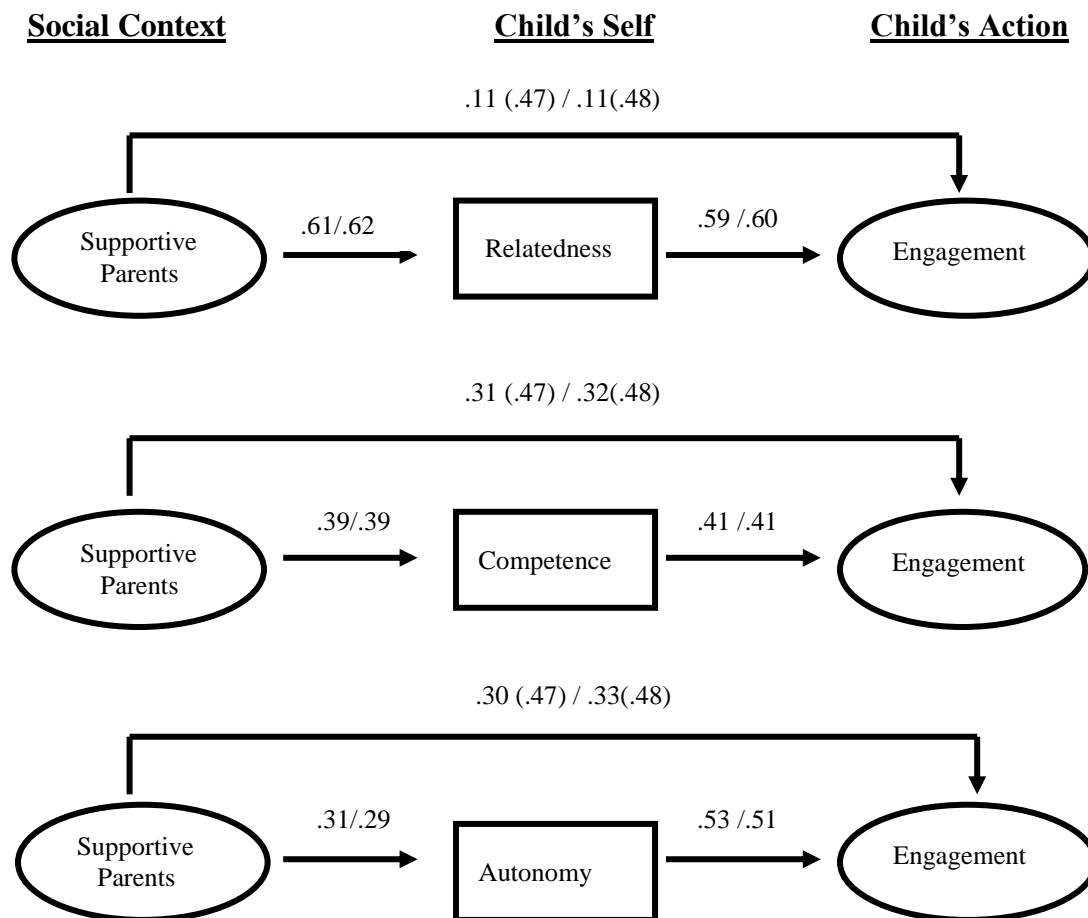


Figure 12. Mediating models for Supportive parents: Significant paths. The values on the line between Context and Self are a zero order correlation; the values on the line between Self and Action are standardized regression coefficients; the values on the link between Context and Action are standardized regression coefficients controlling for Self (or not controlling for Self). Values from Time 1 are before the slash; Time 2 are after the slash. Regression results are also reported in Table 52

The results revealed that Supportive parenting practices remained significant predictors when SSPs were included in the model, indicating direct additive effects on engagement. This finding was consistent for both time points. However, analyses revealed a substantial decrease in β values for Supportive parents when the variance of *relatedness*, *competence* or *autonomy* was accounted for by the model in

comparison to the direct effect model. The Sobel test indicated that the decrease in β values was statistically significant, providing evidence for partial mediation effects. This was found for both Time 1 and Time 2 measurements

In summary, the results revealed partial mediation effects for *relatedness*, *competence*, and *autonomy* on children's engagement for Supportive parents at Time 1 and Time 2.

Differential Mediators Models for a single context: Supportive teachers.

The same set of analyses was conducted to examine the mediator models for Supportive teachers. Findings are summarized in Table 53 and Figure 13. The results revealed partial mediation effects for *relatedness*, *competence*, and *autonomy* on children's engagement for Supportive teachers at Time 1 and Time 2.

Differential Mediators Models for a single context: Non-Supportive parents. The same set of analyses was conducted to examine the mediator models for Non-Supportive parents. Findings are summarized in Table 54 and Figure 14 . The results revealed partial mediation effects for *relatedness*, *competence*, and *autonomy* on children's engagement for Non-Supportive parents at Time 1 and Time 2.

Table 53
Summary of Hierarchical Regression Analysis Testing for SSPs as Mediators of the Effects of Supportive Teachers on Engagement

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	618.9*	.50			15.3*
<i>Step one:</i> Supportive Teachers			<u>.57*</u>	<u>24.88</u>	
<i>Step two:</i> Supportive Teachers Relatedness			.31*	12.78	
			.48*	20.23	
Overall model	618.9*	.45			10.5*
<i>Step one:</i> Supportive Teachers			<u>.58*</u>	<u>24.88</u>	
<i>Step two:</i> Supportive Teachers Competence			.44*	19.60	
			.37*	16.32	
Overall model	618.9*	.50			13.5*
<i>Step one:</i> Supportive Teachers			<u>.58*</u>	<u>24.88</u>	
<i>Step two:</i> Supportive Teachers Autonomy			.37*	16.70	
			.46*	20.61	
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	578.5*	.52			15.1*
<i>Step one:</i> Supportive Teachers			<u>.56*</u>	<u>24.05</u>	
<i>Step two:</i> Supportive Teachers Relatedness			.31*	13.68	
			.51*	22.67	
Overall model	578.5*	.45			10.3*
<i>Step one:</i> Supportive Teachers			<u>.56*</u>	<u>24.05</u>	
<i>Step two:</i> Supportive Teachers Competence			.43*	19.38	
			.39*	17.50	
Overall model	578.5*	.47			12.9*
<i>Step one:</i> Supportive Teachers			<u>.56*</u>	<u>24.05</u>	
<i>Step two:</i> Supportive Teachers Autonomy			.36*	15.58	
			.44*	18.66	

Note. * $p < .000$.

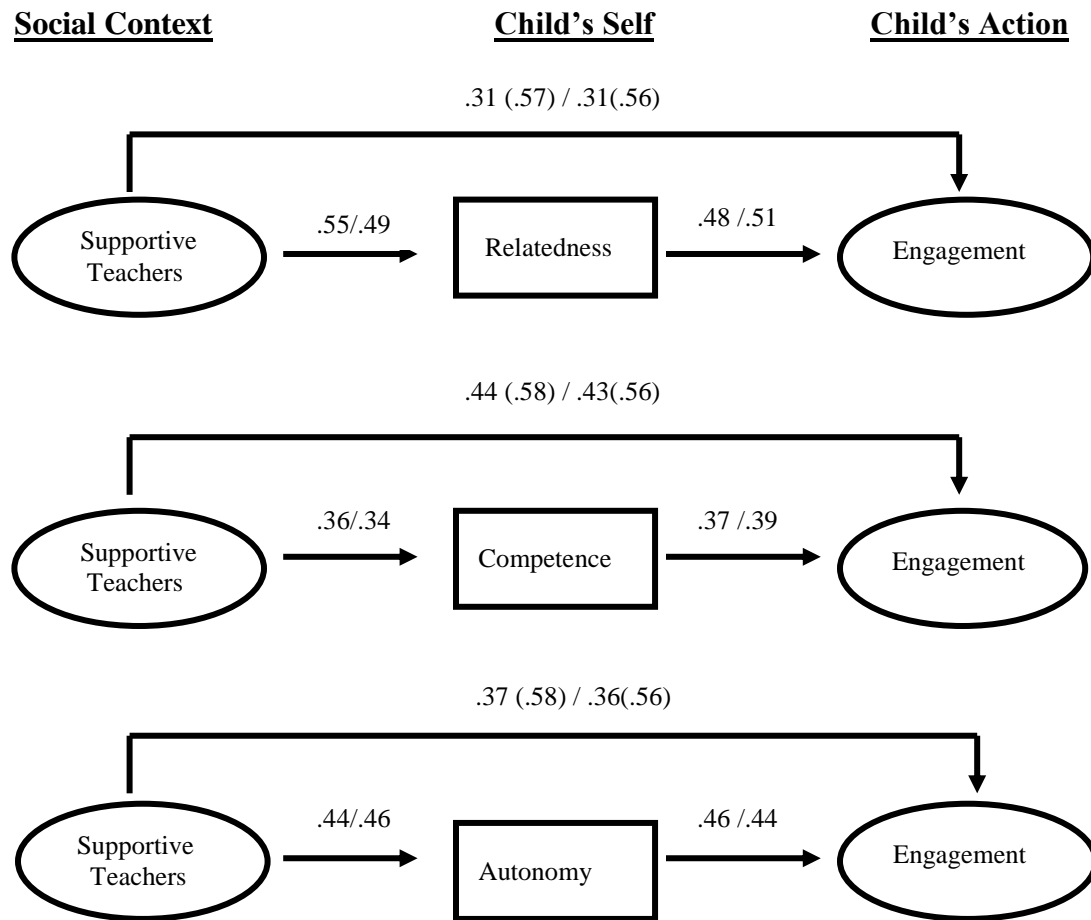


Figure 13. Mediating Models for Supportive teachers: Significant paths. The values on the line between Context and Self are a zero order correlation; the values on the line between Self and Action are standardized regression coefficients; the values on the link between Context and Action are standardized regression coefficients controlling for Self (or not controlling for Self). Values from Time 1 are before the slash; Time 2 are after the slash. Regression results are also reported in Table 53

Table 54
Summary of Hierarchical Regression Analysis Testing for SSPs as Mediators of the Effects of Non-Supportive Parents on Engagement

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	500.1*	.46			-16.1*
<i>Step one:</i> Non-Supportive Parents			-.54*	-22.36	
<i>Step two:</i> Non-Supportive Parents Relatedness			-.22*	-8.29	
			.53*	20.07	
Overall model	500.1*	.39			-11.3*
<i>Step one:</i> Non-Supportive Parents			-.54*	-22.36	
<i>Step two:</i> Non-Supportive Parents Competence			-.37*	-14.66	
			.36*	14.20	
Overall model	500.1*	.49			-12.3*
<i>Step one:</i> Non-Supportive Parents			-.54*	-22.36	
<i>Step two:</i> Non-Supportive Parents Autonomy			-.34*	-15.62	
			.49*	22.31	
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	549.0*	.48			-16.2*
<i>Step one:</i> Non-Supportive Parents			-.55*	-23.43	
<i>Step two:</i> Non-Supportive Parents Relatedness			-.23*	-8.92	
			.53*	20.21	
Overall model	549.0*	.41			-11.2*
<i>Step one:</i> Non-Supportive Parents			-.55*	-23.43	
<i>Step two:</i> Non-Supportive Parents Competence			-.39*	-16.24	
			.36*	14.94	
Overall model	549.0*	.49			-11.9*
<i>Step one:</i> Non-Supportive Parents			-.55*	-23.43	
<i>Step two:</i> Non-Supportive Parents Autonomy			-.38*	-17.10	
			.46*	20.70	

Note. * $p < .000$.

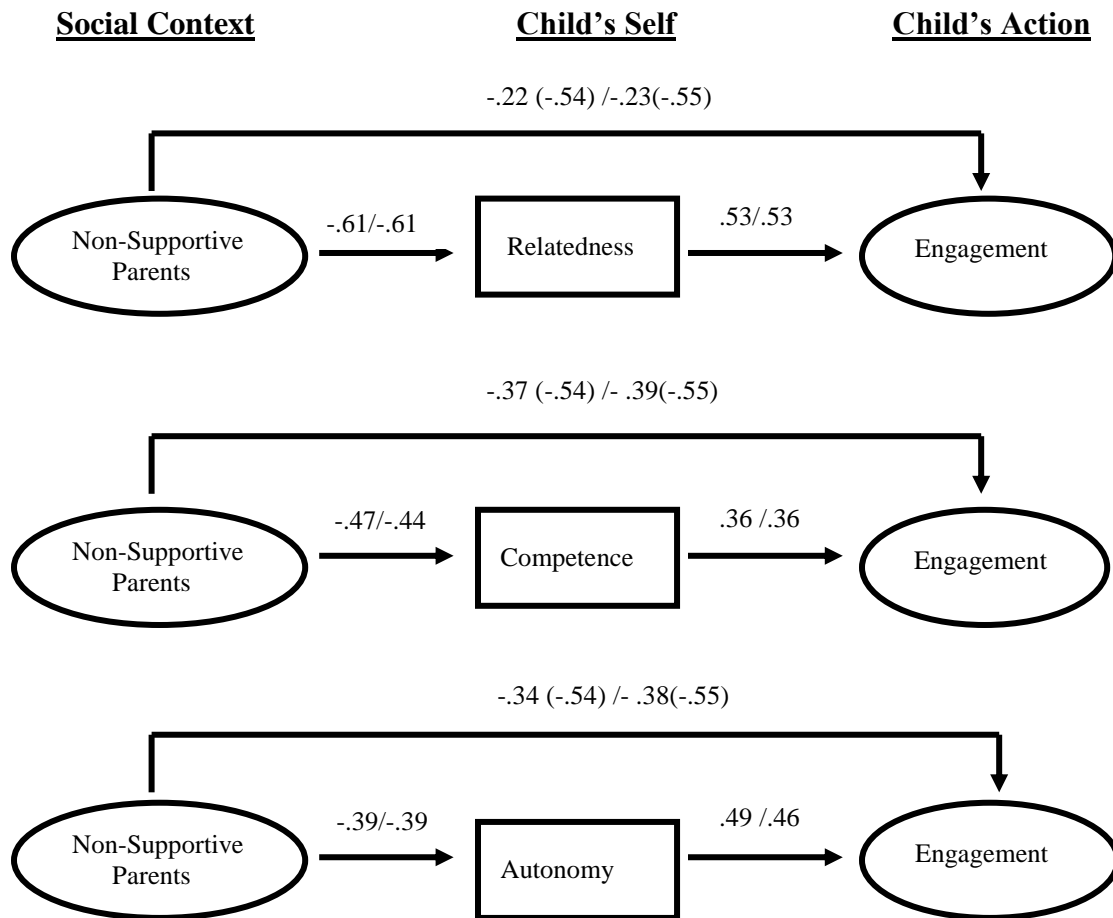


Figure 14. Mediating Models for Non-Supportive parents: Significant paths. The values on the line between Context and Self are a zero order correlation; the values on the line between Self and Action are standardized regression coefficients; the values on the link between Context and Action are standardized regression coefficients controlling for Self (or not controlling for Self). Values from Time 1 are before the slash; Time 2 are after the slash. Regression results are also reported in Table 54

Differential Mediators Models for a single context: Non-Supportive teachers. The same set of analyses was conducted to examine the mediator models for Non-Supportive teachers. Findings are summarized in Table 55 and Figure 15.

Table 55
Summary of Hierarchical Regression Analysis Testing for SSPs as Mediators of the Effects of Non-Supportive Teachers on Engagement

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	955.4*	.56			-14.4*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.91	
<i>Step two:</i> Non-Supportive Teachers Relatedness			-.42*	-18.54	
			.42*	18.33	
Overall model	955.4*	.49			10.0*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.91	
<i>Step two:</i> Non-Supportive Teachers Competence			-.53*	-22.41	
			.27*	11.33	
Overall model	955.4*	.54			-13.4*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.91	
<i>Step two:</i> Non-Supportive Teachers Autonomy			-.46*	-19.95	
			.38*	16.74	
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	929.9*	.57			-15.0*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.50	
<i>Step two:</i> Non-Supportive Teachers Relatedness			-.41*	-18.55	
			.44*	19.79	
Overall model	929.9*	.49			-10.2*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.46	
<i>Step two:</i> Non-Supportive Teachers Competence			-.52*	-21.95	
			.28*	11.88	
Overall model	929.9*	.52			-12.8*
<i>Step one:</i> Non-Supportive Teachers			-.66*	-30.50	
<i>Step two:</i> Non-Supportive Teachers Autonomy			-.47*	-20.49	
			.36*	15.81	

Note. * $p < .000$.

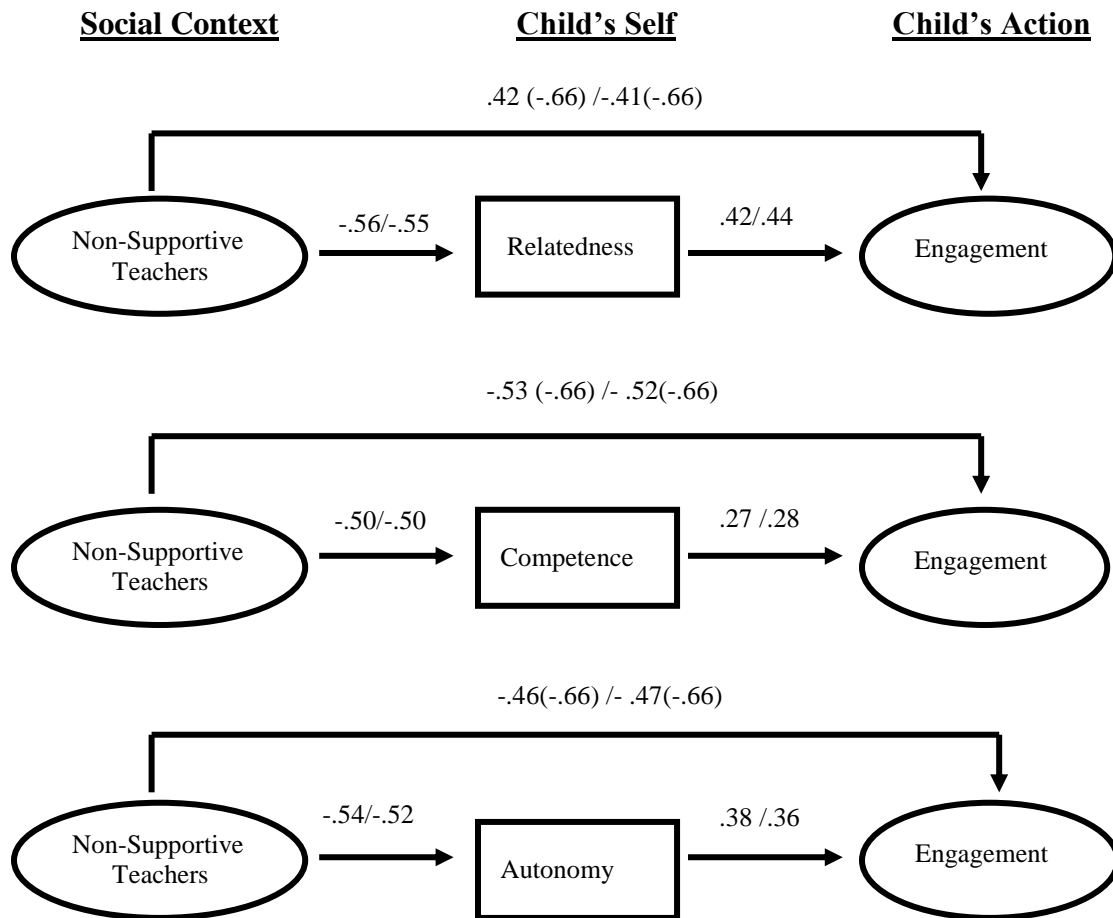


Figure 15. Mediating Models for Non-Supportive teachers: Significant paths. The values on the line between Context and Self are a zero order correlation; the values on the line between Self and Action are standardized regression coefficients; the values on the link between Context and Action are standardized regression coefficients controlling for Self (or not controlling for Self). Values from Time 1 are before the slash; Time 2 are after the slash. Regression results are also reported in Table 55

The results revealed partial mediation effects for *relatedness*, *competence*, or *autonomy* on children's engagement for Non-Supportive teachers at Time 1 and Time 2.

Summary of findings for Differential Mediators Models for a single

context. A set of correlational analyses and hierarchical regressions analyses was conducted to test for mediating effects of SSPs on children's classroom engagement. The Sobel tests indicated that each of the three children's SSPs (relatedness, competence, and autonomy) partially mediated the effects of each individual social context (Supportive parents, Supportive teachers, Non-Supportive parents, and Non-Supportive teachers) on children's classroom engagement. In regards to the research question 6a, there was no difference between parents and teachers in how SSPs mediated the effects on children's classroom engagement.

Research Findings for Differential Mediators Models in a Single Context: Change in Engagement from Fall to Spring

Since significant partial mediation effects were found within each context, the same mediators were tested for effects on changes in children's classroom engagement from fall to spring. This was addressed in the research question 6b: Are the SSPs that mediate the effects of a social context on changes in children's classroom engagement from fall to spring, different for parents versus teachers?

A set of hierarchical regression analyses were conducted to test these effects. The mediation effects of SSPs on children's engagement were tested separately for each social context. The following four requirements had to be met in order to establish the change in children's engagement from fall to spring.

Requirement 1: Significant relationship between IV and change in DV.

$$\left. \begin{array}{l} \text{Step 1: Engagement (time 1)} \\ \text{Step 2: Context (time 1)} \end{array} \right\} \rightarrow \text{Engagement (time 2)}$$

Requirement 2: Significant relationship between IV and mediator.

Context (time 1) → SSP (time 1)

Requirement 3: Significant relationship between mediator and change in DV.

Step 1: Engagement (time 1) }
 Step 2: SSP (time 1) } → Engagement (time 2)

Requirement 4: Significant relationship between mediator and change in DV, controlling for IV (previously significant relationship between IV and change in DV becomes non-significant, or is significantly reduced, when mediator is in the model).

Step 1: Engagement (time 1) }
 Context (time 1) } → Engagement (time 2)
 Step 2: SSP (time 1) }

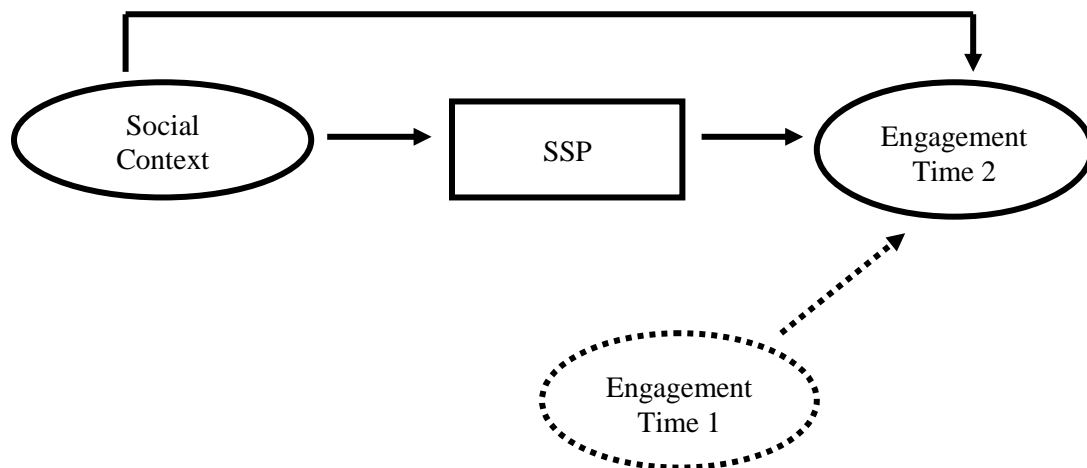


Figure 16. Models examining whether SSPs mediate the effects of a single context on changes in engagement from fall to spring

Change in children's engagement from fall to spring: Supportive

parents. The first requirement for examining whether SSPs mediate the effects of Supportive parents on changes in children's classroom engagement from fall to spring was supported by the data. Results revealed that Supportive parents were a significant predictor of change in children's engagement from fall to spring [$R^2 = .44$, $F(2,1240) = 941.9$, $p < .000$]. In the second step of the hierarchical regression, β for Supportive parents was significant ($\beta = .08$, $t = 3.13$, $p < .01$)

The second requirement for a mediator model was addressed by previous analyses: there was a significant correlation between Supportive parents and each SSPs. The third requirement was confirmed only for relatedness and autonomy. Relatedness and autonomy were significant predictors of change in children's engagement from fall to spring (see Table 56 p. 240). This finding was used for every social context in testing for the third requirement of the mediation effects. Specifically, only relatedness and autonomy were tested for all the mediation effects.

The results for the fourth requirement for testing whether SSPs mediate the effects of Supportive parents on change in children's classroom engagement from fall to spring are reported in Table 57.

Table 56

Summary of Hierarchical Regression Analysis Testing for the Third Requirement for Change in Children's Engagement from Fall to Spring for Supportive Parents

	<u>F</u>	R ²	β	<u>t</u>
Overall model	941.9*	.44		
<i>Step one:</i> Engagement Time			.66**	30.69
<i>Step two:</i> Relatedness 1			.09*	3.33
DV: Engagement Time 2				
Overall model	941.9*	.43		
<i>Step one:</i> Engagement Time 1			.66*	30.69
<i>Step two:</i> Competence			.01	.56
DV: Engagement Time 2				
Overall model	941.9*	.44		
<i>Step one:</i> Engagement Time 1			.66*	30.69
<i>Step two:</i> Autonomy			.11*	3.98
DV: Engagement Time 2				

Note. * $p < .001$, ** $p < .001$.

Table 57
Summary of Hierarchical Regression Analysis Testing for the Fourth Requirement for Change in Children's Engagement from Fall to Spring for Supportive Parents

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	479.2***	.44			
<i>Step one:</i> Engagement (Time 1)			.62***	25.76	
Supportive Parents			<u>.08**</u>	<u>3.13</u>	
<i>Step two:</i> Supportive Parents			.05	1.84	
Relatedness			.07*	2.15	
DV: Engagement (Time 2)					
Overall model	479.2***	.44			3.74***
<i>Step one:</i> Engagement (Time 1)			.62***	25.76	
Supportive Parents			<u>.08**</u>	<u>3.13</u>	
<i>Step two:</i> Supportive Parents			.07**	3.06	
Autonomy			.11***	3.92	
DV: Engagement (Time 2)					

Note. * $p < .05$, ** $p < .01$, *** $p < .000$.

Results revealed one full mediation effect: children's perceived *relatedness* fully mediated the effects of Supportive parents on changes in children's classroom engagement from fall to spring. For *autonomy*, the mediator remained significant in the second step of the regression and the predictor (Supportive parents) also remained significant. The results of the Sobel test indicated that the decrease in β values for Supportive parents was statistically significant, providing evidence for partial mediator effects.

Change in children's engagement from fall to spring: Supportive teachers.

The first requirement for examining whether SSPs mediate the effects of

Supportive teachers on changes in children's classroom engagement from fall to spring was supported by the data. Results revealed that Supportive teachers were not a significant predictor of change in children's engagement from fall to spring. Although the overall model was significant [$R^2 = .43$, $F(2,1240) = 941.9$, $p < .000$], the β for Supportive for Supportive teachers in the second step of the hierarchical regression was not significant ($\beta = .04$, $t = 1.58$, p n.s.). Because the first requirement for the mediation effects was not supported by the data, the remaining requirements were not tested. Thus, SSPs did not mediate the effects of Supportive teachers on changes in children's classroom engagement from fall to spring.

Change in children's engagement from fall to spring: Non-Supportive parents. The first requirement for examining whether SSPs mediate the effects of Non-Supportive parents on changes in children's classroom engagement from fall to spring was supported by the data. Results revealed that Non-Supportive parents were a significant predictor of change in children's engagement from fall to spring [$R^2 = .44$, $F(2,1240) = 941.9$, $p < .000$]. In the second step of the hierarchical regression, β for Non-Supportive parents was significant ($\beta = -.10$, $t = -3.95$, $p < .000$)

The second requirement for a mediator model was addressed by previous analyses: there was a significant correlation between Non-Supportive parents and each SSPs.

The third requirement for a mediator model was also addressed by previous analyses: relatedness and autonomy were significant predictors of change in children's engagement from fall to spring. The results for the fourth requirement for testing whether relatedness and autonomy mediate the effects of Non-Supportive

parents on change in children's classroom engagement from fall to spring are reported in Table 61. Results revealed no mediation effects for relatedness. For *autonomy*, the mediator remained significant in the second step of the regression and the predictor (Non-Supportive parents) also remained significant. The results of the Sobel test indicated that the decrease in β values for Non-Supportive parents was statistically significant, providing evidence for partial mediator effects.

Table 58

Summary of Hierarchical Regression Analysis Testing for the Fourth Requirement for Change in Children's Engagement from Fall to Spring for Non-Supportive Parents

Time 1	F	R ²	β	t	Sobel z
Overall model	484.3**	.44			
<i>Step one:</i> Engagement (Time 1)			.60**	23.94	
Non-Supportive Parents			-.10**	-3.95	
<i>Step two:</i> Non-Supportive Parents			.08*	-2.86	
Relatedness			.06	1.92	
<i>DV:</i> Engagement (Time 2)					
Overall model	484.3**	.45			-3.83**
<i>Step one:</i> Engagement (Time 1)			.60**	23.94	
Non-Supportive Parents			-.10**	-3.95	
<i>Step two:</i> Non-Supportive Parents			-.09**	-3.64	
Autonomy			.11**	3.68	
<i>DV:</i> Engagement (Time 2)					

Note. * $p < .01$, ** $p < .000$.

Change in children's engagement from fall to spring: Non-Supportive

teachers. The first requirement for examining whether SSPs mediate the effects of Non-Supportive teachers on changes in children's classroom engagement from fall to spring was supported by the data. Results revealed that Non-Supportive teachers were a significant predictor of change in children's engagement from fall to spring [$R^2 = .44$, $F(2,1240) = 941.9$, $p < .000$]. In the second step of the hierarchical regression, β for Non-Supportive teachers was significant ($\beta = -.09$, $t = -3.28$, $p < .001$)

The second requirement for a mediator model was addressed by previous analyses: there was a significant correlation between Non-Supportive teachers and each SSPs. The third requirement for a mediator model was also addressed by previous analyses: relatedness and autonomy were significant predictors of change in children's engagement from fall to spring.

The results for the fourth requirement for testing whether relatedness and autonomy mediate the effects of Non-Supportive parents on change in children's classroom engagement from fall to spring are reported in Table 59 (p. 246). For both *autonomy* and *relatedness*, the mediator remained significant in the second step of the regression and the predictor (Non-Supportive teachers) also remained significant. The results of the Sobel test indicated that the decrease in β values for Non-Supportive parents was statistically significant, providing evidence for partial mediator effects for both *autonomy* and *relatedness*.

Table 59

Summary of Hierarchical Regression Analysis Testing for the Fourth Requirement for Change in Children's Engagement from Fall to Spring for Non-Supportive Teachers

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel <i>z</i>
Overall model	480.0***	.44			-2.96*
<i>Step one:</i> Engagement (Time 1)			.60***	20.99	
Non-Supportive Teachers			-.09**	-3.28	
<i>Step two:</i> Non-Supportive Teachers			-.08*	-2.61	
Relatedness			.08*	2.66	
<i>DV:</i> Engagement (Time 2)					
Overall model	480.0***	.44			-3.90***
<i>Step one:</i> Engagement (Time 1)			.60**	20.99	
Non-Supportive Teachers			-.09**	-3.28	
<i>Step two:</i> Non-Supportive Teachers			-.07*	-2.52	
Autonomy			.09**	3.38	
<i>DV:</i> Engagement (Time 2)					

Note. * $p < .01$, ** $p < .001$, *** $p < .000$.

Summary of research findings for the mediating effects of SSPs on change in children's engagement from fall to spring for a single context. A set of hierarchical regressions was conducted to test whether the SSPs mediate the effects of social contexts on changes in children's classroom engagement from fall to spring.

Results revealed one full mediation model: children's *relatedness* mediated the effects of Supportive parents on changes in children's classroom engagement from fall to spring.

Four partial mediation models were found in the data: (1) children's *relatedness* partially mediated the effects of Non-Supportive teachers on changes in children's classroom engagement from fall to spring, (2-3) children's *autonomy* mediated the effects of Supportive and Non-Supportive parents on changes in children's classroom engagement from fall to spring, (4) children's *autonomy* mediated the effects of Non-Supportive teachers on changes in children's classroom engagement from fall to spring. No mediation effects were found for Supportive teachers.

In regards to the research question 6b, the differences for parents versus teachers in the SSPs that mediated the effects of social contexts on changes in children's classroom engagement were the following: (1) Children's *relatedness* (a) fully mediated the influences of Supportive parents, but not Supportive teachers and (b) partially mediated influences of Non-Supportive teachers, but not Supportive parents; (2) Children's *autonomy* partially mediated the influences of (a) both Supportive and Non-Supportive parents, but (b) only Non-Supportive teachers. The effects of Supportive teachers were not mediated by any of the SSP's. One similarity was found for autonomy and Non-Supportive contexts: the effects of Non-Supportive parents and Non-Supportive teachers on changes in children's classroom engagement from fall to spring were mediated by children's autonomy. A summary of these findings is reported in Table 60.

Table 60

Summary of Mediating Effects of SSPs on Changes in Children's Classroom Engagement from Fall to Spring for a Single Social Context

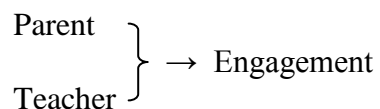
SSP s	<u>Supportive</u>		<u>Non-Supportive</u>	
	Parents	Teachers	Parents	Teachers
<i>Relatedness</i>	Full Mediation	No Effects	No Effects	Partial Mediation
<i>Competence</i>	No Effects	No Effects	No Effects	No Effects
<i>Autonomy</i>	Partial Mediation	No Effects	Partial Mediation	Partial Mediation

Research Findings for Differential Mediators Models: Combined Contexts

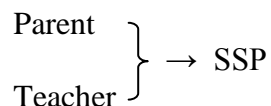
Since all three SSPs were found to partially mediate the effects of each social context on engagement, these effects were combined and tested in the same model. These effects were addressed in the research question 6c: When the effects of parents and teachers on children's engagement are considered simultaneously, are these effects mediated by different SSPs?

All four requirements for mediating joint effects were tested with simultaneous regression analyses.

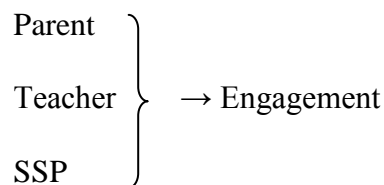
Requirement 1: Significant relationships between IVs and DV.



Requirement 2: Significant relationships between IVs and mediator.



Requirement 3: The effects of IV are controlled to establish the effects of the mediator on DV



Requirement 4: Previously significant relationship between IVs and DV becomes non-significant, or is significantly reduced when mediator is in the model.

In set of analyses testing these questions, Supportive and Non-Supportive parenting and teaching practices were the independent variables (IV), students' engagement was the dependent variable (DV), and children's SSPs were the mediators. All Supportive and Non-Supportive parenting and teaching practices and all SSPs were included in the testing models.

Differential Mediators Models for combined contexts: Supportive parents and Supportive teachers. The first requirement for testing a mediator model was supported by regression analyses. Supportive parents and Supportive teachers were significant predictors of children's classroom engagement at both time points (see Table 61).

The second requirement for a mediation model was also confirmed by regression analyses. All three SSPs (relatedness, competence, and autonomy) were significant predictors of children's classroom engagement at Time 1 and Time 2 (see Table 62).

Table 61

Summary of Regression Analysis Testing the First Requirement for Joint Mediating Effects of Supportive Parents and Teachers on Engagement

		<u>F</u>	R ²	β	<u>t</u>
<u>Time 1</u>	Overall Model	377.6*	.38		
	Supportive Parents			.25*	9.55
	Supportive Teachers			.46*	17.86
<u>Time 2</u>	Overall Model	371.8*	.38		
	Supportive Parents			.27*	10.63
	Supportive Teachers			.43*	16.94

Note. * $p < .000$.

Test for the third and fourth requirement for the mediator model was conducted using a simultaneous regression. The dependent variable was children's engagement. Supportive parents, Supportive teachers, and a SSP (relatedness, competence, or autonomy) were predictors. These analyses tested whether the previously significant association between Supportive parents and Supportive teachers and engagement was no longer significant (or was significantly reduced) when the mediator variance is taken into account. The results of these tests are reported in Table 63.

Table 62
Summary of Regression Analysis Testing the Second Requirement of Joint Mediator Models for Supportive Parents and Teachers on SSPs

Time 1	<u>F</u>	R ²	β	<u>t</u>
<u>Relatedness</u>				
Overall model	513.1**	.45		
Supportive Parents			.44**	18.37
Supportive Teachers			.34**	13.98
<u>Competence</u>				
Overall model	144.6**	.19		
Supportive Parents			.47**	18.63
Supportive Teachers			.31**	12.58
<u>Autonomy</u>				
Overall model	162.8**	.21		
Supportive Parents			.12**	4.23
Supportive Teachers			.38**	13.26
Time 2	<u>F</u>	R ²	β	<u>t</u>
<u>Relatedness</u>				
Overall model	471.4**	.43		
Supportive Parents			.50**	20.28
Supportive Teachers			.26**	10.50
<u>Competence</u>				
Overall model	134.5**	.18		
Supportive Parents			.29**	9.88
Supportive Teachers			.20**	6.75
<u>Autonomy</u>				
Overall model	172.7**	.22		
Supportive Parents			.09*	3.16
Supportive Teachers			.42**	14.56

Note. * $p < .01$, ** $p < .000$.

Table 63
Summary of Regression Analysis Testing the Third and Fourth Requirement of Joint Mediator Models for Supportive Parents and Teachers

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	411.6*	.50			
Supportive Parents			.04	1.43	1.4
Supportive Teachers			.30**	12.11	9.1**
Relatedness			.47**	17.27	
Overall model	362.9*	.47			
Supportive Parents			.15**	6.28	5.2**
Supportive Teachers			.38**	15.68	7.2**
Competence			.33**	14.41	
Overall model	466.7*	.53			
Supportive Parents			.19**	8.52	3.8**
Supportive Teachers			.29**	12.17	9.0**
Autonomy			.44**	20.03	
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	444.1*	.52			
Supportive Parents			.02	.90	0.9
Supportive Teachers			.31**	13.00	8.0**
Relatedness			.50**	19.19	
Overall model	372.2*	.47			
Supportive Parents			.17**	7.02	5.8**
Supportive Teachers			.37**	15.25	6.3**
Competence			.35**	16.96	
Overall model	428.9*	.51			
Supportive Parents			.23**	10.30	3.0*
Supportive Teachers			.26**	10.62	7.1**
Autonomy			.42**	18.43	

Note. ** $p < .000$, * $p < .01$.

A summary of the findings testing for the joint mediating effect for the Supportive social contexts are reported in Table 64.

Table 64

Summary of Mediating Effects of SSPs on Children's Classroom Engagement for Combined Supportive Social Contexts

Time 1	<i>Relatedness</i>	<i>Competence</i>	<i>Autonomy</i>
<i>Supportive Parents</i>	Full Mediation	Partial Mediation	Partial Mediation
<i>Supportive Teachers</i>	Partial Mediation	Partial Mediation	Partial Mediation
Time 2	<i>Relatedness</i>	<i>Competence</i>	<i>Autonomy</i>
<i>Supportive Parents</i>	Full Mediation	Partial Mediation	Partial Mediation
<i>Supportive Teachers</i>	Partial Mediation	Partial Mediation	Partial Mediation

In summary, it appears that joint effects of Supportive parents and Supportive teachers on children's classroom engagement were mediated by children's SSPs. Specifically, children's perceived *relatedness* fully mediated the effects of Supportive parents and partially mediated the effects of Supportive teachers on children's classroom engagement at Time 1 and Time 2. Children's perceived *competence* and perceived *autonomy* partially mediated the joint effects of Supportive parents and Supportive teachers on children's classroom engagement. Thus, one difference was found for joint effects of parents and teachers: the effects of parents were fully mediated by *relatedness*, but the effects of teachers were partially mediated by *relatedness*. There were no differences for parents versus teachers in mediating effects of *competence* and *autonomy*.

Differential Mediators Models for combined contexts: Non-Supportive parents and Non-Supportive teachers. The first requirement for mediator model was supported by regression analyses. Non-Supportive parents and Non-Supportive teachers were significant predictors of children's perceived classroom engagement at Time 1 and Time 2 (see Table 65).

Table 65

Summary of Regression Analysis Testing the First Requirement for Joint Mediating Effects of Non-Supportive Parents and Teachers

		<u>F</u>	R ²	β	<u>t</u>
<u>Time 1</u>	Overall Model	539.3*	.47		
	Non-Supportive Parents			-.22*	-8.37
	Non-Supportive Teachers			-.53*	-20.31
<u>Time 2</u>	Overall Model	553.7*	.47		
	Non-Supportive Parents			-.26*	-10.09
	Non-Supportive Teachers			.43*	-19.68

Note. * $p < .000$.

The second requirement for the mediating model was also confirmed by regression analyses. All three SSPs were significant predictors of children's classroom engagement in both time measurements for both Non-Supportive parents and Non-Supportive teachers (see Table 66).

A test for the third and fourth requirements for the mediator model was conducted using simultaneous regression. The dependent variable was children's perceived engagement. Non-Supportive parents, Non-Supportive teachers, and a SSP (relatedness, competence, or autonomy) were predictors. These analyses were testing whether previously significant association between Non-Supportive parents and

Table 66
Summary of Regression Analysis Testing the Second Requirement of Joint Mediator Models for Non-Supportive Parents and Teachers

Time 1	<u>F</u>	R ²	β	<u>t</u>
<u>Relatedness</u>				
Overall model	463.9*	.43		
Non-Supportive Parents			-.42*	-15.65
Non-Supportive Teachers			-.31*	-11.43
<u>Competence</u>				
Overall model	259.4*	.29		
Non-Supportive Parents			-.26*	-8.72
Non-Supportive Teachers			-.34*	-11.51
<u>Autonomy</u>				
Overall model	257.7*	.29		
Non-Supportive Parents			.12*	4.23
Non-Supportive Teachers			.38*	13.26
Time 2	<u>F</u>	R ²	β	<u>t</u>
<u>Relatedness</u>				
Overall model	463.5*	.43		
Non-Supportive Parents			-.45*	-16.87
Non-Supportive Teachers			-.28*	-10.55
<u>Competence</u>				
Overall model	243.8*	.28		
Non-Supportive Parents			-.23*	-7.57
Non-Supportive Teachers			-.37*	-12.30
<u>Autonomy</u>				
Overall model	236.1*	.28		
Non-Supportive Parents			-.11*	-3.63
Non-Supportive Teachers			-.47*	-15.70

Note. * $p < .000$.

Table 67
Summary of Regression Analysis Testing the Third and Fourth Requirement of Joint Mediator Models for Non-Supportive Parents and Teachers

Time 1	<u>F</u>	R ²	β	<u>t</u>	Sobel	<i>z</i>
Overall model	518.8*	.56				
Non-Supportive Parents			-.05	-1.90		
Non-Supportive Teachers			-.41***	-16.27	9.2***	
Relatedness			.40***	16.00		
Overall model	417.9*	.50				
Non-Supportive Parents			-.16***	-6.09	5.1***	
Non-Supportive Teachers			-.45***	-17.00	9.7***	
Competence			.23***	9.70		
Overall model	523.9*	.56				
Non-Supportive Parents			-.18***	-7.50	3.2**	
Non-Supportive Teachers			-.36***	-13.80	10.3***	
Autonomy			.37***	16.25		
Time 2	<u>F</u>	R ²	β	<u>t</u>	Sobel	<i>z</i>
Overall model	544.0*	.57				
Non-Supportive Parents			-.07***	-2.87	2.8*	
Non-Supportive Teachers			-.39***	-16.07	9.0***	
Relatedness			.41***	16.66		
Overall model	434.6*	.51				
Non-Supportive Parents			-.20***	-8.12	5.9***	
Non-Supportive Teachers			-.42***	-15.97	10.0***	
Competence			.24***	10.21		
Overall model	513.4*	.55				
Non-Supportive Parents			-.22***	-9.12	3.8***	
Non-Supportive Teachers			-.35***	-13.89	10.2***	
Autonomy			.34***	15.14		

Note. *** $p < .000$, ** $p < .001$, * $p < .01$.

Non-Supportive teachers and engagement becomes insignificant when the mediator variance is taken into account. The results of this testing are reported in Table 67.

The findings testing for the joint mediating effect for the Supportive social contexts are summarized in Table 68.

Table 68

Summary of Mediating Effects of SSPs on Children's Classroom Engagement for Combined Non-Supportive Social Contexts

Time 1	<i>Relatedness</i>	<i>Competence</i>	<i>Autonomy</i>
<i>Non-Supportive Parents</i>	Full Mediation	Partial Mediation	Partial Mediation
<i>Non-Supportive Teachers</i>	Partial Mediation	Partial Mediation	Partial Mediation
Time 2	<i>Relatedness</i>	<i>Competence</i>	<i>Autonomy</i>
<i>Non-Supportive Parents</i>	Partial Mediation	Partial Mediation	Partial Mediation
<i>Non-Supportive Teachers</i>	Partial Mediation	Partial Mediation	Partial Mediation

In summary, the combined effects of Non-Supportive parents and Non-Supportive teachers on children's classroom engagement were mediated by children's SSPs. Specifically, children's perceived *relatedness* fully mediated the effects of Non-Supportive parents and partially mediated the effects of Non-Supportive teachers on children's classroom engagement at Time 1. At Time 2, *relatedness* partially mediated the joint effects of Non-Supportive parents and Non-Supportive teachers on children's classroom engagement. Children's perceived *competence* and *autonomy* partially mediated the joint effects of Non-Supportive

parents and Non-Supportive teachers on children's classroom engagement in both Time 1 and Time 2 measurements.

**Research Findings for Change in Children's Engagement from Fall to Spring:
Combined Contexts**

Change in children's engagement from fall to spring combined contexts:

Non-Supportive parents and Non-Supportive teachers. Change in children's engagement from fall to spring for combined contexts was addressed by the research question 6d: When the effects of parents and teachers on changes in children's engagement from fall to spring are considered simultaneously, are these effects mediated by different SSPs?

Testing for simultaneous effects of social contexts required that each social context had a significant mediation effects in change form fall to spring. In previous analyses it was found that only *autonomy* was a significant partial mediator for both Non-Supportive parents and Non-Supportive teachers. Thus, only *autonomy* was tested as a possible mediator for the joint effects of Non-Supportive parents and Non-Supportive teachers on change in children's classroom engagement from fall to spring. A hierarchical regressions was conducted to test for the first requirement of the mediation effects.

Requirement 1: Significant relationship between IV and change in DV.

Step 1: Engagement (time 1)	}	→ Engagement (time 2)
Step 2: Non-Supportive Parent (time 1)		
Non-Supportive Teacher (time 1)		

The first requirement was not supported by the data: Non-Supportive teachers remained significant in the second step of the hierarchical regression (see Table 69).

Table 69

Summary of Hierarchical Regression Analysis Testing for the First Requirement for Change in Children's Engagement from Fall to Spring for Joint Non-Supportive Contexts

	<u>F</u>	R ²	β	<u>t</u>
Overall model	941.3**	.01		
<i>Step one:</i>				
Engagement Time 1			.66**	30.69
<i>Step two:</i>				
Non-Supportive Parents Time 1			-.08*	-2.90
Non-Supportive Teachers Time 1			-.06	-1.89

DV: Engagement Time 2

Note. ** $p < .000$, * $p < .01$

Thus, the joint effects of Non-Supportive parents and teachers on change in children's engagement from fall to spring were not mediated by *autonomy*.

Summary for Differential Mediators Models. Differential Mediators Models were addressed by research question six: Are the process mechanisms that link social contexts to children's motivation different for parents versus teachers? This question was tested in four steps and the following results were found.

First, each SSP (relatedness, competence, and autonomy) was tested as a possible mediator of the effects of each social context (Supportive Parents, Supportive teachers, Non-Supportive parents, and Non-Supportive teachers) on

children's classroom engagement (research question 6a). Every context was tested independently. It was found that the effects of every social context were partially mediated by every SSP. There was no difference in mediation models between the effects of parents versus teachers. These results were found for both Time 1 and Time 2 measurements.

Second, since partial mediation effects were found for every social context and every SSP, the mediating effects of SSPs on changes in children's classroom engagement from fall to spring were investigated next (research question 6b). The differences for parents versus teachers in the SSPs that mediated the effects of social contexts on changes in children's classroom engagement were the following: (1) Children's *relatedness* (a) fully mediated the influences of Supportive parents, but not Supportive teachers and (b) partially mediated influences of Non-Supportive teachers, but not Supportive parents; (2) Children's *autonomy* partially mediated the influences of (a) both Supportive and Non-Supportive parents, but (b) only Non-Supportive teachers. The effects of Supportive teachers were not mediated by any of the SSP's. One similarity was found for autonomy and Non-Supportive contexts: effects of Non-Supportive parents and Non-Supportive teachers on changes in children's classroom engagement from fall to spring were mediated by children's autonomy.

Third, since partial mediating effects of all three SSPs were found for each social context, these effects were combined and tested in the same model (research question 6c). It appears that the joint effects of Supportive parents and Supportive teachers on change in children's classroom engagement have been mediated by

children's SSPs. Specifically, children's perceived *relatedness* fully mediated the effects of Supportive parents and partly mediated the effects of Supportive teachers on children's classroom engagement at Time 1 and Time 2. Children's perceived *relatedness* also fully mediated the effects of Non-Supportive parents and partially mediated the effects of Non-Supportive teachers on children's classroom engagement at Time 1. At Time 2, *relatedness* partially mediated the joint effects of Non-Supportive parents and Non-Supportive teachers. Children's perceived *competence* and perceived *autonomy* partially mediated the joint effects of Supportive parents and Supportive teachers as well as partially mediated the joint effects of Non-Supportive parents and Non-Supportive teachers on children's classroom engagement.

Fourth, since the mediating effects of *autonomy* for each Non-Supportive context were found on changes in children's classroom engagement from fall to spring, the simultaneous effects of both contexts were investigated (research question 6d). It was found that children's perceived *autonomy* did not mediate the combined effects of Non-Supportive parents and Non-Supportive teachers on children's classroom engagement.

Differential Recipient Models

Differential Effects Models have two subcategories: (1) Differential Mediator Models and (2) Differential Recipient Models. Differential Mediator Models were discussed in the previous section. This section addresses Differential Recipient Models. The section starts with an overview of the research questions and an outline of the specific steps followed for testing Differential Recipient Models. The main

body of this section elaborates on the results of statistical testing for the models.

The section concludes with an overall summary of the findings.

Research Questions and Steps for Testing Differential Recipient Models

The examination of Differential Recipient Models investigated whether the effects of parents and teachers on children's developmental outcomes differ based on the developmental level of the target child. The Differential Recipient model can also be viewed as a moderator model, in which children's age may effect the direction and/or strength of the relation between a social context and children's SSP. In other words, a moderator is a third variable that effects the zero-order correlation between the predictor and the outcome (see Figure 26)

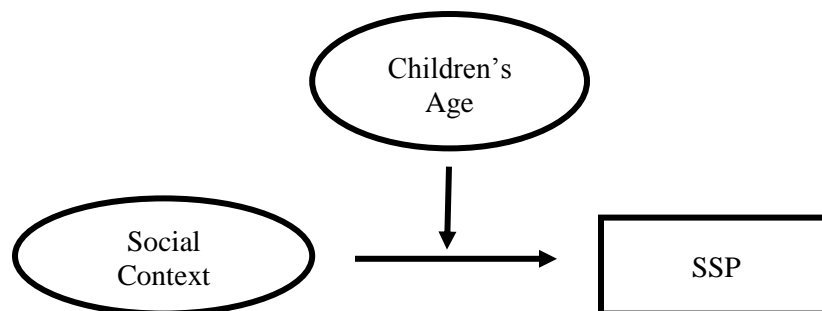


Figure 17. Differential Recipient Models: Moderating Effects of Age

The research question 7 and its subset of questions addressed the Differential Recipient Models.

Question 7. Do the effects of parents and teachers differ based on the developmental level of the target children?

- 7a. Could the effects of parents and teachers on children's SSPs depend on the age of the target children?
- 7b. Could the joint effects of both social contexts on children's SSPs depend on the age of the target children?
- 7c. Could effects of social contexts on changes in children's SSPs from fall to spring depend on the age of the target children?

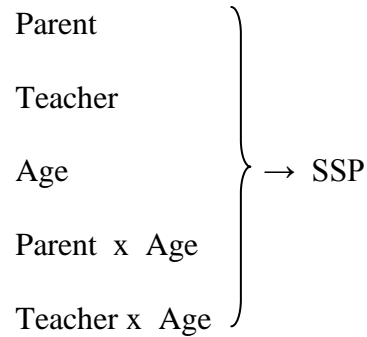
To test the research question 7a, the age variable was dummy coded into two categories: (1) elementary school children in grades three through five were combined in one category and (2) middle school children in grades six and seven were combined in another category. A total of four interaction terms were created by multiplying cross-product of each social context and age variable (Supportive parent x age, Supportive teacher x age, Non-Supportive parent x age, and Non-Supportive teacher x age). A set of hierarchical regressions was conducted to test for age effects.

The first set of analyses was performed for each social context separately. Simultaneous regressions were conducted to test if the effects of social context on SSP depended on children's age. Social context, age, and the interaction term were IVs and a SSP was the DV in those regressions.

$$\left. \begin{array}{l} \text{Context} \\ \text{Age} \\ \text{Context} \times \text{Age} \end{array} \right\} \rightarrow \text{SSP}$$

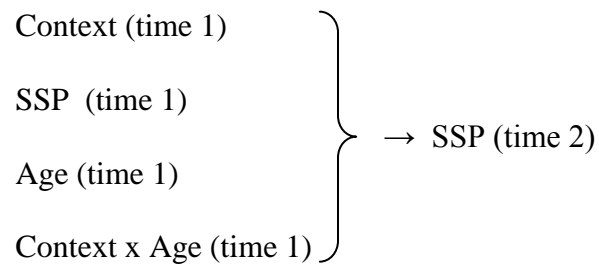
Next, the analyses proceeded to test the research question 7b: Could the joint effects of both social contexts on children's SSPs depend on the age of the target person? If age effects were found for both parents and teachers, the simultaneous effects of both contexts were examined next. These effects were examined by a set

of hierarchical regressions.

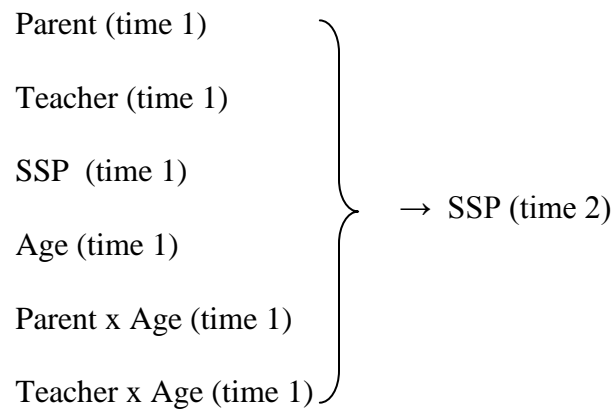


Finally, a set of hierarchical regressions was conducted to test the research question 7c: Could the effects of social contexts on changes in children's SSPs from fall to spring depend on the age of the target child? First, the effects were tested for each social context separately and then both social contexts were combined together.

Separate contexts effects on changes in SSPs



Combined contexts effects on changes in SSPs



Research Finding for Differential Recipient Models

Differential Recipient Models for a single context: Supportive parents and teachers. Six regressions were conducted for Supportive parents and six regressions were conducted for Supportive teachers to test for moderating effects of children's age on SSPs.

Supportive parents. In most models, the effects of Supportive parents on children's SSP's were not moderated by children's age. Only the effects of Supportive parents on *autonomy* in Time 1 were moderated by children's age (see Table 70).

Table 70

Summary of Regression Analysis Testing for Age Effects for Supportive Parents

Supportive Parents	F	R ²	β (Parent X Age)	t
<u>Time 1: Parent and Age Interactions</u>				
DV: Relatedness	235.7**	.37	-.05	-.84
DV: Competence	72.1**	.39	-.02	-.33
DV: Autonomy	73.1**	.15	.15*	2.1
<u>Time 2: Parent and Age Interactions</u>				
DV: Relatedness	261.3**	.39	-.04	-.70
DV: Competence	76.6**	.16	.11	1.5
DV: Autonomy	50.8**	.11	.08	1.1

Note. * $p < .05$, ** $p < .000$.

Follow up correlational analyses were conducted to identify children's age for which Supportive parents had more influence on *autonomy*. It was found that the

correlation between Supportive parents and children's autonomy was higher for middle school children ($r = .33, p < .000$) than for elementary school children ($r = .28, p < .000$). This finding suggests that, although Supportive parents had in general a positive effect on children's *autonomy*, the effect was even stronger on middle school children than on elementary school children.

Supportive teachers. The effects of Supportive teachers on children's *relatedness* and *competence* were not moderated by children's age. For *autonomy*, the effects of Supportive teachers were moderated by children's age at both time points (see Table 71).

Table 71

Summary of Regression Analysis Testing for Age Effects for Supportive Teachers

Supportive Teachers	F	R ²	β (Teacher X Age)	t
<u>Time 1: Teacher and Age Interactions</u>				
DV: Relatedness	179.6**	.55	-.06	-.85
DV: Competence	62.3**	.13	-.08	-1.12
DV: Autonomy	122.9**	.23	.18*	2.7
<u>Time 2: Teacher and Age Interactions</u>				
DV: Relatedness	137.0**	.25	.10	1.3
DV: Competence	56.8**	.12	.00	.02
DV: Autonomy	126.3**	.24	.32**	4.2

Note. * $p < .01$, ** $p < .000$.

Follow up analyses revealed that the correlation between Supportive teachers and children's *autonomy* at Time 1 and Time 2 was higher for elementary school

children ($r = .42, p < .000$ at Time 1 and $r = .49, p < .000$ at Time 2) than for middle school children ($r = .41, p < .000$ at Time 1 and $r = .36, p < .000$ at Time 2). This finding suggests that, although Supportive teachers had in general a positive effect on children's *autonomy*, the effect was even stronger on elementary school children than on middle school children at both time points.

In summary, it was found that (1) children's age did not moderate the effects of Supportive parents and Supportive teachers on children's *relatedness* and *competence*, (2) the effects of Supportive parents on children's *autonomy* at Time 1 were more important for middle school children than for elementary school children and (2) the effects of Supportive teachers on children's *autonomy* at both time points were more important for elementary school children than for middle school children.

Differential Recipient Models for a single context: Non-Supportive parents and teachers Six regressions were conducted for Non-Supportive parents and six regressions were conducted for Non-Supportive teachers to test for moderating effects of children's age on SSPs.

Non-Supportive parents. Results of regression analyses revealed that the effects of Non-Supportive parents did not depend on children's age for *relatedness* and *competence* at both time points. The moderating effects of age were found for children's *autonomy* at both time points (see Table 72).

Follow up analyses revealed that the correlation between Non-Supportive parents and children's *autonomy* at Time 1 and Time 2 was higher for elementary school children ($r = -.41, p < .000$ at both time points) than for middle school

Table 72

Summary of Regression Analysis Testing for Age Effects for Non-Supportive Parents

Non-Supportive Parents	<u>F</u>	R ²	β (Parent X Age)	t
<u>Time 1: Parent and Age Interactions</u>				
DV: Relatedness	239.6***	.37	.07	1.09
DV: Competence	117.4***	.22	.03	.33
DV: Autonomy	112.9***	.22	-.23**	-3.3
<u>Time 2: Parent and Age Interactions</u>				
DV: Relatedness	254.0***	.38	.09	1.34
DV: Competence	103.2***	.20	.01	.13
DV: Autonomy	85.1***	.17	-.16*	-2.2

Note. * $p < .05$, ** $p < .001$, *** $p < .000$.

children ($r = -.38$, $p < .000$ at Time 1 and $r = -.32$, $p < .000$ at Time 2). This finding suggests that, although Non-Supportive parents had in general an undermining effect on children's *autonomy*, the effect was even stronger on elementary school children than on middle school children.

Non-Supportive teachers. The effects of Non-Supportive teachers on children's *relatedness* did not depend on children's age. For *competence*, the moderating effects of age were found in Time 1. For *autonomy*, the moderating effects of age were found at both time points (see Table 73).

Follow up analyses revealed that the correlation between Non-Supportive teachers and children's perceived *competence* at Time 1 was higher for middle

Table 73
Summary of Regression Analysis Testing for Age Effects for Non-Supportive Teachers

Non-Supportive Teachers	F	R ²	β (Teacher X Age)	t
<u>Time 1: Teacher and Age Interactions</u>				
DV: Relatedness	189.1***	.32	.04	.59
DV: Competence	140.2***	.26	.15*	2.2
DV: Autonomy	194.0***	.32	-.22**	-3.4
<u>Time 2: Teacher and Age Interactions</u>				
DV: Relatedness	175.7***	.30	.13	1.8
DV: Competence	141.9***	.26	.14	1.9
DV: Autonomy	164.4***	.29	-.31***	-4.3

Note. * $p < .05$, ** $p < .001$, *** $p < .000$.

school children ($r = -.53$, $p < .000$) than for elementary school children ($r = -.45$, $p < .000$). This finding suggests that, although Non-Supportive teachers had in general an undermining effect on children's *competence*, the effect was even stronger on middle school children than on elementary school children.

Follow up analyses for *autonomy* revealed that the correlation between Non-Supportive teachers and *autonomy* at both time points was higher for elementary school children ($r = -.56$, $p < .000$ at Time 1 and $r = -.57$, $p < .000$ at Time 2) than for middle school children ($r = -.48$, $p < .000$ at Time 1 and $r = -.39$, $p < .000$ at Time 2). This finding suggests that, although Non-Supportive teachers had in general an undermining effect on children's perceived *autonomy*, the effect was even

stronger on elementary school children than on middle school children.

The overall findings of moderating effects of age for Supportive and Non-Supportive social contexts are reported in Table 74.

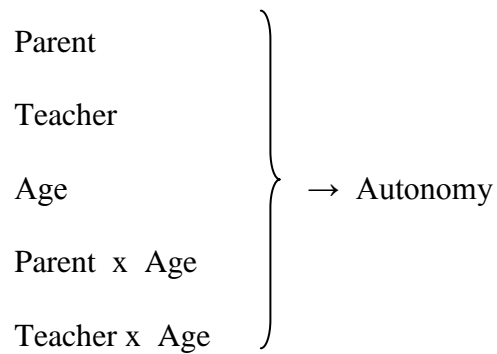
Table 74

Summary of the Moderating Effects of Age for Single Contexts

Context	Time	SSP	r (context and SSP)	
			Elementary School	Middle School
<u>Parents</u>				
Supportive	1	Autonomy	.28*	.33*
Non-Supportive	1	Autonomy	-.41*	-.38*
Non-Supportive	2	Autonomy	-.41*	-.32*
<u>Teachers</u>				
Supportive	1	Autonomy	.42*	.41*
Supportive	2	Autonomy	.49*	.36*
Non-Supportive	1	Competence	-.45*	-.53*
Non-Supportive	1	Autonomy	-.56*	-.48*
Non-Supportive	2	Autonomy	-.57*	-.39*

Note. * $p < .000$.

Differential Recipient Models: combined contexts. Since three moderating effects of age on children's *autonomy* were found for both contexts (Supportive parents and teachers at Time 1; Non-Supportive parents and teachers at both time points), three regression analyses were conducted to test joint effects (Research Question 7b).



The findings are reported in Table 75 and Table 76.

Table 75

Summary of Regression Analysis Testing for the Moderating Effects of Age on the Joint Effects of Supportive Contexts on Autonomy at Time 1

	<u>F</u>	R ²	β	<u>t</u>
<u>Time 1</u>				
Overall model	77.7*	.24		
Supportive Parents			.11	1.50
Supportive Teachers			.18*	2.38
Age			.18**	6.96
Supportive Parent x Age			.01	0.09
Supportive Teacher x Age			.17*	2.20

DV: Autonomy

Note. * $p < .05$, ** $p < .000$.

Results suggested that, when the effects of parents and teachers on children's *autonomy* were considered simultaneously, children's age moderated the effects of teachers, but not the effects of parents. A follow up simultaneous regression analysis was conducted to verify the age of children for which teachers had a more significant

Table 76

Summary of Regression Analysis Testing for the Moderating Effects of Age on the Joint Effects of Non-Supportive Contexts on Autonomy at Time 1 and 2

	<u>F</u>	R ²	β	<u>t</u>
<u>Time 1</u>				
Overall model	121.0*****	.33		
Non-Supportive Parents			-.04	-0.56
Non-Supportive Teachers			-.27***	-3.28
Age			.18*****	7.58
Non-Supportive Parent x Age			-.08	-0.96
Non-Supportive Teacher x Age			-.18*	-2.14
DV: Autonomy				
<u>Time 2</u>				
Overall model	104.2*****	.30		
Non-Supportive Parents			-.21**	-2.49
Non-Supportive Teachers			-.06	-.62
Age			.09*****	3.87
Non-Supportive Parent x Age			.08	1.01
Non-Supportive Teacher x Age			-.39*****	-4.34
DV: Autonomy				

Note. * $p < .05$, ** $p < .01$, *** $p < .001$, ***** $p < .000$.

influence. It was found that the regression weight for Supportive and Non-Supportive teachers and children's *autonomy* was higher for elementary school children than for middle school children (see Table 77).

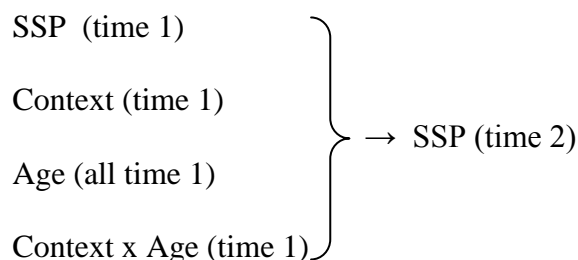
Table 77

Summary of Group Comparison Analysis Testing for the Moderating Effects of Age on Effects of Teachers on Autonomy

Context	β	t
<u>Supportive Teachers Time 1</u>		
Elementary School	.38*	8.18
Middle School	.32*	-3.28
<u>Non-Supportive Teachers Time 1</u>		
Elementary School	-.50*	-11.26
Middle School	-.39*	-8.31
<u>Non-Supportive Teachers Time 2</u>		
Elementary School	-.51*	-12.00
Middle School	-.31*	-6.11

Note. * $p < .000$.

Differential Recipient Models single context: Changes from fall to spring. Since five moderation models were found in Time 1 (Supportive parents and autonomy, Supportive teaches and autonomy, Non-Supportive parents and autonomy, Non-Supportive teachers and competence, and Non-Supportive teachers and autonomy), changes from Time 1 to Time 2 in SSPs were investigated by using simultaneous regressions (Research Question 7c).



Parents. For parents, results revealed that the interaction term (Supportive parents X Age and Non-Supportive parents X Age) was not significant. Thus, children's age did not moderate the effects of Supportive or Non-Supportive parents on changes in children's *autonomy* from fall to spring for (see Table 78).

Table 78

Summary of Regression Analysis Testing for the Moderating Effects of Age on Change in Children's Autonomy from Fall to Spring for Parents

	<u>F</u>	R ²	β	<u>t</u>
<u>Supportive Parents</u>				
Overall model	199.7*	.40		
Autonomy Time 1			.61*	25.18
Supportive Parents			-.01	-0.22
Age			-.02	0.73
Supportive Parents x Age			.06	1.02
DV: Autonomy Time 2				
<u>Non-Supportive Parents</u>				
Overall model	199.5*	.39		
Autonomy Time 1			.61*	24.08
Non-Supportive Parents			.04	0.70
Age			.02	0.70
Non-Supportive Parents x Age			-.08	-1.37
DV: Autonomy Time 2				

Note. * $p < .000$.

Teachers. For teachers, results revealed that the interaction term in the Supportive teachers and *autonomy* model and in the Non-Supportive teachers and *autonomy* model was significant. This indicates that children's age moderated the effects of Supportive and Non-Supportive teachers on changes in children's *autonomy* from fall to spring. The interaction term in the Non-Supportive teachers and *competence* model was not significant, indicating that children's age did not moderate the effects of Non-Supportive teachers on changes in children's *competence* from fall to spring. For summary of these findings see Table 79.

Since there were no model in which age was found to moderate the effects of both parents and teachers at Time 1, joint effects of parents and teachers on children's changes in SPP's from fall to spring were not investigated.

Summary for Differential Recipient Models. The Differential Recipient Models suggest that the effects of parents and teachers on children's developmental outcomes may differ based on the developmental age of the target children. These models were addressed in Research Question 7 and they were tested with a set of regression analyses. For research question 7a (Could the effects of parents and teachers on children's SSPs depend on the age of the target children?), a total of eight Differential Recipient Models was found for both Supportive and Non-Supportive social contexts. Most effects were found for children's *autonomy*, only one model was found for *competence*. No moderating effects of age were found for *relatedness*.

Table 79

Summary of Regression Analysis Testing for the Moderating Effects of Age on Change in Children's Autonomy from Fall to Spring for Teachers

	<u>F</u>	R ²	β	<u>t</u>
<u>Supportive Teachers</u>				
Overall model	202.3*****	.40		
Autonomy Time 1			.60*****	24.75
Supportive Teachers			-.13*	-2.05
Age			.01	0.61
Supportive Teachers x Age			.18***	2.90
DV:	Autonomy Time 2			
<hr/>				
<u>Non-Supportive Teachers</u>				
Overall model	150.0*****	.33		
Competence Time 1			.45*	16.47
Non-Supportive Teachers			-.10	-1.48
Age			.06**	2.50
Non-Supportive Teachers x Age			-.09	-1.37
DV:	Competence Time 2			
<hr/>				
<u>Non-Supportive Teachers</u>				
Overall model	202.7*****	.40		
Autonomy Time 1			.60*****	22.19
Non-Supportive Teachers			.15**	2.40
Age			.02	0.79
Non-Supportive Teachers x Age			-.20**	-3.18
DV:	Autonomy Time 2			

Note. * p < .05, ** p < .01, *** p < .001, ***** p < .000.

For Supportive parents, the moderating effects of children's age were found for *autonomy* at Time 1 (parents were more important to middle school children than to elementary school children). For Supportive teachers, the moderating effects of children's age were found for *autonomy* at both time points (teachers were more important to elementary school children than to middle school children).

For Non-Supportive parents, the moderating effects of children's age were found for *autonomy* at both time points (parents were more important to elementary school children than to middle school children). For Non-Supportive teachers, the moderating effects of children's age were found for (1) *competence* at Time 1 (teachers had stronger effect on middle school children than on elementary school children) and (2) *autonomy* at both time points (teachers were more important to elementary school children than to middle school children).

Three models for parents and teachers had comparable findings, therefore both contexts were combined to test joint influences for the moderating effects of children's age on *autonomy*: Supportive parents and Supportive teachers at Time 1 and Non-Supportive parents and Non-Supportive teachers at Time 1 and Time 2. It was found that (1) children's age moderated only the effects of teachers, not parents (2) teachers were more important to elementary school children than to middle school children.

It was also found that children's age moderated the effects of Supportive and Non-Supportive teachers on changes in children's *autonomy* from fall to spring.

The findings for the Differential Recipient Models are summarized in

Table 80.

Table 80

Overall Summary of Findings for the Moderating Effects of Age

	Competence	Autonomy
Supportive Parents		
Time 1		stronger for middle school
Supportive Teachers		
Time 1		stronger for elementary school change from fall to spring
Time 2		stronger for elementary school
Non-Supportive Parents		
Time 1		stronger for elementary school
Time 2		stronger for elementary school
Non-Supportive Teachers		
Time 1	stronger for middle school	stronger for elementary school change from fall to spring
Time 2		stronger for elementary school

Sequential Effects Models

The purpose of the study was to empirically test four proposed conceptual models: (a) Independent, (b) Interactive, (c) Differential, and (d) Sequential Effects

Models. This section examines the final set of models: Sequential Effects Models.

The JMCI framework suggested three possible variations of effects for the Sequential Effects Models (see Figure 7 on p. 112). The current study tested only the first type of effects: Context to Person to Context model.

This section starts with an overview of the research questions and an outline of specific steps followed for testing Sequential Effects Models. The main body of this section presents the results of statistical testing for the *context to person to context* model. The section concludes with an overall summary of the findings.

Research Questions and Steps for Testing Sequential Effects Models

A set of analyses were conducted for the *context to person to context* model, testing whether children's experiences in one social context influence children's engagement, which over time influences their experiences in another social context. Sequential Effects Models were addressed in research question 8 and its subset of questions.

Question 8. Do children's experiences with one social context influence their engagement, which, over time, influences children's experiences in the other social context?

Depending on quality of parent and teacher practices, four specific research questions were formulated.

- 8a. Do more supportive parents' interactions with their children at home lead to children's higher engagement, which, over time, lead to more supportive teachers' interactions with children in school?
- 8b. Do more non-supportive parents' interactions with their children at home lead children to be more disaffected, which, over time, result in more non-supportive teachers' interactions with children in school?
- 8c. Do more supportive teachers' interactions with students at school lead to children's higher engagement, which, over time, lead to more supportive parents' interactions with children at home?
- 8d. Do more non-supportive teachers' interactions with students at school lead to children to be more disaffected, which, over time, result in more non-supportive parents' interactions with children at home?

The *context to person to context* sequential model (*parent*→*child*→*teacher* and *teacher*→*child*→*parent*) can be thought of as a mediator model. The sequences of relationships in this model are based on changes over time. Ideally, it would require three time measurements to test a *context to person to context* model. For example, parenting practices at Time 1 could possibly influence children's SSPs at Time 2, and children's SSPs at Time 2 could possibly influence teachers' practices in Time 3. However, the data had only two time measurements. Thus, analyses tested the four requirements for the mediator model using two time measurement data. Specifically, the study investigated whether parental practices at Time 1 could influence children's engagement at Time 2, and whether children's engagement at Time 2 could, in turn, influence teachers' practices at Time 2. Similarly, the study investigated whether teachers' practices at Time 1 could influence children's engagement at Time 2, and whether children's engagement at Time 2 could, in turn, influence parental practices at Time 2.

Confirming that the mediator model is superior to the direct effects model required three conditions: (1) a significant relationship between quality of parent-child and teacher-child relationship (IV Time 1 and DV Time 2), (2) a significant relationship between child engagement and quality of teacher-child relationship (mediators Time 2 and DV Time 2) and (3 and 4) a previously significant relationship between quality of parenting Time 1 (IV) and teaching Time 2 (DV) is no longer significant or is significantly reduced when the mediator (engagement Time 2) is included in the model (Baron & Kenny, 1986).

The first requirement and the second requirement for the mediator model were tested in prior correlational analyses. To test the third and fourth requirements for the mediator model a set of hierarchical regression analyses was conducted. Four regressions were conducted, depending on the quality of the social context.

Hierarchical Regression 1:

Step 1: Supportive Parent (time 1)	}	→ Supportive Teacher (time 2)
Step 2: Engagement (time 2)		

Hierarchical Regression 2:

Step 1: Supportive Teacher (time 1)	}	→ Supportive Parent (time 2)
Step 2: Engagement (time 2)		

Hierarchical Regression 3:

Step 1: Non-Supportive Parent (time 1)	}	→ Non-Supportive Teacher (time 2)
Step 2: Engagement (time 2)		

Hierarchical Regression 4:

Step 1: Non-Supportive Teacher (time 1)	}	→ Non-Supportive Parent (time 2)
Step 2: Engagement (time 2)		

Research Findings for Sequential Models

The first requirement for the mediator model was addressed by previous analyses. Supportive and Non-Supportive parents and teachers (Time 1) were significant predictors of children's classroom engagement (Time 2). The second requirement for the mediating model was also confirmed by previous analyses: there were a significant correlations between Supportive and Non-Supportive parents at Time 1 and Supportive and Non-Supportive teachers at Time 2; and there were a significant correlations between Supportive and Non-Supportive teachers at Time 1 and Supportive and Non-Supportive parents at Time 2.

A test for the third and fourth requirements for the mediator model was conducted using hierarchical regression, testing whether a previously significant association between (1) a parent context at Time 1 and a corresponding teacher context at Time 2 and (2) a teacher context at Time 1 and a corresponding parent context at Time 2 is no longer significant or is significantly reduced when mediator variance is taken into account.

The results revealed that the mediator (children's classroom engagement) was significant in the second step of all hierarchical regressions (see Table 81 and Figure 18). At the same time, every social context that was entered in the first step of the hierarchical regressions remained significant even after *engagement* (the mediator) was included in the model. This indicated the direct additive effects of the social

Table 81
 Summary of Hierarchical Regression Analysis Testing for Sequential Effects Models

	<u>F</u>	R ²	β	<u>t</u>	Sobel z
Overall model	156.4*	.34			11.5*
<i>Step one:</i> Supportive Parent (Time 1)			<u>.34*</u>	<u>12.50</u>	
<i>Step two:</i> Supportive Parent (Time 1)			.15*	5.95	
Engagement (Time 1)			.51*	20.51	
DV: Supported Teacher (Time 2)					
Overall model	183.0*	.26			-12.7*
<i>Step one:</i> Supportive Teacher (Time 1)			<u>.36*</u>	<u>13.53</u>	
<i>Step two:</i> Supportive Teacher (Time 1)			.20*	7.33	
Engagement (Time 1)			.40*	14.99	
DV: Supportive Parent (Time 2)					
Overall model	301.2*	.46			-13.6*
<i>Step one:</i> Non-Supportive Parent (Time 1)			<u>.44*</u>	<u>17.36</u>	
<i>Step two:</i> Non-Supportive Parent (Time 1)			.20*	8.74	
Engagement (Time 1)			-.57*	-24.76	
DV: Non-Supportive Teacher (Time 2)					
Overall model	372.8*	.37			12.5*
<i>Step one:</i> Non-Supportive Teacher (Time 1)			<u>.48*</u>	<u>19.31</u>	
<i>Step two:</i> Non-Supportive Teacher (Time 1)			.28*	10.70	
Engagement (Time 1)			-.42*	-16.19	
DV: Non-Supportive Parent (Time 2)					

Note. * $p < .000$.

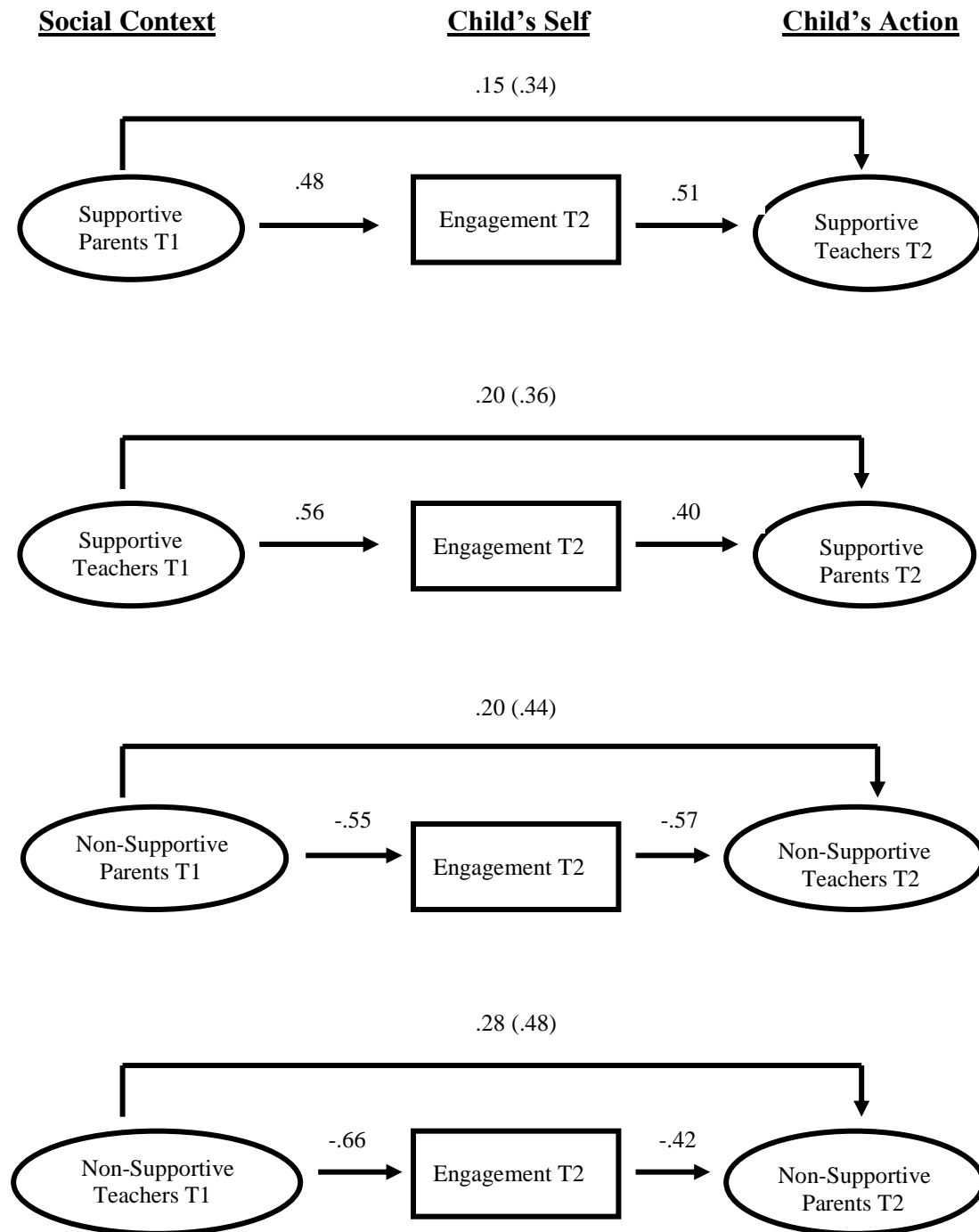


Figure 18. Sequential Effects Models: Significant paths. The values on the link between predictor and mediator are a zero-order correlations; the values on the link between the mediator and the outcome are standardized regression coefficients; the values on the link between the predictor and the outcome are standardized regression coefficients controlling for mediator (or not controlling for mediator). Regression results are also reported in Table 81

context and mediator on the outcome variables. However, there was a substantial decrease in β values for every social context in the second step of the hierarchical regressions when the variance of the mediator was accounted for by the model. The Sobel test indicated that the decrease in β values was statistically significant, providing evidence for partial mediator effects for all models.

Summary of findings for Sequential Effects Models. *Context to person to context* sequential models (*parent*→*child*→*teacher* and *teacher*→*child*→*parent*) were investigated in this study. Four models were tested for possible sequential effects. Partial mediation sequential effects were found for all four models. Results revealed that:

1. Supportive parents' interactions with their children at home at Time 1 led to children's higher engagement at school at Time 2, which, in turn, led to more Supportive teachers' practices with children in school at Time 2 (research question 8a). In addition, Supportive parental practices with children at home at Time 1 also had a direct effect on teachers' Supportive practices with children at school at Time 2.
2. Non-Supportive parents' interactions with their children at home at Time 1 led to children's higher disaffection in school at Time 2, which, in turn, led to more Non-Supportive teachers' practices with children in school at Time 2 (research question 8b). In addition, Non-Supportive parental practices with children at home at Time 1 also had a direct effect on teachers' Non-Supportive practices with children at school at Time 2.
3. Supportive teachers' interactions with their students in the classroom at

Time 1 led to children's higher engagement in school at Time 2, which, in turn, led to more Supportive parental practices with children at home at Time 2 (research question 8c). In addition, Supportive teachers' practices with children at school at Time 1 also had a direct effect on parents' Supportive practices with children at home at Time 2.

4. Non-Supportive teachers' practices with their students in the classroom at Time 1 led to children's higher disaffection in school at Time 2, which, in turn, led to more Non-Supportive parental practices with children at home at Time 2 (research question 8d). In addition, Non-Supportive teachers' practices with children at school at Time 1 also had a direct effect on parents' Non-Supportive practices with children at home at Time 2.

CHAPTER 7: DISCUSSION

This section begins with a brief summary and integration of the findings pertinent to the empirical testing of the newly developed joint multiple context influence (JMCI) framework, that consists of four conceptual models: (a) Interactive, (b) Independent, (c) Differential, and (d) Sequential Effects Models. A summary of the findings for each model is followed by an analysis of the study's limitations and a discussion of the implications of the findings for conceptualization and measurement of parents' and teachers' joint influences on children's academic outcomes. Possible interventions aimed at optimizing children's developmental outcomes are also addressed. At the end of this section, the overall utility of the JMCI framework is revisited and directions for future research are suggested.

Summary of the Findings

A primary purpose of this study was to empirically test the four newly developed joint multiple context influence models: (a) Interactive, (b) Independent, (c) Differential, and (d) Sequential Effects Models. In this section the findings for each of these models are presented. All four models were useful in providing an account of the joint effects of parent and teacher motivational support on children's academic self perceptions and classroom engagement. These conceptual models represent various ways in which social contexts possibly affect children's developmental outcomes. Four social contexts (Supportive parents, Non-Supportive parents, Supportive teachers, and Non-Supportive teachers) and four developmental outcomes for children (perceived relatedness, perceived competence, perceived autonomy, and classroom engagement) were investigated in these models. The

effects of joint influences of the social contexts on change in children's developmental outcomes from fall to spring were also examined for every model.

Interactive and Independent Effects Models

Interactive Effects Models suggest that the effects of social contexts interact with one another as they exert their influences on a developing person: the extent of influence of one context depends on the level of the other context. According to interactive models, the joint effects of social contexts are always greater than the sum of their individual influences. Consequently, combined effects of social contexts cannot be understood unless they are considered simultaneously. In contrast, Independent Effects Models suggest that each social context has its own influences on a developing person. However, the effects of these multiple social contexts are not related. Only two Interactive Effects were found in this study; the remaining models were Independent Effects (22 models). This section presents the findings from the Independent Effects Models, followed by the findings from the Interactive Effects Models.

Independent Effects Models. Findings for the Independent Effects Models were relatively clear, consistent, and uniform. It was apparent that both parents and teachers play an important role on children's academic self perceptions. All contextual influences were unique in that both parents and teachers accounted for unique variance in all SSPs and the influences of one social context did not depend on the value of another social context. It was also found that for every model, the specific nature of the unique effects was additive. This means that the effects of the contexts add up or accumulate, and the effects of one context do not cancel or

amplify the effects of the other context. Nevertheless, additive effects indicate that the variance in children's SSPs accounted for by the two social contexts was significantly different from the variance accounted for by just one context.

Parents versus teachers. It was also of interest to investigate possible similarities and differences in the amount of variance accounted for by each social context in children's SSPs. The results revealed a consistent pattern differential weightings of contextual influences for *relatedness* and *autonomy*. Specifically, parents accounted for significantly more variance in children's *relatedness* than teachers did. However, for *autonomy*, teachers accounted for significantly more variance than parents did. This pattern did not depend on the quality of parenting or teaching: regardless of whether parents were Supportive or Non-Supportive, they were more important to children's *relatedness* and, regardless of whether teachers were Supportive or Non-Supportive, they were more important to children's *autonomy*.

The amount of variance that parents versus teachers accounted for in children's perceived *competence* was not as straightforward as it was for children's perceived *relatedness* and *autonomy*. Nevertheless, there was consistency in how parents and teachers exerted their joint influences on children's perceived *competence*. When the combination of the social contexts was congruent (Supportive parents/Supportive teachers or Non-Supportive parents/Non-Supportive teachers), the difference in the amount of variance accounted for by parents versus teachers was very small and, although statistically significantly different in some models, not particularly noteworthy. In contrast, when the combination of the social contexts was

incongruent (Supportive Parents/Non-Supportive teachers or Non-Supportive parents/Supportive teachers), the Non-Supportive context within each combination accounted for more variance in children's *competence* (regardless of whether it was the parental or teacher context).

It should be noted, however, that even when parents accounted for a significantly smaller amount of variance in children's SSPs than teachers did, that amount of variance was still significant over and above the effects of parents. Similarly, when teachers accounted for a smaller amount of variance in children's SSPs than parents did, that amount of variance was still significant over and above the effects of parents.

Change over time. Although both contexts played an important role in predicting children's SSPs in concurrently, when examined for predicting changes in SSPs from fall to spring, context effects were not very uniform or consistent. First of all, the effects of parents and teachers were found only in predicting changes in children's *relatedness* and *competence*; no effects were found in predicting changes in *autonomy*. Furthermore, in some models, only one context was a predictor of change, but not the other (e.g., Supportive parents in the Supportive parents/Supportive teachers combination and *relatedness*; Non-Supportive teachers in the Supportive parents/Non-Supportive teachers combination and *relatedness*; Non-Supportive teachers in the Non-Supportive parent/Non-Supportive combination and *competence*; Supportive parent in the Supportive parent/Non-Supportive teachers combination and *competence*).

In addition, in one model, only interactive effects of parents and teachers

predicted changes in children's *competence* from fall to spring (for the Supportive parents/Supportive teachers combination). Finally, in one model, unique effects of parents and interactive effects of both social contexts were found in predicting changes in children's *relatedness* from fall to spring (Non-Supportive parents/Supportive teachers combination).

Interactive Effects Models. Although a total of eleven statistically significant interactions were found in the data, most of them did not have adequate or replicated empirical validation. Thus, the study does not have a strong case for the Interactive Effects Models and, as a result, interpretation of the findings can be challenging and problematic. This section begins by addressing the lack of empirical substantiation for the Interactive models and proceeds to the discussion of the specific nature of interactive effects in two selected models. For the discussion of the patterns of interactive effects across various combinations of social contexts, see Appendix M.

Lack of empirical validation. Most interactive effects did not meet the criteria required for basic empirical validation. First of all, in every model the percent of variance in the children's outcomes accounted for by the interaction term was rather small (it ranged from .3 percent to 4 percent). Since the effect size was very small, the question arises as to whether statistically significant interactions justify practical significance of the effects and are worth noting.

To answer this question, two factors were considered. First, even in a large sample, empirically significant interactions are hard to detect. Even a small effect size can provide insight into the phenomenon and so be of theoretical significance.

Secondly, in the current study, the effect sizes were not considerably smaller than the effects found in comparable studies. Thus, any statistically significant interaction effects found in this study are perhaps worth noting.

However, there were two additional issues that clearly undermined the validity and overall interpretability of the found interactions. First, for several interactive models, lines on the profile plots were almost parallel or positioned very closely to one another. This is indicative of very weak or trivial interactive effects. Second, most interactive models were not replicated across two time points: only three out of eleven models were replicated across time. This represents a rather important obstacle to the *statistical conclusion validity*.

When results cannot be replicated at two time points, the findings cannot be relied upon. It is possible that the interactive effects were attained due to random error in sampling and measurement. Moreover, out of the three models that were replicated across two time measurements, only one model indicated a clear presence of interaction effects when it was graphed on the profile plots (i.e., lines were not close to one another or parallel on the graph). For models to be replicated, the results have to be comparable at the two measurement points. Thus, lack of a cross-time replication and parallel or proximal position of the lines on the profile plots undermined even further the overall validity of the interactive effects findings.

It is evident that the findings do not demonstrate strong support for the Interactive Effects Models in describing the joint effects of parents and teachers on children's self-systems. Nevertheless, the study is exploratory in its nature and the interactive models that were found could be of theoretical importance. Given how

infrequently interactive effects are found or even investigated in psychological studies, the results of the current study can provide preliminary insights into the specific nature of interactive influences and may help to refine ways of conducting future research (See Appendix N for the summary of findings for significant interactions).

Two Interactive Effects Models. The two interactive models that met criteria for a substantial replication were for children's perceived *competence* in the Non-Supportive parents/Supportive teachers combination at Time 1 and Time 2. It is important to note that using the "Non-Supportive" label in interpretations of interactive effects is problematic. The "low on Non-Support parents" is a double negative expression and it can confuse the explanation of the findings. Subsequently, the "Non-Supportive" label was changed to *Negative* in the interpretations of interactive effects. This change had no implications about the overall quality of the parents and teachers.

Both models had partial dependence effects because the main effects of parents and teachers remained significant in the presence of the interactive effects. In general, the presence of interactive effects suggested that the extent of influence of one context depends on the level of the other context, and so the nature of the effects cannot be understood unless both contexts considered simultaneously. The specific nature of the interactive effects in both models was counterbalancing: Even when children had Negative parents, their competence was increasing in the presence of teachers' Support. In other words, Supportive teachers safeguarded and buffered the

effects of Negative parents. The higher on Support teachers were, the more *competent* children were.

Interestingly, the nature of counterbalancing effects in Time 1 was different than in Time 2. In Time 1, the influence of Supportive teachers was even stronger if parents were not so Negative. When parents were extremely Negative, it was difficult for teachers to offset their harmful influences. However, in Time 2, the influence of Supportive teachers was stronger if parents were extremely Negative. When parents were not so Negative, it was difficult for Supportive teachers to offset parental effects. In addition, interactive effects of Negative parents and Supportive teachers were found in predicting changes in children's *competence* from fall to spring over and above the unique effects of children's competence at Time 1. It is important to note that these findings are very preliminary and have to be interpreted with caution. Future research is needed to confirm, elaborate, and clarify the precise nature of the joint interactive effects.

Differential Effects Models

The Differential Effects Models are process oriented models which suggest possible mechanisms that link social contexts and children's developmental outcomes. Using the proposed JMCI framework, two kinds of Differential Effects Models were tested in the study: Differential Mediators Models and Differential Recipient Models.

Differential Mediators Models. The findings for the Differential Mediators Models suggested that children's SSPs (relatedness, competence, and autonomy) are possible pathways through which social contexts affect children's engagement in

school. When each social context was investigated individually, no support was found for the notion that each social context exerted its effects on children's school engagement solely by shaping their self-perceptions. However, there was strong evidence that the effects of every social context (Supportive Parents, Supportive teachers, Non-Supportive parents, and Non-Supportive teachers) were partially mediated by individual SSPs. Partial mediation suggested a two-fold nature of the effects of contexts: (1) an *indirect* effect in which each social context influenced school engagement through their effects on children's SSPs, at the same time, (2) that every social context also had a *direct* influence on children's school engagement.

Furthermore, the partial mediation models that were found for parents did not differ from the partial mediation models that were found for teachers. All models were replicated across two time points. These findings are consistent with previous research showing that parents and teachers can shape children's school performance by having an impact on their academic self-perceptions (Ginsburg & Bronstein, 1993; Glasgow et al., 1997; Steinberg et al., 1989; Wentzel, 1993, 1994).

Of special interest to this study was to examine children's SSPs as possible mechanisms mediating joint effects of parents and teachers on children's classroom engagement. Two sets of congruent contexts combinations were investigated: the Supportive parents/Supportive teachers combination and the Non-Supportive parents/Non-Supportive teachers combination. The results revealed that the effects of these combinations of social context on children's classroom engagement were mediated by every children's SSPs.

However there was a slight difference between the nature of mediating effects of *relatedness* versus *competence* and *autonomy*. Children's *competence* and *autonomy* partially mediated the effects of both Supportive and Non-Supportive combinations of contexts on children's classroom engagement. These findings were consistent for both Time 1 and Time 2. Children's *relatedness* also mediated the effects of joint social contexts on children's school engagement, but (1) for the Supportive combination, *relatedness* fully mediated the effects of Supportive parents and partially mediated the effects of Supportive teachers at both time points and (2) for the Non-Supportive combination, *relatedness* (a) fully mediated the effects of Non-Supportive parents at Time 1, but partially mediated the effects of Non-Supportive parents at Time 2 and (b) partially mediated the effects of Non-Supportive teachers at both Time 1 and Time 2. Thus, all three SSPs were mediating factors, with consistent results for *competence* and *autonomy*, and with slightly inconsistent results for *relatedness*.

In regards to SSPs mediating the effects of a single context on changes in children's classroom engagement from fall to spring, it was found that not all SSP's had mediating effects. No support was found for the mediating effects of children's *competence*. There was some support for the mediating effects of *relatedness* and *autonomy*, but the findings were not uniform and rather inconsistent across social contexts.

Children's *autonomy* partially mediated the effects of Non-Supportive parents and Non-Supportive teachers on changes in children's classroom engagement from fall to spring. Children's *autonomy* also partially mediated the influences of

Supportive parents on changes in children's classroom engagement from fall to spring. Children's *relatedness* fully mediated the influences of Supportive parents and partially mediated influences of Non-Supportive teachers. Interestingly, no mediating effects were found for Supportive teachers. In addition, no mediating effects of SSP's were found for joint contexts, predicting changes in children's engagement from fall to spring. This finding was somewhat predictable, because changes over time are usually very difficult to detect in empirical investigations especially for joint effects of social contexts.

Differential Recipient Models. The Differential Recipient Models suggested that the effects of parents and teachers on children's developmental outcomes may differ based on the developmental level of the target child. The current study investigated two different age groups: children who were in elementary school (grades three through five) and children who were in middle school (grades six and seven).

In general, it was found that both parents and teachers play an important role on children's SSPs at all ages. There was no age at which parents and teachers were not important, or for which one context was important and the other one was not. Nevertheless, a few interactions of parents and teachers with age were found in the data, suggesting that, while being important to children of all ages, parents' and teachers' influences on some SSPs were stronger for one age group than for the other. Main effects in those interactions remained significant, suggesting that the influence amount of the contexts interacted with children's age, but influences were present regardless of age.

Single context. A total of eight Differential Recipient Models were found when each social context was considered individually. It was of interest to know if the moderating effects of children's age were more likely to take place for some SSPs, but not others. It appears that children's age was most important to contextual influences on children's perceived *autonomy* (seven out of eight Differential Recipient Models were found for *autonomy*). On the other hand, children's age was not important to contextual influences on *relatedness* (no models were found for *relatedness*), suggesting that both parents and teachers are equally important to children of all ages. Only one moderating model was found for children's *competence*.

There was a consistent pattern in most models for children's *autonomy*. It appears that the effects of teachers were more frequently moderated by children's age than the effects of parents (five out of eight models were found for teachers) and, regardless of whether teachers were Supportive or Non-Supportive, they had stronger influences on elementary school children than on middle school children. The effects of Non-Supportive parents on *autonomy* were also stronger for elementary school children than for middle school children. Two models were found in which the context was more important to middle school children than for elementary school children: Supportive parents and children's *autonomy* and Non-Supportive teachers and children's *competence*.

Joint contexts. Since the moderating effects of age on children's perceived *autonomy* were found for both Supportive parents and teachers in Time 1 and Non-Supportive parents and teachers in Time 1 and Time 2, it was of special interest to

combine these contexts into one model. In all these models, the effects of parents on children's *autonomy* were not moderated by age, but the effects of teachers were. Specifically, teachers had a stronger effect on elementary school children than on middle school children. It was also found that children's age did not moderate the effects of Non-Supportive parents and teachers on changes in children's *autonomy* from fall to spring.

Sequential Effects Models

Sequential Effects Models are process oriented models that attempt to explain time-graded links between the contexts and a developing person. This study examined only one of the three Sequential Effects models suggested in the JMCI framework: the *context* → *person* → *context* model. This model suggests that children's experiences in one social context may influence their engagement, which in turn influences the children's experiences in the other social context over time. This model can be also viewed as a mediation model, in which a developing person mediates the relationship between two social contexts.

All mediating models were significant. The mediation was partial, suggesting a two-fold nature of the effects of contexts: (1) an *indirect* effect in which one social context influenced the other social context through their effects on children's school engagement, at the same time, (2) that one social context also had a *direct* influence on the other social context. In general, the study confirmed that children's engagement in school can be a mediating connection between the quality of parent and teacher contexts. This finding marks the beginning of unraveling possible

mechanisms that link the influences of social contexts on the developing child over time. Four partial mediation models were found in the data:

(1) Supportive parents' interactions with their children at home at Time 1 led to children's higher engagement at school at Time 2, which, in turn, led to more Supportive teaching practices with children in school at Time 2. In addition to these mediating effects, Supportive parenting practices with children at home at Time 1 also had a direct effect on teachers' Supportive practices with children at school at Time 2.

(2) Non-Supportive parents' interactions with their children at home at Time 1 led to children's higher disaffection in school at Time 2, which, in turn, led to more Non-Supportive teaching practices with children in school at Time 2. In addition to these mediating effects, Non-Supportive parenting practices with children at home at Time 1 also had a direct effect on teachers' Non-Supportive practices with children at school at Time 2.

(3) Supportive teachers' interactions with their students in the classroom at Time 1 led to children's higher engagement in school at Time 2, which, in turn, led to more Supportive parenting' practices with children at home at Time 2. In addition to these mediating effects, Supportive teaching practices with children at school at Time 1 also had a direct effect on parents' Supportive practices with children at home at Time 2.

(4) Non-Supportive teachers' practices with their students in the classroom at Time 1 led to children's higher disengagement in school at Time 2, which, in turn, led to more Non-Supportive parenting practices with children at home at Time 2. In

addition to these mediating effects, Non-Supportive teaching practices with children at school at Time 1 also had a direct effect on parents' Non-Supportive practices with children at home at Time 2.

Limitations of the Study

The study has three notable limitations, all which are related to measurement and design. The first limitation is concerned with the use of self-report measurements, the second with an aggregate measurement of social contexts, and the final limitation with the insufficient number of time measurement points and spacing of measurements. Each of these limitations is described and discussed with respect to the interpretations of the findings of the study and future research.

Self-Report Based Assessment

All variables in this study were measured by children's self-reports. This method of assessment is a notable limitation of this study.

Social contexts. Children's perceptions may not always correspond to what actually happens in their face-to-face interactions with parents and teachers. For example, studies indicated that the way parents perceive themselves in their parental role often does not correspond to their children's experience of parenting (Paulson & Sputa, 1996; Smetana, 1995). Children's interpretations of their own and others behaviors may be distorted and, when used alone, may be biased indicators of actual interactions with parents and teachers.

It should be noted that previous research has demonstrated that children's experiences of their interactions with parents are also important predictors of children's academic outcomes (Grolnick et al., 1991). Some researchers suggested

that children's evaluation of the quality of their social relationships may have a stronger impact on children's outcomes than evaluations of the adults involved in those relationships (Furman & Buhrmester, 1992; Smetana, 1995). For example, in terms of parental influences on children's developmental outcomes, Rohner (1986) has argued that children are affected by how they perceive and interpret parental behavior. Yet, sole reliance on children's self-reports for assessment of parents' and teachers' contexts may be insufficient.

Thus, using only children's reports for the assessment of parents' and teachers' contexts is a possible limitation of the current study. Observations in actual home and classroom settings may provide more objective descriptions of behaviors and dynamics among interacting social partners. Use of multiple reporters may also allow finding more differential effects in the complexity of social relationships.

Engagement. Measurement of classroom engagement using only child reports can be problematic as well. It has been illustrated in the psychological literature that children's reports of engagement correlate with objective performance indicators (e.g. grades) as well as with teachers' reports of engagement, suggesting that children's reports are valid at least to some extent (Connell, 1994; Glasgow, et al., 1997; Ryan & Powelson, 1991). However, children's perceptions of their classroom engagement can be biased and relying exclusively on children's reports can undermine the objectivity of the data. Including teachers' reports of children's engagement or classroom observations would provide a more accurate and precise measure of children's classroom behaviors.

Common method variance. Since all variables (social contexts, children's SSPs, and classroom engagement) were assessed using children's self-reports, data can be susceptible to common method variance. Common method variance refers to the amount of covariance shared among variables because of the common method used in collecting data (Buckley et al., 1990). Due to this common reporter variance, the covariance between constructs can be inflated. Differential Mediators Effects Models and Sequential Effects Models that address multiple links in mediator effects may be particularly vulnerable to this common method bias.

Furthermore, same-reporter/self-report measurement can contribute to the problem of multicollinearity. Specifically, there may be an overlap in how children perceive their parents and teachers. Thus, children's perceptions of one social context may be carried over to another context, which makes the measurement of the contexts highly intercorrelated. Intercorrelated contexts, when used simultaneously in the analyses, account for the same variance in dependent variables multiple times. This decreases the discriminatory and predictive power of the statistic. It is possible that more differential effects might be found with different reporters of the constructs under study.

Multiple Time Points

Another noticeable limitation of the study was an insufficient number of measurement points that would be required for testing the Sequential Effects Models. The Sequential Effects Models suggested that children's experiences in one social context influence their engagement, which, over time, influences the children's experiences in the other social context. The sequences of relationships in this model

are based on changes over time. Testing these models would require three times of measurements: a measure of one social context at Time 1, a measure of children's engagement at Time 2, and a measure of another social context at Time 3.

However, the data set had only two measurement points. The last link in the model was tested for simultaneous rather than temporal "influences." Thus, the way Sequential models were tested in this study did not correspond to the intended conceptual definition of temporal relationships among the variables. Consequently, the findings of mediating effects in the Sequential models should be interpreted accordingly. Future studies should include three measurement points in order to adequately test for sequential effects and changes over time.

It has to be noted that, although the study did not have a sufficient number of measurement points to test the Sequential Effects Models, use of two time points in the study was a general strength not a limitation. Even two times of measurements provided a stronger empirical validity to the overall findings of the models tested in comparison to the single time point design that is traditionally used in research. There is virtually no study in the psychological literature to date that has examined change over time in parents' and teachers' interactive influences on children's academic outcomes. Therefore, the longitudinal design of this study is a considerable strength.

In addition to the number of measurement points, there was also a problem with spacing of measurements. One measurement was taken at the beginning of the school year and the second measurement was taken at the end of the year. However, to better understand the nature of the process, process analyses should space multiple

measurements in order to keep pace with the process. For example, it would be more appropriate to use weeks or even days as time measurement intervals to better understand how children's engagement or disaffection in classroom setting can possibly link parents' practices at home and teachers' practices at school. Only such proximal time measurements could allow a study to detect reinforcing or counterbalancing loop mechanisms that possibly govern the dynamics of the parent-child-teacher system.

Parent and Teacher Aggregate

This study used an aggregate of positive and negative practices for the assessment of social contexts. Specifically, positive aspects of the three bi-polar dimensions of parenting and teaching were combined to form a Supportive type of social context (warmth, structure, and autonomy support), while negative aspects of the three bi-polar dimensions (rejection, chaos, and coercion) were combined to form a Non-Supportive type of social context.

Structurally, these two aggregates of positive and negative practices were two distinguishable constructs of parenting and teaching. Although structurally sound, these Supportive and Non-Supportive aggregates may lack functional specificity of the dimension-specific approach. Any kind of aggregate approach to measurement inevitably diminishes the discriminatory and explanatory power of prediction: (1) it is difficult to point out which specific parents' and teachers' practices, and to what extent, affect children's outcomes and (2) it is also more difficult to explain precisely why and how the process of influence takes place. The dimension-specific approach can complement and enhance the use of the aggregate approach by possibly

revealing more distinctive and unique influences. All the limitations of this study should be kept in mind, as the next section discusses the implications of the findings.

Implications of the Results

Findings from this study have implications for measurement and conceptualizations of parents' and teachers' joint influences and for identifying the pathways through which parenting and teaching practices shape children's academic motivation and performance. This section starts with a discussion of general implications of the study and proposed JMCI framework. Next, the findings for each of the four joint effects models suggested in the JMCI framework (Interactive, Independent, Differential, and Sequential Effects Models) are summarized and their implications for future empirical work and possible interventions aimed at optimizing children's school performance are discussed.

General Contribution of the Study and JMCI Framework

Several decades of psychological research have established that the quality of parent-child and teacher-child relationships plays an important role in how well children perform in school. Although these relationships have been extensively investigated in research, traditionally, each context was examined in isolation. Hence, very little is currently known about the combined influences of both parents and teachers on children's academic successes.

The main contribution of the current study is in bringing together two social contexts - parents and teachers - which were previously studied separately, and examining their combined effects on children's academic motivation. The findings from this study contribute to the growing body of knowledge regarding the ways in

which multiple social contexts interact with one another, forming a system which shapes children's academic success. What makes this study so unusual is that it examined parents, teachers, and children as one unit, as a system, employing approaches, tools, and insights from the discipline of Systems Science.

The most significant contribution of this project was in developing a more comprehensive framework of joint multiple contextual influences (JMCI framework) that is (1) general enough to be applicable to various contexts and various developmental outcomes, and at the same time (2) specific enough that it can provide clear and detailed guidelines for future empirical investigations. This framework contains four models of joint effects: *cumulative*, *interactive*, *differential*, and *sequential*. These models provide a descriptive and refined account of how parents and teachers could express their combined influences on children's academic outcomes. The models reflect the complexity of these influences to an extent not seen in prior research and theory.

The contribution of the JMCI framework is also in offering a systematic, point by point guide for empirical investigations, which can lead to more complete and precise findings. The JMCI framework can potentially unify empirical findings at various levels of analyses and provide guidelines for investigation of joint contextual influences, specifying the nature of underlying mechanisms, processes, and functional principles describing how the contexts operate together. Use of this conceptual framework can prevent a wide range of inconsistencies, contradictions, and a great deal of confusion in empirical findings which currently exists in psychological literature.

In addition, the four models proposed by the JMCI framework are so general and systemic that they can be applied not only to parents and teachers, but also to other social contexts, such as peers or siblings. This framework could also be useful in designing intervention studies, which can provide specific suggestions for what parents, teachers, and other social partners can do to optimize children's developmental outcomes.

Implications for the Interactive Effects Model

Although a total of eleven statistically significant interactions were found in the data, most of them did not meet the basic criteria to justify practical significance of the found interactive effects. Only two Interactive Effects Models were found in the data that met criteria for a substantial replication: children's perceived *competence* in the Non-Supportive parents/Supportive teachers combination at Time 1 and Time 2. Furthermore, significant joint interactive effects of Non-Supportive parents and Supportive teachers were found in predicting changes in children's *competence* from fall to spring.

Incongruent contexts. First of all, it is important to note that the Interactive Effects Models were found for the incongruent combination of social contexts (Non-Supportive parents/Supportive teachers). In general, incongruent combinations generated more statistically significant interactions than congruent combinations. Although most interactions were not supported by the study, they still may be insightful in understanding interactive influences of joint social contexts. Thus, one possible explanation for this finding is that, when two social contexts are of a different quality (e.g., one context is Supportive and another is Non-Supportive),

their joint influences may be more intricate and complex and this complexity may lead to interactive effects. However, the incongruent Non-Supportive parents/Supportive teachers combination generated more statistically significant interactions than the incongruent Supportive parents/Non-Supportive teachers combination. Thus, it is possible that it is not the incongruence per se, but rather a specific incongruent combination of the contexts that is more predictive of interactive effects.

Competence. The fact that the interactive Effects Models were found only for children's *competence* may also be of importance. Interestingly, children's *competence*, in comparison to other SSPs, had the most statistically significant interactions. This possibly suggests that children's perceived *competence* itself is predictive of interactive effects. Then, the question arises: what sets *competence* apart from other SSPs? It is possible that children's perceived *competence* is a more complex, multifaceted psychological construct than the other SSPs. Competent children are more likely to engage in a wide range of more complex and adaptive behaviors than those who are less competent. These complex behaviors, in turn, may elicit actions and influences from their parents and teachers that are more interactive in nature.

For example, it has been shown in the psychological literature that competent children are more motivated to learn, more likely to approach their parents and teachers, engage in conversations, ask for help, and elicit stronger support from their social partners (Birch & Ladd, 1997; Bowen & Bowen, 1998; Deci et al., 1991; Goodenow, 1993; Grolnick & Ryan, 1989; Herman et al., 1997; Marchant et al.,

2001; Roeser et al., 1996; Ryan et al., 1994; Skinner & Belmont, 1993; Steinberg et al., 1992; Wagner & Phillips, 1992; Wentzel & Asher, 1995; Wentzel, 1997). It is possible that, as Supportive teachers foster children's *competence*, children find more effective strategies and better solutions to cope with the stress of Non-Supportive parenting that they experience at home. Competent children themselves may elicit a more interactive and complex set of behaviors from their social partners.

On the other hand, children who are low on *competence* due to experiencing a Non-Supportive climate at home may behave in the classroom in a way that signals to attentive and Supportive teachers that these children need extra help and attention. Children who are low on *competence* may be still engaged in their studies, but come across as timid, hesitant, and in need of encouragement. Supportive teachers, capable of recognizing such children, may attend to them in a way that counterbalances the effects of the Non-Supportive environment these children have at home.

Specific nature of Interactive effects. Two Interactive Effects Models were found for the Non-Supportive Parents/Supportive teachers combination and children's *competence* at both time points. The specific nature of the interactive effects in the two models has theoretical and practical implications. For clarity of the explanation of the nature of the interactive effects, Non-Supportive parents will be referred to as Negative parents in these models.

The interactive effects in both models were counterbalancing: children of Negative parents had an increase in *competence* if their teachers were Supportive. In other words, Supportive teaches safeguarded and buffered the effects of Negative parents. The higher on Support teachers were the more *competent* children were.

Interestingly, the nature of counterbalancing effects was different in Time 1 and Time 2 points.

Time 1: At the beginning of the school year. When parents were *highly* Negative, even teachers *low* on Support had a strong positive effect on children's *competence*. It appeared that when children experienced *high* levels of stress and hostility in their home, even teachers *low* on Support were of great importance to such children's *competence*. However, the higher on Support teachers were, the less effect they had on those children. To put it differently, the increase in children's perceived *competence* took place at a decreased rate if children had highly Negative parents. When parents were highly Negative, it was difficult for even highly Supportive teachers to offset their harmful influences. Although Supportive teachers could buffer the effects of extremely Negative parents, they could do it only to a certain point. Indeed, the overall counterbalancing influence of Supportive teachers was stronger if parents were *less* Negative. Children of *highly* Supportive teachers and *less* Negative parents had the highest scores on *competence*.

Time 2: At the end of the school year. By the end of the academic year, the pattern of teachers' influences was reversed. Supportive teachers did not have strong buffering effect on children who had less Negative parents. Supportive teachers could not improve those children's *competence* to the same extent as they did at the start of the academic year. By the end of the year, Supportive teachers had stronger effects on children of *highly* Negative parents. It is as if *less* Negative parents were not "bad enough" for Supportive teachers to have a noticeable counterbalancing effect on children's *competence*. It appears that there is almost a threshold that

determines the counterbalancing dynamic in this system. At the end of the year, if parents were above the threshold (i.e., *highly* Negative), Supportive teachers could counterbalance their effects. If parents were below the threshold (i.e., not so Negative), Supportive teachers could not safeguard those negative effects to the same extent they did for children of less Negative parents; the pattern was reversed for the beginning of the year. Indeed, the overall counterbalancing influence of Supportive teachers was stronger if parents were *extremely* Negative. Children of *very* Supportive teachers and *very* Negative parents had the highest scores on *competence*.

Thus, the findings for these two *counterbalancing* models can be summarized as follows:

(1) Supportive teachers had a counterbalancing effect on children's competence, if children had Negative parents,

(2) However, the effects of Supportive teachers at the beginning and the end of the academic year varied, depending on whether parents were highly Negative or not so Negative:

(a) At the beginning of the year, even *highly* Supportive teachers were limited in how much they could buffer the negative influences of Negative parents; parents should be at least not too Negative for highly Supportive teachers to facilitate a significant improvement in children's competence.

(b) However, by the end of the academic year, Supportive parents meant the most to children who had extremely Negative parents: The higher

on Support teachers were the stronger buffering effect they had on children's competence.

These findings have rather important implications for psychological research and theory. This study is one of the first of its kind to use a systemic approach to empirical investigation. It is clear from the findings that influences of parents and teachers on children's outcomes cannot be understood fully if examined separately. The results confirmed that a child, parent, and teacher form a system and in order to understand this system in its totality, the interconnectedness of all the components of the system should be considered simultaneously. The findings for the two *counterbalancing* models illustrated that, when all the parts of the system are considered simultaneously, a new entity emerges whose essence cannot be decomposed into a simple sum of its parts.

Furthermore, the findings suggest that children's Negative experiences in one context make the quality of relationship in the other context even more important, based on the ability of that context to buffer and counterbalance the effects of the Negative context. Interestingly, the data suggested that the nature of the counterbalancing effects may also depend on time: contextual influences in the beginning of the year may vary from those at the end of the year. Thus, the joint effects of two contexts are not always straightforward and additive and the outcomes depend on various conditions and combinations of factors.

For example, caring and supportive teachers can safeguard against the adversity that children experience at home only to a certain point. Although teachers play a very important role in facilitating children's optimal competence, at times they

cannot do it alone. At the start of the academic year, there is a ceiling effect to teachers' influences: supportive and caring parents also have to be present in children's lives in order for children to develop self-competence. However, by the end of the year, after prolonged exposure of teachers' Support, children from extremely Negative homes benefit the most from caring, structured and autonomy supportive interactions with their teachers. It is possible that children, who come from extremely disadvantaged homes, must have a consistent and long term exposure to the teachers' Support in order for that Support to have a counterbalancing effect. Indeed, children of the most Negative parents benefit most from teachers' consistent and long term Support.

These findings have important implications for school and home settings. Both parents and teachers should be aware of the nature of their joint influences on children's self-perceived competence. Programs aimed at developing a collaborative partnership between parents and teachers should be considered by appropriate agencies. Both social partners should be encouraged to work together in order to create and sustain a consistent supportive environment in both the home and school settings. A set of specific tools and strategies intended to optimize children's academic performance and general psychological well-being should be identified and implemented in such programs.

Additionally, this finding can have important implications for educational settings. If even a below average teacher can have a positive impact on children who come from highly non-supportive homes, then the power of teachers' influences is rather astounding. This is not to suggest that less than optimal or average

performance of teachers should be encouraged or tolerated, but to illustrate how important and vital teachers' influences can be and what a remarkable contribution they can have on children who are at risk at home.

It is of great value to educators to know that children who come from disadvantaged and stressful home environments where they are deprived of proper care can bounce back and succeed academically if they experience genuine, consistent care and supportive interactions with their teachers at school. This study suggests that teachers can be a fundamental support factor that facilitates resilience in children who are exposed to adversity in their homes.

This finding has a practical application within immediate school settings and even academic policy making. Various intervention programs should be considered and implemented, aiming at (1) raising teachers' awareness that they can safeguard against adversity that children experience at home and assist in the development of children's healthy self-perceptions, (2) helping teachers to identify children who come from non-supportive homes and ensure the provision of support and care to these children at school, and (3) training teachers to facilitate and sustain supportive, face-to-face interactions with children in their immediate classroom settings.

It is important to note that all findings for these two Interactive Effects Models are very preliminary and must be used with caution. Future research is needed to confirm, elaborate, and clarify the precise nature of the joint interactive effects.

Implications from the Findings for Independent Effects Models

In addition to illustrating that joint influences of parents and teachers may occasionally interact in their influences on children's outcomes, the current study also provided strong evidence that parents and teachers can exert their influences independently from one another; that is, effects of the contexts add up or accumulate. This section elaborates on potential implications of this finding, presented in the following order. First, general implications of findings for the Independent Effects Models will be noted. Then, the influences of parents versus teachers will be discussed. The contextual influences on change over time in children's outcomes will be reviewed at the end of this section.

General implications of the findings for Independent Effects Models. The study clearly indicated that that both parents and teachers play an important role on children's academic self perceptions. Joint contextual influences of congruent and incongruent combinations of Supportive and Non-Supportive contexts were unique and additive in their nature. In addition, when parents accounted for a significantly smaller amount of variance in children's SSPs than teachers did, that amount of variance was still significantly over and above the effects of parents. Similarly, when teachers accounted for a smaller amount of variance in children's SSPs than parents did, that amount of variance was still significantly over and above the effects of parents.

The findings of joint contextual independent effects have rather significant implications. The implications are twofold and to some extent paradoxical: on one hand, additive joint contextual effects can be disadvantageous to children, but, on the

other hand they can be quite beneficial to children's outcomes. To elaborate, if the effects of parents and teachers are independent, it means that they cannot counterbalance each other and the Supportive context cannot make up, compensate, or overwrite the negative effects of the Non-Supportive context. Empirical findings suggested that children who are exposed to the adversity of harsh, punitive, and hostile parenting, cannot be rescued by supportive caring teachers. Similarly, supportive loving parents cannot safeguard their children from the adversity of poor teaching styles. Thus, the disadvantage of the joint independent additive effect is in the absence of counterbalancing effects on children who need them the most.

On the other hand, absence of counterbalancing effects can be considered good news. Specifically, if parents and teachers make independent additive contributions in their joint influences, then the Supportive context is always beneficial and favorable to children's outcomes, regardless of how negative and unsupportive the other context is. Interestingly, in interactive effects, a Supportive context does not automatically imply safeguarding influences; the effects of Support may depend on various factors within the interaction. Although Support is a good thing, its positive effects are not a guarantee in the interactive effects models, but a gamble, at least to some extent. However, when effects are independent and additive, Supportive contexts are always beneficial and advantageous to children's outcomes; they do not depend on the effects of the Non-Supportive context. Even in the presence of the highly Non-Supportive context, the effects of the Supportive context are maintained and have a positive effect on the child. This can be beneficial to children's developmental outcomes.

There is another disadvantage of the independent additive joint influences: effects of one context cannot amplify effects of the other context. There is no positive reinforcing loop in the dynamic of influences; the effects do not magnify each other and, therefore, children cannot benefit from the well known idea in academic literature that the “rich get richer” or the Matthew effect. Thus, if children have both Supportive parents and Supportive teachers, they cannot take full advantage of what two positive contexts have to offer when their influences are amplifying in nature.

On the other hand, absence of amplifying effects can be a good thing when both contexts are Non-Supportive. If Non-Supportive influences cannot magnify each other, then children do not experience the “poor get poorer” side of the Matthew effect. If children have two Non-Supportive contexts, the negative influences of these contexts are not reinforcing each other. Although two negative contexts cannot offer buffering effects and children have to find a source of support outside of the parent and teacher interactions, the good news is that these two negative contexts do not amplify each other either. In the midst of adversity, absence of amplifying negative effects can be advantageous to children’s developmental outcomes.

Thus, a critical contribution of the findings is in the suggestion that empirical investigation would benefit from targeting parent and teacher contexts together. If taken one at a time, each context cannot adequately account for the full range of children's experiences with their social partners. When parents and teachers are

examined simultaneously, they provide more precise representations of contextual influences on children's outcomes than when studied alone.

Parents versus teachers. It was also of interest to investigate possible similarities and differences in the amount of variance accounted for by each social context in children's SSPs. The results revealed a consistent pattern of contextual influences for *relatedness* and *autonomy*. Specifically, parents accounted for significantly more variance in children's *relatedness* than teachers did. However, for *autonomy*, teachers accounted for significantly more variance than parents did. This pattern did not depend on the quality of parenting or teaching: regardless of whether parents were Supportive or Non-Supportive, they were more important to children's *relatedness* and, regardless of whether teachers were Supportive or Non-Supportive, they were more important to children's *autonomy*.

The current study illustrated empirically that when parents' and teachers' effects are considered simultaneously, each context accounts for unique variance in children's SSPs. The study also suggested that parents and teachers vary in their influences on children's SSPs: regardless of whether parents were Supportive or Non-Supportive, they were more important to children's *relatedness* and, regardless of whether teachers were Supportive or Non-Supportive, they were more important to children's *autonomy*.

This is a rather important finding that suggests that parents, as primary caregivers, are instrumental in satisfying children's need to belong. It is in day-to-day interactions with their parents that children learn whether they are valuable and important, if they are appreciated and loved. Cumulatively, these experiences with

parents can foster or undermine children's perceptions of *relatedness*. Over time, this self-perception of *relatedness* becomes an internal resource that children possibly carry into other social settings, like school, and use to encourage their academic performance and motivation.

On the other hand, teachers are potentially more important influencing children's need for *autonomy*. It is possible that being in classroom settings children learn how to work by themselves, how to make their own decisions, solve problems, and be independent and unique individuals. These consistent day-to-day experiences possibly shape children's self perceptions of *autonomy*. One of the contributions of the study is to suggest that the development of self-perceptions of *relatedness* and *autonomy* are differentially weighted: parents are more influential to children's perceptions of *relatedness* and teachers are more influential to children's perceptions of *autonomy*.

The amount of variance that parents versus teachers accounted for in children's perceived *competence* was not as straightforward. For congruent contexts (Supportive parents/Supportive teachers or Non-Supportive parents/Non-Supportive teachers), the difference in the amount of variance accounted for by parents versus teachers was very small and not particularly noteworthy. For incongruent contexts (Supportive Parents/Non-Supportive teachers or Non-Supportive parents/Supportive teachers), it was the Non-Supportive context within each combination that accounted for more variance in children's *competence* (regardless of whether it was the parental or teacher context).

These findings, which linked children's SSPs and specific combinations of social contexts, are an important step toward understanding the nature of social interactions and the complexity of joint influences. These findings are an important preliminary step toward recognizing the details and specifics in joint contextual influences on children's developmental outcomes.

These findings provided empirical support of the idea that when parents and teachers are considered simultaneously, they account for unique variance in children's outcomes and therefore should be targeted together in psychological research. The contribution of the current study is in providing empirical evidence that the traditional context-specific approach, which investigates one context at a time, is reductionistic and cannot adequately account for the complexity of joint social influences. This study's findings redirect the course of contemporary research towards a more systemic approach, confirming that both parents and teachers should be considered simultaneously, as a system, in empirical studies in order to obtain a more accurate and explicit depiction of contextual influences.

Change over time. Although both contexts played an important role in children's SSPs concurrently, when examined for predicting changes in SSPs from fall to spring, the effects were not very uniform or consistent. First of all, the effects of parents and teachers were found only in predicting changes in children's *relatedness* and *competence*; no effects were found in predicting changes in *autonomy*. Furthermore, in some models, only one context was a predictor of change, but not the other. In other models, only interactive effects of parents and teachers predicted changes in children's *competence* from fall.

From this longitudinal finding it appears that joint influences of parents and teachers could have long lasting effects on children's outcomes. It is important for parents and teachers to know that their interactions with children shape not only the way children view themselves at the present time, but also the way children will perceive themselves later in life. It is possible that children carry these perceptions across various situations and settings and these perceptions may define the quality of new experiences that children have with their social partners as well as the course of their development.

This longitudinal component of the study contributed to a better understanding of influences that occur within the parent-teacher-child system over time. It appears that joint influences of parents and teachers could have lasting effects on children's outcomes and are not uniform in their nature. The contribution of the longitudinal findings of this study is in demonstrating the continuity of social influences over time. It is important for parents and teachers to be aware that they influence not only the way children view themselves at the present time (in moment to moment, face-to-face interactions), but that these influences can last over extended periods of time, perhaps even years to come. Thus, this study provided insight as to how parents and teachers jointly direct and shape the course of children's development over time.

Implications from the Findings for Differential Effects Models

Although it has been well established in current research that parents and teachers play an important role in shaping children's developmental outcomes, very little is known about how these influences are transmitted. Even less is known about

the mechanisms and psychological processes that contribute to joint contextual influences. One of the purposes of this study was to test possible mechanisms that link social contexts and children's developmental outcomes. The JMCI framework suggested Differential Effects Models to describe such mechanisms. The Differential Effects Models are process oriented models. They were subdivided into two categories: Differential Mediators Models and Differential Recipient Models. In this section, the implications of findings for the Differential Mediators Models will be presented first, followed by the implications of findings for the Differential Recipient Models.

Differential Mediators Models. The findings for the Differential Mediators Models suggested that all children's SSPs (relatedness, competence, and autonomy) are possible pathways through which social contexts affect children's engagement in school. Almost all models demonstrated partial mediation: each social context exerted its effects on children's school engagement not only by shaping children's self-perceptions, but also through a *direct* influence of each social context on children's school engagement.

These findings of partial mediation effects were consistent for single and combined contexts and were present at both time points. In addition, the mediating models for parents did not differ from the mediating models for teachers. These findings are consistent with existing research showing that parents and teachers can shape children's school performance by having an impact on their academic self-perceptions (e.g., Connell, 1990; Connell, 1994; Deci & Ryan, 1991; Deci et al., 1991; Estrada et al., 1987; Ginsburg & Bronstein, 1993; Glasgow et al., 1997; Steinberg et al., 1989; Wentzel, 1993, 1994). This study provided further empirical

support to better understand *how* and *why* parents and teachers transmit their influences on children's developmental outcomes.

Although all three SSPs were mediating factors, there was a slight difference for children's *relatedness*. *Relatedness* fully mediated the effects of Supportive parents at both time points and of Non-Supportive parents at Time 1. Even more notably, children's *relatedness* fully mediated the influences of Supportive parents in predicting changes in children's engagement from fall to spring. This is a rather important finding as it possibly suggests that the effects of parents are more pronounced on the self system of *relatedness* and that parents have more lasting effects on children's perceived *relatedness*, in comparison to other SSPs. It appears to be logical that parents are a primary source of children's perceived *relatedness* and that children rely more on their parents than teachers to know that they are loved, safe, belong, and valued in their social setting. It is possible that perceived *relatedness* becomes a more stable internal resource that children carry across contexts and, over time, perceived *relatedness* becomes predictive of children's level of engagement in school.

In regards to SSPs mediating the effects of social contexts on changes in children's classroom engagement from fall to spring, no support was found for the mediating effects of children's *competence*. There was some support for the mediating effects of *relatedness* and *autonomy*. This is a rather significant finding, because the mediating effects on changes over time in children's outcomes are difficult to detect. The contribution of the longitudinal findings of this study is the suggestion that parents and teachers could have lasting effects on children's

relatedness and autonomy. The findings provided empirical support for the continuity of social influences and better understanding of temporal influences in the mediation models.

Overall, the findings for the Differential Mediators Models represent an important first step towards understanding and unraveling the mechanisms, processes, and functional principals through which multiple contexts potentially operate together to influence children's school engagement. The findings indicated that children are active participants in their interactions with parents and teachers. Children perceive, organize, and transform their experiences into cognitive representations or self-perceptions, which over time become their internal resources. These internal resources, in turn, are used by children in their classroom settings to foster or undermine their academic engagement.

Despite the fact that the exact nature of the mediating processes in a parent-teacher-child system needs further empirical investigation, the insights provided by this study can be used to develop a more comprehensive theoretical framework of the mechanisms and processes underlining joint contextual effects. The findings of the current study may also be useful in designing intervention studies aimed at optimizing children's school performance. Parents and teachers should be well informed that their daily interactions with children at home and in the classroom setting may have a direct effect on how children perceive themselves and that these self-perceptions, in turn, affect the quality of children's engagement in school. In order to optimize children's academic engagement, parents and teachers may have to adopt different strategies and ways of interacting with children. For example,

teachers and parents may place emphasis on increasing *warmth*, *structure*, and *autonomy support* in their interactions with children and decreasing *hostility*, *chaos*, and *coercion* in order to optimize their children's academic self-perceptions.

Differential Recipient Models. The Differential Recipient Models suggested that the effects of parents and teachers on children's developmental outcomes may differ based on the developmental level of a target child. Children of two developmental levels were investigated in this study: children who were in elementary school (grades three through five) and children who were in middle school (grades six and seven).

In general, it was found that both parents and teachers play an important role on children's SSPs at all ages. There was no age at which parents and teachers were not important, or for which one context was important and the other one was not. Nevertheless, while being important to children of all ages, parents' and teachers' influences on some SSPs were stronger for one age group than for the other.

First of all, influences of parents and teachers on children's *relatedness* were not affected by the children's age. This possibly suggests that children's perceptions of *relatedness* are a more fundamental and basic cognitive representation of self, which is affected by social interactions independently from age. Parents' and teachers' interactions with children may facilitate or undermine children's basic need to belong, to be accepted, and to be loved, which, in turn, facilitates or undermines children's self perception of relatedness. Since the need to belong is important to any developmental age, contextual influences on perceptions of *relatedness* could be also independent from age.

Among all SSPs, children's age mattered the most to the effects of Non-Supportive parents and both Supportive and Non-Supportive teachers on children's perceived *autonomy* and the influences were more important to elementary school children than to middle school children. This finding is rather puzzling, because it is known that developmentally, autonomy is more important to older children (Eccles, et al., 1991, Steinberg & Silverberg, 1986).

The findings possibly suggest that development of the self-perception of being autonomous in an academic setting, feeling free to make one's own decisions, to be unique and different from others forms during elementary school and at that age children are more vulnerable to the effects of parents and teachers. By middle school, children's sense of academic autonomy may have been formed, to at least some extent, and therefore influences of parents and teachers are less pronounced for that age group. It is also possible that peers become very important to middle school children's sense of autonomy and the effects of parents and teachers, although still significant, are just less important to this age group than they were for elementary school children.

Furthermore, two models were found in which social contexts were more important to middle school children than for elementary school children: Supportive parents and children's *autonomy* (Time 1) and Non-Supportive teachers and children's *competence* (Time 1). It is important to note that the moderating effects of age were not replicated across both measurement points for these two models. When models cannot be replicated across time, this may be indicative of a problem with the *statistical conclusion validity* and, as a result, such models should be interpreted with

caution. On the other hand, the fact that most models were found for one time measurement, but not the other, may in itself be an indication of temporal differences that should be explored further.

For example, it is possible that Non-Supportive teachers have more negative effects on perceived *competence* for middle-schoolers in the fall (at the beginning of the school year) when children are still in the process of adjusting to the transition from elementary school to middle school. It is known that such transitions are objectively stressful for children (Hartos & Power, 1997; Mac Iver & Epstein, 1991; McEwin, 1998). It is possible that Non-Supportive teachers are more influential in such stressful times to children's sense of *competence*. However, children gradually familiarize themselves with the school routine and by the second half of the academic year the effects of Non-Supportive teachers may be less instrumental.

It is also possible that, if children had Supportive teachers in their elementary schools but they start middle-school with Non-Supportive teachers, it creates incongruence with their previous experiences and possibly makes their adjustment to middle school more stressful and challenging. As a result, children's perceptions of *competence* can be undermined. It also makes sense that Supportive parents would be very important to children's sense of autonomy while they are in this stage of transition, especially if children have no Support from their teachers at school.

Finally, when the effects of Non-Supportive parents and Non-Supportive teachers were considered simultaneously, only the effects of teachers mattered to the elementary school children. Although children's age was a moderator in the Non-Supportive parent model, the moderating effects of age for Non-Supportive parents

became insignificant when Non-Supportive teachers were added to the model.

This is another important illustration of how the effects of social contexts can not be understood accurately unless they are examined simultaneously as a whole. When taken alone, each context has its own influences, but when combined into one system, a qualitatively new entity emerges which was not observable when the contexts were examined independently.

One possible explanation for this leading role of teachers is that, when children enter elementary school, they spend just as much (if not more) time interacting with their teachers as they do with their parents; as a result, teachers become more important to their children's sense of *autonomy* at this age. Younger children may also need more caring supervision and clear guidance from their teachers (even more so than from their parents) in order to feel autonomous in the classroom setting. If teachers are Non-Supportive, it has a significant undermining effect on elementary school children's sense of *autonomy*. It is possible that for children of this age to successfully carry out their classroom tasks and responsibilities and to develop a self perception of being unique, independent, and autonomous individuals, teachers' genuine care and support are essential. Interestingly, teachers' Non-Support may be not as crucial for middle school children.

It was also found that children's age moderated the effects of Supportive and Non-Supportive teachers on changes in children's *autonomy* from fall to spring. This finding was rather important, because the moderating effects of age on changes in children's outcomes across time are very difficult to detect even in a large sample. It

suggests the continuity of teachers' influences throughout the course of an academic year for the elementary school children.

Implications from the Findings for Sequential Effects Models

Sequential Effects Models are also process oriented models that attempt to explain time-graded links between the contexts and a developing person. The study examined only one of the three Sequential Effects Models suggested in the JSMI framework: the *context to person to context* model. The *context to person to context* model can be thought of as a mediation model, in which a person (child) plays a role of a mediator. According to this model, one social context (e.g., parent) affects the developing person (e.g., child's engagement) and, over time, the developing person affects another social context (e.g., teacher). Similarly, a teacher affects the child and the child, over time, can influence the parent.

The study examined *context to person to context* mediating effects using a longitudinal design. In fact, "effects" in sequential models imply changes over time. The sequential effects cannot be fully understood within a concurrent time point; they have to be examined through multiple time measurements. Sequential effects are probably one of the most ignored effects in research on joint influences of multiple contexts.

The findings suggested that children's engagement may be a mechanism that mediates the relationship between parents' and teachers' contexts. It appears that children's engagement is an action that the child carries back and forth from home to school and back home, linking these two social contexts. All models had partial mediation effects, meaning that in addition to the mediating effects of engagement,

the quality of one context in the fall had a direct effect on the other context in the spring. Specifically, the Supportive context in the fall was linked to children's higher engagement at school in the spring; in turn, children's engagement led to more Support in the other context. Similarly, the Non-Supportive context in the fall was linked to children's lower engagement at school in the spring; in turn, children's low engagement led to more Non-Support in the other context. In addition, there was a direct effect between the two social contexts: more Support or Non-Support at home was linked to more Supportive or Non-Supportive teaching at school and more Support or Non-Support at school was linked to more Supportive or Non-Supportive parenting at home.

These findings suggest that teachers in the classroom setting possibly treat students differently depending on students' level of engagement (Skinner & Belmont, 1993). Similarly, at home, parents treat children differently depending on whether children are doing well or poorly at school. Thus, children's engagement may elicit certain responses from their parents and teachers, and these responses, over time, shape children's developmental outcomes.

It is important to note that all measurements of the contexts and engagement were based on children's perceptions. Thus, sequential effects are all taking place within the children's heads, so to speak. Understanding how children form those perceptions can provide additional insight into the findings. For example, previous research suggested that children can form their perceptions of social interactions not based on people's actual behaviors, but rather on the principle of *transference* (e.g., Paulson et al., 1998; Ryan & Grolnick, 1986; Stiller & Lynch, 1994).

According to this principle, children's perceptions of their teachers may be influenced by their experiences at home and vice versa. For example, children who have more positive interactions with parents at home may form a belief that people are in general kind and supportive and, as a result of this belief, they perceive their teachers more positively. If children's experiences with parents are negative, they may form a general belief that social interactions are unpleasant and stressful and, as a result, may perceive their teachers more negatively.

Children may carry these beliefs, or internal working models, into the classroom setting and perceive their teachers through these positive or negative filters. It means that children's perceptions of their teachers may not be based solely on teachers' actual behaviors. It is important for teachers and parents to be aware of this potential bias in children's social cognition and the mechanism of transference that takes place. With this awareness parents and teachers can help children to learn new ways of appraising their social interactions and constructing more objective representations of their social partners.

Thus, the dynamic between children's cognitive processes, their engagement and quality of social interactions can be rather complex, and the current study took an important step toward understanding the mechanisms involved and the nature of this complexity. However, the study provided only preliminary findings and the precise nature of the mechanisms and mediating processes is still largely unknown and not well understood. Future studies should investigate various psychological processes that children use to develop their perceptions of social interactions, especially attending to the principle of *transference* as one possible psychological

mechanism. Furthermore, there may be a set of reinforcing and counterbalancing feedback loop mechanisms that govern the dynamic of the relationships between the social partners. These mechanisms have to be addressed in future research in order to understand the nature of the sequential effects.

Summary of Key Points

The findings and implications of the study are complex and multifaceted. The purpose of this section is to condense the specific findings of all four models into a user-friendly summary. This section integrates numerous details into core patterns and essential points. The overarching picture of all four models is also presented at the end of this section.

Joint Independent Models. In general, joint influences of parents and teachers on children's SSPs are independent of one another. The effects add up or accumulate; they do not cancel each other out and they do not amplify one another.

Disadvantages when the Contexts are Incongruent

(1) “Good” contexts cannot overwrite “bad” contexts. The Supportive context cannot compensate for or safeguard from the negative effects of the Non-Supportive context. Children who are exposed to the adversity of harsh, punitive, and hostile parenting cannot be rescued by supportive and caring teachers. Similarly, supportive and loving parents cannot rescue children from the adversity of poor teaching styles.

In the Non-Supportive parents/Supportive teachers combination, children's *relatedness* and *competence* are more at risk than their autonomy. In the Supportive parents/Non-Supportive teachers combination, children's *autonomy* and *competence*

are more at risk than their relatedness. Children's *competence*, in comparison to other SSPs, is more at risk in incongruent combinations because *competence* is always undermined more by the Non-Supportive context than it is fostered by the Supportive context.

(2) “Good” contexts cannot amplify “good” contexts. There is no positive reinforcing loop in the dynamic of Supportive parents' and Supportive teachers' influences; the effects do not amplify each other. The effects of one *good* context cannot make the effects of other *good* context even better. Thus, children's SSPs cannot benefit from a “rich get richer” effect.

Advantage when the Contexts are Incongruent

(1) “Bad” contexts cannot overwrite “good” contexts. The Supportive context is always beneficial and favorable to children's outcomes, regardless of how negative and unsupportive the other context is. Even when children's SSPs are undermined by a Non-Supportive context, they are still sustained and fostered, at least to some degree, by a Supportive context. It appears that children are capable of distinguishing between supportive and non-supportive experiences they have with their parents and teachers and they compartmentalize those experiences in separate schemas and use them accordingly in the corresponding contexts.

(2) “Bad” contexts cannot amplify “bad” contexts. Non-Supportive influences do not magnify each other. The effects of one *bad* context cannot make the effects of other *bad* context even worse. Thus, children are not experiencing a “poor get poorer” effect.

One exception: Interactive model for competence. Non-Supportive parents and Supportive teachers had counterbalancing joint influences on children's *competence*.

Advantage. Caring and very supportive teachers can safeguard against the poor quality of parenting that children experience at home and foster children's *competence*. It is especially true for the children of not very Negative parents at the beginning of the school year and for children of extremely Negative parents at the end of the school year.

Disadvantage. (1) At the beginning of the school year, if parents are extremely harsh, punitive, and insensitive, even highly Supportive teachers cannot counterbalance or repair the damage of harmful parental influences on children's *competence* to the same extent that they do for children of not so Negative parents. (2) At the end of the year, if parents are not very Negative, even highly Supportive teachers cannot counterbalance parental influences on children's *competence* to the same extent that they do for children of highly Negative parents. Sadly enough, these children cannot benefit from the very thing that they need the most, teachers' Support.

It is important to note that, although Supportive teachers cannot add anything positive to children's *competence* or buffer children's *competence* from the negative parenting effects, Supportive teachers is still beneficial to children's *relatedness* and *autonomy* in this incongruent combination of social contexts. For those SSPs the effects of parents and teachers are unique and additive. Therefore, teachers' Support is independent from negative influences of parents and always beneficial to

children's *relatedness* and *autonomy*.

Differential Mediator Models. Both parents and teachers typically express the same goal; they want children to be engaged in schooling. Thus, the key question is how to achieve this goal. Findings from the Differential Mediator Models explain a possible pathway that can lead to this goal: parents' and teachers' daily interactions with children at home and in the classroom have a direct effect on how children perceive themselves; these self-perceptions, in turn, affect the quality of the children's engagement in school. The sequence of influence is the same for parents and teachers. Thus, SSPs are multiple pathways to engagement. Relatedness had a more central role in mediating the effects of Supportive parents on engagement than it did for other quality of social contexts. In addition to indirect influences on engagement, parents and teachers also have direct effect unmediated effects on how well children do at school.

Differential Recipient Models.

Core finding 1. Parents and Teachers are important to the SSPs of children of all ages. There was no age for which both parents and teachers were not important, or for which one context was important and the other one was not.

Good News. There is no critical period for the effects of parents and teachers on the development of children's SSPs. Parents and teachers cannot put a child at risk by missing that critical time.

Bad News. Children of all ages need their parents and teachers for optimal development of all SSPs. So, every age is a sensitive age and lack of parents' and teachers' support can undermine optimal development of children's SSPs. This is

especially true for children's *relatedness*, because the effects of parents and teachers were equally important to all ages for this SSP.

Core finding 2. While important to children of all ages, parents' and teachers' influences on some SSPs were stronger for one age group than for the other.

(a) In general, parents and teachers mattered more to children's *autonomy* during elementary school than middle school. This is a very important finding, because *autonomy support* may be ignored by parents and teachers for children of this age. Given that elementary school children are so young, parents and teachers may focus more on affection, supervision, structure, control, rules and regulations and focus less on supporting children's freedom to make their own choices, form their own opinions, and direct the course of their own actions. It appears that the groundwork for fostering children's autonomy and independence starts at an early age.

(b) When Non-Supportive parents and Non-Supportive teachers were considered simultaneously, only the effects of teachers mattered to the elementary school children. This is an indication of the centrality of the teachers' role in shaping *autonomy*.

Core finding 3. There were two SSPs for which social contexts were more important at the transition to middle school. The beginning of the school year is objectively stressful to children, because they are adjusting to the transition from elementary to middle school. In this transition, children's *autonomy* benefits more from parental Support and children's *competence* is more vulnerable to the

negative effects of Non-Supportive teachers.

Sequential Models. When there are two interacting social settings, home and school, the question arises: What factors and processes link these systems together in space and time? It appears that the child himself/herself carries back and forth influences of social interactions from one setting to another: from home to school and from school back home. Specifically, it is children's actions, or engagement, that mediates the relationship between parents' and teachers' contexts, linking these social contexts together. In addition to mediating effects of engagement, the quality of one context has a direct effect on the quality of the other context.

Overall picture. Parents and teachers had unique independent effects on children's SSPs. In general, the nature of parents' influences did not differ from teachers' influences, although parents were more important to *relatedness* and teachers were more important to *autonomy*. The effects of parents and teachers were important to children of all ages. For autonomy, parents and teachers were more important to elementary school children. The influences of parents and teachers on children's engagement in school were partially mediated by children's SSPs. It was children's engagement that linked the two social contexts together in time (see Figure 19).

Although no interacting contextual influences were found concurrently, process models that addressed influences over time indicated a possibility of multiple amplifying and counterbalancing loops running the dynamics of this complex system, which must be explored in future research.

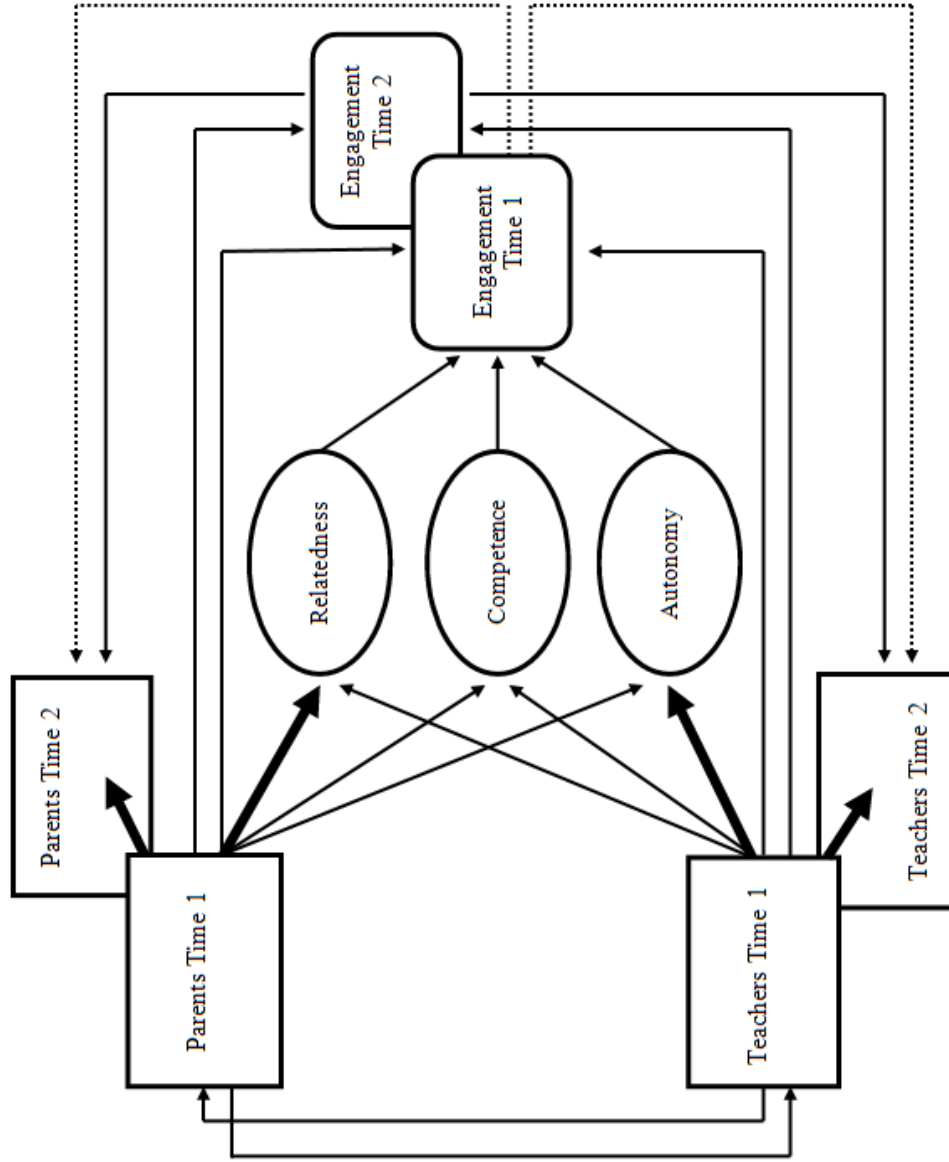


Figure 19. Motivational model of context, self and action, based on the findings of the study; solid lines, are significant paths, dashed lines are proposed paths

Reevaluation of the Proposed JMCI Framework

The proposed project aimed to accomplish three goals: (1) to develop the joint multiple contexts influences framework JMCI; (2) to test empirically the JMCI framework; and (3) following the empirical investigations, to reexamine the clarity and value of the JMCI framework. This chapter elaborates on the third goal of the project. It reevaluates and reexamines potential contributions and weaknesses of the proposed framework revealed after utilizing it as a guide for carrying out statistical analyses in this study.

Contributions of the JMCI Framework

This study confirmed that the framework is useful in guiding analyses and interpreting the findings in the models under study. The JMCI framework makes an important contribution to the investigation of contextual influences. When used in future studies it: (1) provides criteria for data selection and collection, (2) facilitates more systematic statistical analyses, (3) leads to more comprehensive interpretation of findings, and (4) suggests the utility of wider applications within the field of psychology and possibly even in other relevant disciplines.

(1) Criteria for data selection and collection. The JMCI framework provides specific criteria for the kind of data required to maximize the effectiveness of empirical investigations. For example, when joint effects are under study, the framework suggests that measurements of social contexts should be *comparable*. If measurements are not comparable, it cannot be determined whether the presence or absence of effects is due to actual influences or due to discrepancies in measurements. If future studies meet this measurement comparability criterion, it

would lead to more uniform findings that are easier to integrate across different studies.

The framework suggests two types of comparability that should be considered in empirical investigations: source and attributes. *Source* comparability refers to the reporters of the data. Since there are multiple possible reporters (parents, teachers, and children), for social contexts to be comparable, they have to be measured by the same reporters. For example, the teacher and parent constructs are not comparable if the quality of parenting is measured by parent report and the quality of teaching is measured by child report. *Attributes* comparability refers to consistency in measurement of social contexts. If items measuring the quality of parenting differ from the items measuring the quality of teaching then empirical comparability of the constructs is jeopardized.

Moreover, the JMCI framework specifies the type of data that would be required to examine joint effects models. For example, for two types of sequential models, *context to context to person* and *person to context to context*, items measuring parent and teacher contexts have to be derived from conceptual definitions in which the contexts influence one another. Furthermore, sequential models consist of time-graded links between contexts and a person. In order to test these links within a mediator model, ideally the data should have three measurement points.

(2) More systematic statistical analyses. The JMCI framework offers a well-organized criterion and a systematic, point by point guideline for empirical investigation, which would contribute to more comprehensive and precise findings.

It provides a template or a map which allows researchers to follow distinct sequential steps in the process of statistical testing (this tool is also known as a *decision tree* in systems science literature). Specifically, the JMCI framework provides a systematically organized range of decision making options which are "mutually-exclusive" (i.e., the presence of one type of joint effects rules out the presence of others) and "collectively-exhaustive" (i.e., the sum of the framework's individual models encompasses all possible joint contextual influences) (Delp et al., 1977).

The starting point or the base of this *decision tree* consists of very general and more overarching options, which branch out in sequences of more specific empirical investigations. For example, according to this map or *decision tree*, Interactive Effects Models should be tested first (see Figure 9 on p.157). If an interaction is significant, more specific models of *interaction* effects and their respective subsets of models are tested. Depending on whether the main effects are significant or not, two categories of *interactive* models are possible: partial or complete. If main effects are significant, it suggests the presence of partial dependence models. Thus, the subset of partial dependence models (amplifying, boosting, diminishing, and counter-balancing) should be tested. If main effects are not significant, it suggests the presence of complete dependence models. As a result, the subset of complete dependence models (activating, buffering, compensating, and immunizing) should be tested. All testing is done in a concurrent time measurement, and if found to be significant, influences on changes over time in children's outcomes are tested.

If no support for interaction effects is found, the *Independent Effects Models* should be tested. Depending on whether the main effects are significant, two categories of *independent* effects are possible: unique and substitutive effects. If main effects are significant, it suggests the presence of unique effects models. Thus, the subset of unique effects models (congruent and incongruent) should be tested. If at least one main effect is not significant, it suggests the presence of substitutive effects models. Thus, the subset of substitutive models (alternative contexts and alternative pathways) should be tested. All testing is done in a concurrent time measurement, and if found to be significant, influences on changes over time in children's outcomes are tested.

Although the Differential and Sequential Effects Models are not linked statistically with Independent and Interactive Effects Models, they have their own subcategories of models. They are tested from the most general to more specific models. This *decision tree* provides a systematic, point by point guide for statistical testing. Such a precise procedure would contribute to more thorough and comprehensive findings.

Each of these proposed models can be thought of as a discrete level of analyses under study with corresponding sub-categories of models. The four proposed models of the JMCI framework (Independent, Interactive, Differential, and Sequential Effects Models) reflect the complexity of possible relationships between parents, teachers, and a developing person, and they specify the focus and level of testing for empirical investigation. In addition, the strengths of one model are designed to compensate for the limitations of another, cumulatively offering a more

inclusive and explicit account of multiple contextual influences and providing a theoretical foundation for systematic empirical investigation.

(3) More comprehensive findings. When the JMCI framework is used to guide empirical investigations, it leads to more comprehensive and systemic discoveries, compared to prior studies on joint effects. The reason for this is that the JMCI framework consists of more complex and dynamic models, which cumulatively address the phenomenon of joint influences to an extent not yet considered by existing research or theory. The JMCI framework (a) explores the complexity of joint influences and how these influences shape change over time, (b) investigates specific structures, relevant mechanisms and processes through which these influences are carried, and (c) organizes these structures and mechanisms into a coherent empirically testable set of models.

Compared to traditional research and theory which have been criticized for their inability to "to see the forest and the trees" (Senge, 1990), the JMCI framework, while focusing on specific details, aims not to lose sight of the whole. Traditionally, researchers simply pick one or two of their favorite "trees" and focus their full attention on them. Even when they step back, they still see multiple trees rather than the forest of which they are part. They miss, as Senge puts it, "the forest for the trees." The JMCI framework is designed to incorporate both: (1) essential details, and (2) mindfulness about the whole. Thus, it examines both forests and the individual trees that comprise them. Such a framework, when used for empirical investigation, would inevitably lead to more comprehensive and accurate findings.

Thus, the JMCI framework provided not only very useful step-by-step guidelines for future empirical investigations, but it has the potential to organize both existing and future research in a more cohesive, comprehensive, unified, and well-organized system of empirical findings and theoretical propositions. The *decision tree* should be implemented in future research as a useful tool to add new pathways or options for empirical investigations or prune paths that are no longer empirically valid and sound.

(4) Multiple applications. The JMCI framework can have multiple applications. The framework was developed based on the notion that parent-teacher-child relations are a system. The framework identifies structures, principles, and interrelations which are so general and systemic that they can be applied not only to parents and teachers, but also to other social contexts, such as peers or siblings. This framework could also be useful in designing intervention studies, which can provide specific suggestions about what parents, teachers, and other social partners can do to optimize children's school performance.

The framework could be also used to study joint effects of more than two social contexts (e.g., parents, teachers, siblings, and friends). Extending the use of the framework to other social partners (or microsystems) can be thought of as an application *within* the system's focal level of perception. The JMCI framework also can be applied *between* the hierarchical levels of perception of the system. While it could be applied to the level directly above this immediate system, it can also be applied to the many levels that exist above the system under examination, thus shifting the focal level accordingly. If applied at the levels above the focal system,

joint influences of neighborhoods, social institutions, or overall culture can be investigated. Similarly, this can be applied to the many levels that exist below the current focal point of perception. If applied at the levels *below* of the focal point of perception, one possibility is an examination of joint influences of specific parent and teacher practices (e.g., warmth, rejection, provision of structure, chaos, autonomy support, and coercion).

Furthermore, given that the JMCI framework is so general and designed not to be context specific, it can be adapted to any psychological phenomenon that involves multiple contextual influences. For example, the framework can be adopted to study joint influences of family and work settings on employee job performance or joint influences of family and hospital staff on cancer patients' recovery. It is also possible that the JMCI framework can be applied to studying joint contextual influences in other relevant disciplines such as sociology, anthropology, education, social work, or political science.

Potential Limitations

One of the purposes of this project was to detect possible limitations and to improve the proposed JMCI framework based on what was learned from the statistical analyses. It was expected that the use JMCI framework to guide the examination of specific contexts in a data set would provide feedback in regards to the utility and comprehensiveness of the JMCI framework. Although the study generally supported the usefulness of the JMCI framework, this section reevaluates the JMCI framework, focusing on some possible shortcomings and making suggestions for future work on the framework.

Statistically weak models. All models in the JMCI framework have strong conceptual justifications to be a distinct representation of a specific type of joint contextual influences on developmental outcomes. However, the analyses and empirical findings did not confirm the presence of all categories and subcategories of models suggested in the JMCI framework. For example, some subcategories for the Interactive and Independent Effects Models in the *decision tree* were not confirmed by the data. Most interactive effects did not satisfy basic statistical criteria to justify practical significance of effects.

Furthermore, the Interactive Effects Models that were found were *partial dependence* models; not even one *complete dependence* model was found in the data. In addition, out of the four suggested types of *partial dependence* models (amplifying, boosting, diminishing, and counterbalancing) only one type of effects was found in the data: *counterbalancing*. Similarly, for Independent Effects Models, there was only empirical support for *unique* effects models; no *substitutive* effects models were found in the data. For the Sequential Effects Models, testing was performed only for one out of four suggested models: *context to person to context*.

One possible reason for the discrepancy between the empirical findings and proposed conceptual models is that the models are not as different and distinct as the framework suggests them to be. Future research is needed to verify the usefulness of some models as being distinct. Combining some models together may be a reasonable consideration for future research. It is also possible that, conceptually, the models are credible and well defined, but empirically other strategies (such as the use of extreme groups, cluster analyses to detect configurations or profiles of

combinations, or multigroup comparisons using structural equation modeling) are better suited to detect them.

It is important to note that, because some suggested models were not found in the current study, it does not substantiate that the effects they represent are absent in actual social interactions. The findings of one study are not sufficient to make conceptual modifications and reconsider the structural classification of the JMCI framework. Future studies have to be mindful of any inconsistencies between empirical findings and conceptual models suggested in the JMCI framework. More empirical testing is needed in order to further reevaluate, clarify, and redefine, if needed, the proposed framework.

Additional models. The proposed JMCI framework claims to be "collectively-exhaustive," meaning that it encompasses all possible categories and types of joint contextual influences. However, it is highly likely that additional models exist that were not anticipated by the framework. Given the complex and dynamic influences within the parent-teacher-child system, it is also possible that the JMCI framework categories of models are not uniform, but have their own subtypes or subcategories.

If social contexts are decomposed below a focal point level, it is possible that the nature of contextual influences at that level can be explained by a set of new models. For example, the effects of specific parenting and teaching practices may differ depending on children's personal characteristics. When teachers encourage interactive group work in their classroom, children, who are socially outgoing and get energized by working with other children, would benefit from this practice.

However, the same practice could have the opposite effect on children who are timid, shy, or introvert. Such children may experience nervousness and anxiety when asked to interact with other children and, as a result, their academic performance declines. Similarly, it is possible that some parenting practices can be simultaneously beneficial and undermining, depending on the fit with a child's temperament and personality.

In addition, parents' and teachers' influences can be setting-specific. For example, expression of parental warmth and affection is beneficial when expressed in a setting in which children feel comfortable receiving it (e.g., home). However, when parents express affection in front of peers, a child may feel uncomfortable or embarrassed and, as a result, experience parental affection unfavorably. This response may be more prevalent in older children and especially boys. Thus, it is possible that the same parental practices can be beneficial in one setting but adverse in the other.

These effects are known as *disordinal* interactions in empirical literature. Only ordinal interactions were suggested by the JMCI framework, predicting that combined parents' and teachers' influences produce greater or lesser effects. However, if contexts are decomposed to a lower level of perception within the parent-teacher-child system, it is possible that the effects of social contexts on children's outcomes can be opposite, depending on the level of the other variable under study. In contrast to amplifying and counterbalancing effects, *disordinal* influences have not been widely addressed in the psychological literature; therefore, this category of effects should be treated with caution.

Thus, future research should attend to the possibility of uncovering new subcategories of effects and models not currently included in the JMCI. As suggested above, one direction for expanding the JMCI framework is to consider factors below the focal level of the social partners on developing children. In this regard, the importance of the perspective of the child versus an outside observer may be especially salient: The idea is that the actual behavior of the social partners (as determined by observations) may produce different subjective experiences (as reported from the child's perspective) depending on the attributes of the child or specific social settings in which the behaviors are enacted.

Furthermore, Sequential Effects Models are the least empirically explored models; therefore they have the most potential to be subdivided into new effects-specific and process-specific categories. Future research should be mindful about these new possible classifications.

Integration of findings. The current study illustrated usefulness of the proposed JMCI framework in guiding empirical investigation. The framework is effective and efficient in directing statistical analyses, using step-by-step progressive instructions, indicating pathways and decomposing relations within the system to specific mechanisms and processes. Given that four proposed models were intended to address most properties of the parent-teacher-child system, the findings of the empirical investigation are numerous, multifaceted, not uniform, and at times inconsistent

At the same time, however, while writing up the summary of the findings from the current study, it became evident that the proposed framework, although

successful at guiding empirical investigation, does not provide means for integrating the findings into a cohesive whole, nor does it assist in identifying or better understanding any new properties which emerge as a result of the system's interacting components.

In other words, the JMCI framework guides researchers in decomposing the system, but it provides little direction about (1) how to integrate the smaller units (subsystems), which comprise the system under study into the larger unit (supra-system or environment), (2) how those merging subsystems function together as a comprehensive, new-level system quality, that is (a) irreducible to the sub-system's parts and (b) not directly traceable to the sub-system's components. To identify this emerging property would be even more challenging if, in addition to parents and teachers, peers and siblings are also included under study and multiple time points are also accounted for.

In short, the JMCI framework is useful for analysis, but not for synthesis. Future work on the framework could benefit from a consideration of systems principals which describe attributes of the whole, and specifies how different combinations of interacting components may contribute to the creation of those attributes. Also useful may be ecological theories that focus on mesosystem properties, and data analysis strategies, such as configural analyses, typologies, or person-centered analyses, that allow for the identification of patterns.

Future Research

The current study constitutes an important first step toward understanding and unraveling the complexity of multiple contextual influences. It attempted to answer

such important questions as: Do children's relationships with parents relate to the quality of the relationships that children establish with their teachers? Do the effects of one social context simply add to the effects of another context? Does the quality of children's relationships with their parents interact with and modify the type of relationships that children develop with their teachers? If home and school are governed by different rules and have different qualities and characteristics, how do children adapt to the differences and navigate the transitions?

The JMCI framework provided a more general and comprehensive theoretical and empirical guide for understanding and answering these questions. However, the models and processes in a parent-teacher-child system suggested in the JMCI framework need further empirical investigation. This section begins with suggestions for future research based on the strengths and limitations of the present study. It focuses on improvement of assessments and additional considerations for testing parents' and teachers influences on children's self-system processes and classroom engagement. This section also makes general suggestions for future research, discussing the importance of alternative mediation models, reciprocal effects, and additional interaction partners.

Expanding Current Findings

The current study indicated that both parents and teachers are important to children of all ages. However, it was found that Non-Supportive teachers were more important to (1) *autonomy* of elementary school children and (2) *competence* of middle school children. In addition, Supportive parents were more important to *autonomy* of middle school children. Although these findings are very interesting, it

is not clear what parents' and teachers' practices and to what extent influenced these outcomes. Future studies could investigate specific aspects of teaching and parenting (e.g., provision of clear rules and regulations, expectations, autonomy support, encouragement, coercion, hostility, and affection), identifying practices that are more important to children of one age and less important to another age.

Furthermore, the current study indicated the presence of interactive effects for the Non-Supportive parents/Supportive teachers combination and children's *competence*. In future research, it may be useful to select children from congruent social contexts (Supportive Parents/Supportive teachers and Non-Supportive parents/Non-Supportive teachers) and incongruent social contexts (Supportive parents/Non-Supportive teachers and Non-Supportive parents/Supportive teachers) and link each combination of the social contexts with a specific SSP. Such approach can be helpful in finding out if some combinations of social contexts are (1) better predictors of SSP's and (2) more likely to interact in their joint influences on children's outcomes.

It would be also valuable for future research to follow up specific joint interactive effects that predict change over time in children's outcomes. For example, joint effects of Supportive parents and Supportive teachers on children's *competence* were independent, when examined concurrently; however, when examined across two time points, they were interactive. Similarly, the effects of Non-Supportive parents and Supportive teachers on children's *relatedness* were independent, when examined concurrently; however, when examined across two time points, they were interactive. The current study did not investigate the specific nature of these

interactive over time effects. It is possible that joint effects of two Supportive contexts are amplifying across two time points and joint effects of two incongruent contexts are counterbalancing. Future research could focus on identifying the specific nature of interactive effects of social contexts when they predict over time in developmental outcomes.

Assessment

Parent and teacher contexts. Quality of social contexts in this study was measured by using an aggregate approach. Three positive aspects of parenting and teaching (i.e., warmth, structure, and autonomy support) were combined to form a Supportive quality type of social context, while three negative aspects of parenting and teaching (e.g., rejection, chaos, and coercion) were combined to form a Non-Supportive quality type of social context. It is possible that use of aggregate measure diminished the discriminatory and explanatory power of prediction. It is difficult to specify which parental and teaching practices. A specific parenting dimension approach may provide a more detailed and precise conceptual and empirical model of parenting and teaching and boost the discriminatory and explanatory power of statistics. Thus, future studies should consider a specific dimension approach as an alternative measurement of parenting and teaching. Further examination of the effects of the six uni-polar dimensions on children's outcomes seems warranted. Comparing and contrasting the findings from dimension versus aggregate approaches could also lead to more refined and accurate models of social influences.

Furthermore, future studies, instead of combining all positive and all negative practices of a social context, should focus more on patterns of parenting and

teaching. For example, in future research, every parent and teacher could be characterized by a score on each of the three positive and three negative polarities of the dimensions and a more differentiated and precise profile of each parent and teacher could be created. Based on similarities in such profiles, future studies could attempt to depict various parenting and teaching styles, which would allow for more refined explanations of which dimensions (or combinations of dimensions) are linked to the respective child outcomes.

Alternatively, individual differences in children's self-perceptions can be used as a basis for identifying clusters of optimal versus poor parenting. For example, researchers could select children with highly adaptive self-system processes and children who have maladaptive self-system processes and evaluate which parenting and teaching practices distinguish between these groups of children. Linking different profiles of children's SSPs with various combinations of Supportive and Non-Supportive parenting and teaching practices could provide a useful way of understanding interactive influences of social contexts.

In addition, future studies should consider children's ages when measuring social contexts. It is possible that for children of certain ages, an aggregate or typology approach to measurement of social influences may be a better predictor of developmental outcomes and for children of different ages, a specific dimension approach may be a better predictor of the same outcomes.

Measures of mothers and fathers. In the present study the effects of both mothers and fathers on children's self-system processes and engagement were combined together in to one predictor. It is possible that mothers and fathers may

have different effects on children's outcomes, therefore joint effects of mothers and fathers (as distinct predictors of children's academic outcomes) should be addressed in future studies. It is possible that the effects of mothers and fathers on children's self-perceptions are not independent, but additive or even interactive. Examining the effects of mothers and fathers separately will allow identification of possible unique, compensatory, or interactive joint parental influences. Children who don't have both parents can also be investigated in future research.

Furthermore, instead of averaging parental effects across individuals, future studies could focus on differences in parenting practices within each family. For example, future research could verify whether families in which both parents are mostly characterized by positive dimensions have children with more adaptive self-system processes, compared to families in which both parents are mostly characterized by negative dimensions, or in which one parent's characterized by negative and another by positive dimensions. In addition, it is important to investigate whether the positive parenting of one parent could compensate for the negative parenting of another parent. For example, future studies could examine whether bad fathering does not have negative effects if mothering is satisfactory.

Reporters. All variables in this study (predictors and outcomes) were measured via children's self-report. Some researchers suggest that children's evaluations of the quality of their relationships may have a stronger impact on children's outcomes than evaluations of the adults involved in those relationships (Furman & Buhrmester, 1992; Smetana, 1995). Yet, sole reliance on children's self-reports may be insufficient.

Future studies could use parents' and teachers' reports to measure quality of parenting and teaching. One of the advantages of using parents' and teachers' reports in future studies is that they can supplement findings of research based on children's reports of parenting and teaching (Grolnick et al., 1991). By using parents' and teachers' reports, the future studies could confirm that the relationship between joint effects of parents and teachers on children's developmental outcomes are not due to common reporter variance.

However, use of parents' and teachers' reports could be also problematic because parents' and teachers' perceptions of their practices and quality of interaction with children may be biased. For a more complete depiction of the parenting and teaching processes, future studies should take the perspectives of all interacting partners into consideration. In addition, future research could explore whether parents' and teachers' perceptions of their practices are an antecedent of the children's perceptions of parents and teachers, and whether children's perceptions in turn mediate the relationship between parents' and teachers' experiences and children's self-system processes.

It is also known that children's and adults' reports do not always concur with descriptions of observed behavior. Thus, there is also a need to complement existing findings with observational data. Future studies could include the assessment of children's actual interactions with parents and teachers, by using direct home and classroom observations as a more objective measure of parenting and teaching. Including multi-source and multi-method data collection will allow for empirical examination of the links and the discrepancies between objective and subjective

measurements of social contexts and children's developmental outcomes.

Finally, there are specific suggestions about the reporters of the data: (1) it may be more desirable to have multiple reporters of the constructs under study; and (2) some constructs may be better measured by one type of reporter than another. For example, since there are three possible reporters (parents, teachers, and children), it may be important to include each reporter's measurements of as many constructs as possible in order to obtain multiple perspectives on the phenomenon under study. If measurements obtained from all three reporters are reliable and statistically comparable, the selection of the strongest predictor is a possible option.

However, if measurements of constructs differ, depending on who the reporter is, there are two possible solutions: (1) aggregation of constructs across reporters or (2) selection of the reporter who is the most conceptually suitable for the measurement of that construct. For example, children, compared to parents and teachers, may be better reporters of their self-system processes, because self-system processes represent children's internal beliefs about themselves. However, teachers may be better reporters of children's classroom engagement because they observe children's behavior on a daily basis and therefore can depict it more accurately than could the children or their parents.

Students' engagement. Future studies may wish to expand on measures of children's engagement. It is important for future studies to investigate the possible differences between children's behavioral and emotional engagement in school. Children who demonstrate behavioral engagement in the classroom may be

disengaged emotionally. For example, they may feel bored, anxious, or even angry. These negative emotions can eventually lead to behavioral disengagement.

It would be important for future research to investigate whether there is a difference in how self-system processes, as well as quality of parenting and teaching, affect children's behavioral versus emotional engagement in school. It should be noted that, although teachers could be more accurate in reporting children's behavioral engagement, it would be essential for future studies to use children's report of emotional engagement, because children are more in touch with their emotional state than outside observers. Thus children's reports of the emotional component of engagement would be a more valid measure of children's classroom motivation. Furthermore, future research should include classroom observations as more objective measures of children's behavioral engagement in classroom setting.

Mediating and Moderating Mechanisms

It was found in the present study that self-system processes are one mechanism that explains the link between parents' and teachers' practices on children's school engagement. It is possible that SSPs are not only a link to children's school engagement, but to a wide range of other developmental outcomes. Future studies could test the suggested mediating process with other outcomes such as social competence at school, educational goals, expression of creativity, popularity among peers, or coping with academic failure or social conflict.

Furthermore, self-system processes are not the only possible mechanism which could explain the relationship between parenting and teaching practices and children's school performance. Other possible mediators, not encompassed by this

model, should also be considered in future studies as possible motivating resources that link contextual influences to children's outcomes: children's academic values, self-restraint, school interest, aspirations, mastery, and performance orientation could also be investigated in future.

The current study also examined children's age as a possible factor that moderates the contextual influences on children's motivation. It was found that the effects of Supportive and Non-Supportive parenting and teaching sometimes differ for children of different ages. In addition to a typology approach, future studies can use a dimension approach to verify whether children's age moderates the effects of specific parent and teacher practices. For example, parents' and teachers' *warmth* and *structure* could be more important for the development of adaptive self-perceptions in younger children, while parents' and teachers' *autonomy support* might become more important as children reach adolescence. Similarly, the effects of parenting dimensions may differ depending on children's gender. The same parenting and teaching dimensions may influence boys and girls differently.

Future studies could also explore other personality or behavioral characteristics of the child, such as ethnic background, maturity level, mental age, resilience, language ability, pro-social attitudes, or social skills, as additional possible moderating factors. These personal characteristics and tendencies may not only promote competence and a sense of relatedness and autonomy, but also elicit positive feelings and attitudes from teachers and parents. Therefore, these personal characteristics of children can play an important role in the dynamics of relationships

within a parent-teacher-child system and they should be investigated in future research.

In addition, parents' and teachers' personal characteristics and attitudes also can be investigated in future research as possible antecedents of quality of interaction with children. For example, sets of beliefs that parents and teachers have about their roles or attributions that they make about children's behaviors can be important predictors of the quality of support that parents and teachers provide to children at home and in the classroom setting. In addition, stress levels, which parents and teachers experience in their lives, as well as their ability to cope with the stress, also can be examined in future studies as possible antecedents of the quality of social interactions with children.

Longitudinal and Reciprocal Effects

The current study included a longitudinal design in order to clarify the predictors of differential change over time and the causal ordering between variables. The longitudinal design adds credibility to the findings, because studies based on designs that are correlational in nature cannot make causal conclusions about their findings. However, not all longitudinal findings in this study were conclusive. Therefore, it is important for future research to include multiple time measurements and to continue to explore the nature of Sequential influences. For example, the Sequential Effects Models suggested in the JMCI framework cannot be fully understood within a concurrent time; they have to be examined through multiple time measurements. Two measurement points, as used in the current study, were not sufficient for proper testing of the *context*→*person*→*context* Sequential model. Future

studies should include at least three time measurements for Sequential effects testing. Three time points would allow for testing *context*→*context*→*person* and *person*→*context*→*context* Sequential Effects Models, as suggested in the JCMI.

It is also valuable to explore in more detail reciprocal effects of children's school performance on the quality of parenting and teaching over time within the parent-child and the teacher-child system. For example, hostile and coercive parenting may lead to children's lower academic engagement. Over time, children's poor performance in school can lead to further increases in parental hostility and coercion. Thus, a reinforcing feedback loop mechanism may be established within the system. Future studies can explore at what point such a mechanism would have to stabilize, change, or even possibly collapse and what the factors contribute to such a dynamic. Furthermore, it is possible that when parents use coercion and hostility, pressuring their children into academic success, children may improve their academic performance, at least temporarily. This would indicate a counterbalancing feedback loop mechanism within the parent-child system. However, most likely this mechanism would not be very sustainable over time.

These changes over time within micro systems (i.e., parent-child and teacher-child micro systems) should be explored in future research. Identifying various patterns and dynamics (e.g., temporal sequences of feedback loops) can help to better understand the complexity of longitudinal influences and continuous and discontinuous changes they have on children's outcomes. Combining overtime influences of each micro-system into a meso-system entity will take future research

to a level of complexity not yet seen in the study of student motivation and achievement.

Multiple Social Partners and Multiple Levels of Analyses

In addition to parents and teachers, children's performance at school can also be affected by peers (Kurdek et al., 1995; Sage & Kindermann, 1999). Relationships with peers can be a source of support or stress for children when they are adjusting to school demands. Children who experience positive interactions with their peers are more likely to be engaged in their classroom setting. On the other hand, peer rejection has been linked to children's increased negative attitudes towards schooling, feelings of loneliness, social anxiety and avoidance, poor adjustment, and academic problems (Crick & Ludd, 1993; Ludd, 1990; Ludd & Price, 1987). It is also recognized that peer groups can foster or undermine children's sense of belonging and their academic competence in school (Guay et al., 1999). Furthermore, children also may find themselves in conflict if the same behaviors or attitudes (e.g., academic aspirations, honesty, and competitiveness) are valued by parents and teachers, but devalued by peers (Birch & Ladd, 1996).

Thus, for a more accurate and complete perspective on children's academic motivation, it is important for future research to include peer groups as another important social context. Future research could explore whether the effects of parents, teachers, and peers on children's academic self-perceptions are additive, competitive, amplifying, or compensatory. More research is needed to explore the mechanisms that possibly regulate the influences of multiple partners on children's academic engagement.

The four models proposed by the JMCI framework are so general and systemic that they can be applied not only to parents, teachers, and peers, but also to other social contexts, such as siblings. This framework could also be useful in designing intervention studies, which can provide specific suggestions about what parents, teachers, and other social partners can do to optimize children's school performance.

The JMCI framework can also be applied to study joint influences at different levels of perception of the parent-teacher-child system. At higher levels of perception, contextual structures such as neighborhoods, social institutions, or overall culture can be investigated using the JMCI framework models. At a lower level, joint influences of contextual characteristics such as warmth, rejection, provision of structure, chaos, autonomy support, and coercion could be investigated. Furthermore, the JMCI framework can be adapted to other fields of psychology that involve joint contextual influences (e.g., social or industrial-organizational psychology) or even to other relevant disciplines such as sociology, anthropology, education, social work, or political science.

Generalizability

The current study was conducted on a rather homogeneous sample. The participants of the study were predominantly white and middle class or lower-middle class. The JMCI framework implies that the ways social contexts affect children's self-system processes might be similar for various groups of children. Nevertheless, it is important to test this assumption directly. It is important for future research to include ethnic and racial minorities, as well as families from various socioeconomic

backgrounds, in order to investigate possible variations that diverse populations may bring to the proposed models. It is possible that some self-system processes may be relatively more important for some sub-groups of people than for others. Special attention should be given to measurement equivalence across different groups. Specifically, the item pool for different ethnic and racial population should reflect culturally appropriate ways of expressing parenting and teaching practices.

In addition to the homogeneity problem, the sample in the current study appeared to have a positive selection bias. Specifically, the majority of the parents and teachers had higher scores on Support and lower scores on Non-Support. Such skewness in the distribution of scores may suggest that the more successful and effective parents and teachers were selected for the study and, therefore, the sample may not be representative. As a result, generalizability of the study's findings to broader populations is restricted. Future studies should safeguard against such selection biases, ensuring that a broader range of parents and teachers are included in the sample under study.

Use of JMCI in Future Research

Further extensive empirical testing of the proposed joint effects models is the next step toward determining the contribution and utility of the proposed JMCI framework. When these models are used in future studies, researchers should be vigilant of possible limitations within the proposed JMCI framework, which might be uncovered by new statistical analyses. Future studies are needed to provide feedback regarding comprehensiveness of the JMCI framework. It is possible that in future studies the data may suggest that, some conceptual models are statistically

indistinguishable. In that case, the usefulness of those models as being distinct needs to be reevaluated.

Similarly, future studies may suggest a new class of conceptual models not considered by the JMCI framework. For example, if one of the JMCI framework models can be tested in multiple ways, then the possibility of an additional class of models should be taken into consideration. It is also possible that when Sequential Effects Models are tested with an appropriate number of time measurements, new and more refined subcategories of specific influences may be uncovered. Furthermore, if in future studies upon the completion of empirical testing, the data indicate modifications or changes that have to be made to any of the suggested models, the proposed JMCI framework should be closely reexamined and revised as needed.

Conclusion

In conclusion, a study was conducted to explore the links between parenting and teaching contexts in relation to children's academic motivation. The study developed the JMCI framework, which integrated and organized findings and models that have been described in the research literature as well as depicted in several general theories and overarching approaches, into a more comprehensive and coherent framework. The JMCI framework consists of four sets of joint contextual influences models which were tested by the study.

In general, this study provided some empirical support for every category of the proposed models. The inclusion of both parents and teachers allowed for a finer differentiation among social influences and greater explanatory specificity in

predicting children's school outcomes. It was found that the joint influences of parents and teachers on children's SSPs are not uniform: they can be interactive or unique in their nature, depending on the quality of the social contexts and the child's outcome itself.

The study also indicated that self-system processes are possible pathways through which parents and teachers exert their influences on children's academic engagement, making a valuable addition to a still small body of knowledge that tries to explain the process of these influences. This study also illustrated that the age of the developing child can be a factor in the way social contexts exert their influences. Furthermore, the current study also made an important step toward understanding the mechanism of Sequential effects and the nature of changes over time in parent-teacher-child systems. The study suggested that children's engagement may be a mechanism that mediates the relationship between parents' and teachers' contexts.

Despite some limitations, the findings of this study made an important contribution to the field of knowledge regarding the influences of multiple social contexts on a developing child. This study is one of the few to extend its focus beyond the micro-level to include meso-level relationships. This study also demonstrates that when social contexts are combined together within one study, they operate in such manner that a new unique property emerges which becomes an attribute of the *whole*, and this property is virtually invisible if each of the social contexts is examined independently.

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Appendix A

Parent Context (child-report, items sample)

Parents as Social Context Questionnaire (PASCQ) (Skinner, Regan, & Welborn, 1986).

Warmth

My parents enjoy the time they spend with me.
When I'm in trouble, my parents are there for me.
My parents know how I feel about things.

Rejection

Sometimes I wonder if my parents like me.
My parents do not seem to have enough time for me.
Sometimes I feel like my parents just do not understand me.

Structure

My parents treat me fairly.
When I do not understand something, my parents explain it to me.
My parents make clear what they expect of me.

Chaos

My parents keep changing the rules.
Every time I do something wrong, my parents act differently.
A lot of time I do not know what my parents want me to do.

Autonomy support

My parents let me choose how to do things around the house.
My parents encourage me to make decisions for myself.
My parents listen to me when I have something to say.

Coercion

My parents do not pay attention to what I have to say.
My parents are always telling me what to do.
My parents try to control everything I do.

Note. Responses range from "Not at all true" to "Very true."

Appendix B

Teacher Context (child-report, items sample)

Teachers as Social Context Questionnaire (TASCQ) (Belmont, Skinner, Wellborn & Connell, 1991)

Warmth

My teacher likes me.
My teacher really cares about me.
My teacher knows a lot about me.

Rejection

My teacher does not seem to enjoy having me in class.
My teacher never there for me.
My teacher does not understand me.

Structure

My teacher treats me fairly.
I know what to expect from my teacher.
My teacher makes it clear what she expects from me.

Chaos

My teacher keeps changing rules.
My teacher does not make it clear what she expects of me in class.
When I break rules I do not know how teacher will react.

Autonomy Support

My teacher gives me choices about how I do schoolwork.
My teacher encourages me to do things my own way.
My teacher listens to my ideas

Coercion

My teacher never listens to my side.
My teacher tries to control everything I do.
My teacher makes me do everything his way.

Note. Responses range from "Not at all true" to "Very true."

Appendix C

Self-system Processes (child-report, items sample)

Relatedness to Parents, Teachers, and Peers (Lynch & Wellborn, 1987).

Relatedness to Parents and Teachers

When I am with my parents/teacher:

I feel accepted (+)

I feel like someone special (+)

I feel ignored (-)

I feel unimportant (-)

I wish my parents/teacher:

Paid more attention to me (-)

Could spend more time with me (-)

Knew me better (-)

I wish I was closer to my parents/teacher. (-)

Relatedness to Self

I feel important (+)

I wish I were different (-)

I wish I felt better about myself (-)

I feel lonely (-)

Student Perceptions of Control Questionnaire (Wellborn, Connell, & Skinner, 1989)

If I decide to learn something hard, I can. (+)

I can do well in school if I want to. (+)

I can get good grades in school. (+)

I can't get good grades no matter what I do. (-)

I can't stop myself from doing poorly in school. (-)

I can't do well in school, even if I want to. (-)

Autonomy Orientations (Ryan & Connell, 1989)

Why do I do my homework? Because I want to understand the subject.

Why do I do my classwork? Because I want to learn new things.

Why do I work on classwork? Because I think classwork is important for my learning.

Why do I try to do well in school? Because I enjoy doing schoolwork well.

Why do I try to do well in school? Because doing well in school is important to me.

Note. Responses range from “Not at all true” to “Very true.”

Appendix D

Students' Engagement (child-report, items sample)

Child Report of Engagement (Wellborn, 1991).

Behavioral Engagement

- I try very hard at school (+)
- I participate in class discussions (+)
- The first time my teacher talks about a new topic, I listen very carefully (+)
- When we start something new, I practically fall asleep (-)
- My mind wanders when my teachers starts new topic (-)
- When I am in class, I just act like I am working (-)

Emotional Engagement

- When I am working on my classwork, I feel
 - relaxed (+)
 - involved (+)
- When we start something new in school, I feel
 - interested (+)
 - worried (-)
- When my teacher first explains new material, I feel
 - relaxed (+)
 - board (-)
- When I am at school I am
 - happy (+)
 - good (+)

Note. Responses range from “Not at all true” to “Very true.”

Appendix E

Supportive Parents, Supportive Teachers, and Children's Competence at Time

1: Significant Interaction

Research question 1a. Are there interactive effects between Supportive parents' and Supportive teachers' influences on children's competence? A hierarchical regression was performed testing whether the effects of Supportive parents and Supportive teachers interact in their influences on children's competence at Time 1. Children's perceived competence was the dependent variable. Supportive parents and Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Supportive Parent	}	→ Competence
	Supportive Teacher		
Step2:	Supportive Parent x Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .19$, $F(2,1239) = 145$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived competence. Semi-partial correlations indicated that Supportive parents uniquely accounted for 5.7 percent of variance in children's sense of competence while Supportive teachers accounted for 4.1 percent of the variance. $\underline{R^2}$ Change was also significant [$\underline{R^2}$ Change = .004, $F(1,1238) = 6.10$, $p < .01$], suggesting that the interaction accounted for a significant .4 percent of variance in children's perceived

competence over and above the unique effects of parents' and teachers'. All β 's were significant for both steps of hierarchical regression. The results of the test for significance of β values are presented in Table 1.

Table 1

Summary of Hierarchical Regression for Supportive Parents and Teachers, Predicting Children's Competence at Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.27*	9.82
Supportive Teachers	.23*	8.1
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.64*	-2.49

Note. * $p < .000$.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only .4 percent of the variance in children's competence. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, scores of Supportive parents and Supportive teachers at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's competence and plotted on a graph (see Figure 1).

Both lines on the graph represented parents. One line represented parents who were low on Support (one standard deviation below the mean) and the other line represented parents who were high on Support (one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Support and one standard deviation above the mean for teachers who were high on Support). The Y-axis represented children's scores on competence.

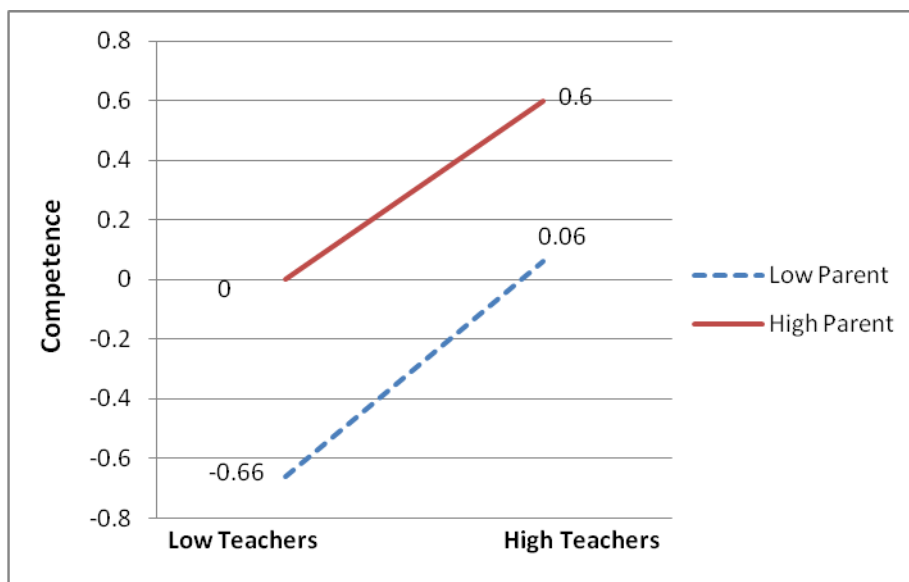


Figure 1. Interactive effects of Supportive parents and Supportive teachers on children's competence at Time 1

Follow up testing revealed that the lines were almost parallel on the profile plot. This can be an indication of no interaction effect. However, as it was noted earlier, interactions can be difficult to detect. Given the exploratory nature of this study, detected statistical significance for interaction in regression analyses can be of the theoretical importance. In consequence, the results of the profile plot were used for the interpretation of the effects.

When compared to the suggested JMCI framework conceptual interactive models, these results revealed that the interactive effects are possibly *amplifying* in their nature. It appeared that:

1. When parents were low on Support, highly Supportive teaches amplified children's competence.
2. When teachers were low on Support, highly Supportive parents amplified children's competence.
3. Children's competence was the highest when both parents and teachers were high on Support.
4. Children's competence was the lowest when both parents and teachers were low on Support.

Appendix F

Non-Supportive Parents, Non-Supportive Teachers, and Children's

Competence at Time 1: Significant Interaction

Research question 1a. Are there interactive effects between Non-Supportive parents' and Non-Supportive teachers' influences on children's competence? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Non-Supportive teachers interact in their influences on children's competence (Time 1 measurement). Children's perceived competence was the dependent variable. Non-Supportive parents and Non-Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1: Non-Supportive Parent	}	→ Competence
Non-Supportive Teacher		
Step2: Non-Supportive Parent x Non-Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .30$, $F(2,1239) = 258$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived competence. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 4.3 percent of variance in children's sense of competence while Non-Supportive teachers accounted for 7.6 percent of the variance. \underline{R}^2 Change was also significant [\underline{R}^2 Change = .010, $F(1,1238) = 17.67$, $p < .000$], suggesting that the interaction accounted for a significant 1 percent of

variance in children's perceived competence over and above the unique effects of parents and teachers.

β for the interaction was significant in the second step of hierarchical regression. In the first step of the regression, β 's for both parents and teachers were significant, but they became not significant in the second step, suggesting that once the interaction was accounted for, the main effects did not longer contribute to the variance in children's competence. This was rather an important finding, because it suggested that, despite the small effect size of the interaction, once accounted for in the regression model, the interaction overwritten the main unique effects of both social contexts. The results of the test for significance of β values are presented in Table 2.

Table 2

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Competence at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.26*	-8.72
Non-Supportive Teachers	-.34*	-11.51
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	-.58*	-4.30

Note. * $p < .000$.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only .4 percent of the variance in children's

competence. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that this significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Non-Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's competence and plotted on a graph (see Figure 2).

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the other line represented parents who were high on Non-Support (one standard deviation above the mean). Non-Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Non-Support and one standard deviation above the mean for teachers who were high on Non-Support). The Y-axis represented children's scores on competence.

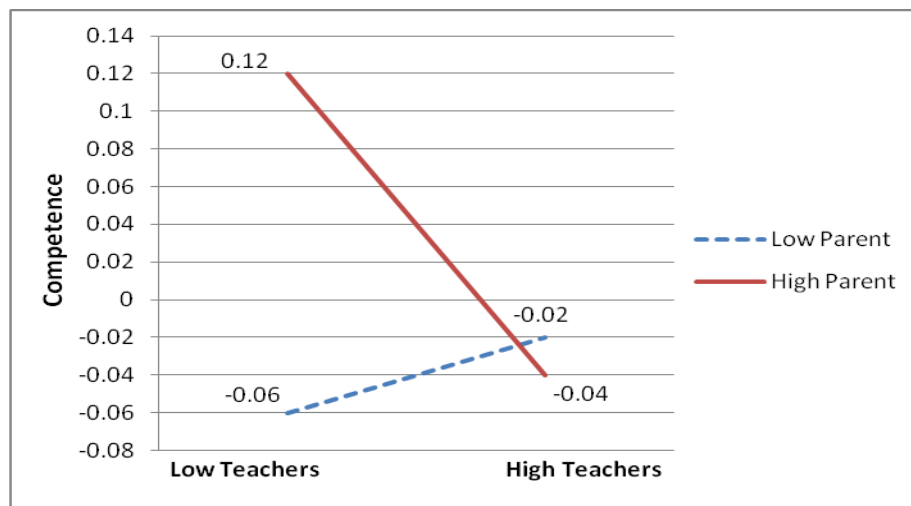


Figure 2. Interactive effects of Non-Supportive parents and Non-Supportive teachers on children's competence at Time 1

Follow up testing revealed that the lines were not parallel, but crossed on the profile plot, confirming the presence of interactive effects. Crossed lines on the interaction plot were not expected by the suggested JMCI framework; therefore there is no corresponding model in the framework. During the development of the JMCI framework, it was assumed that combined parents' and teachers' influences will produce larger or lesser effects. These types of effects are indicative of ordinal interactions. Thus, only ordinal interactive models were suggested in JMCI framework. However, in the obtained results the lines were crossed in the profile plot. This suggested the presence of a disordinal interaction. Disordinal interactions take place when a predictor has one type of effect at one level of a second predictor, but an opposite effect at a different level of that second predictor. The results suggested that the effects of low or high on Non-Support teachers were opposite, depending on whether parents were low or high on Non-Support. It appears that:

1. As teachers' scores on Non-Support increased, children's scores on competence: (a) increased, if parents were low on Non-Support, but (b) decreased, if parents were high on Non-Support.
2. When parents were high on Non-Support, the effects of Non-Supportive teachers on children's competence were stronger. When parents were low on Non-Support the effects of Non-Supportive teachers were less pronounced.

Appendix G

Non-Supportive Parents, Non-Supportive Teachers, and Children's Autonomy at Time 1: Significant Interaction

Research question 1a. Are there interactive effects between Non-Supportive parents' and Non-Supportive teachers' influences on children's autonomy? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Non-Supportive teachers interact in their influences on children's autonomy (Time 1 measurement). Children's perceived autonomy was the dependent variable. Non-Supportive parents and Non-Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Non-Supportive Parent	}	→ Autonomy
	Non-Supportive Teacher		
Step2:	Non-Supportive Parent x Non-Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .30$, $F(2,1239) = 258$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived autonomy. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for .8 percent of variance in children's sense of autonomy while Non-Supportive teachers accounted for 14.1 percent of the variance. R^2 Change was also significant [R^2 Change = .007, $F(1,1238) = 12.16$, $p < .001$], suggesting that the interaction accounted for a significant .7 percent of variance in children's perceived

autonomy over and above the unique effects of parents and teachers. All β 's were significant in both steps of the hierarchical regression. The results of the test for significance of β values are presented in Table 3.

Table 3

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Perceived Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.11**	-4.03
Non-Supportive Teachers	-.47**	-15.71
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.48*	4.11

Note. * $p < .001$, * $p < .000$.

It is also important to note that the effect size of the interaction was very small. The interaction accounted for only .7 percent of the variance in children's autonomy. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Non-Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's autonomy and plotted on a graph (see Figure 3).

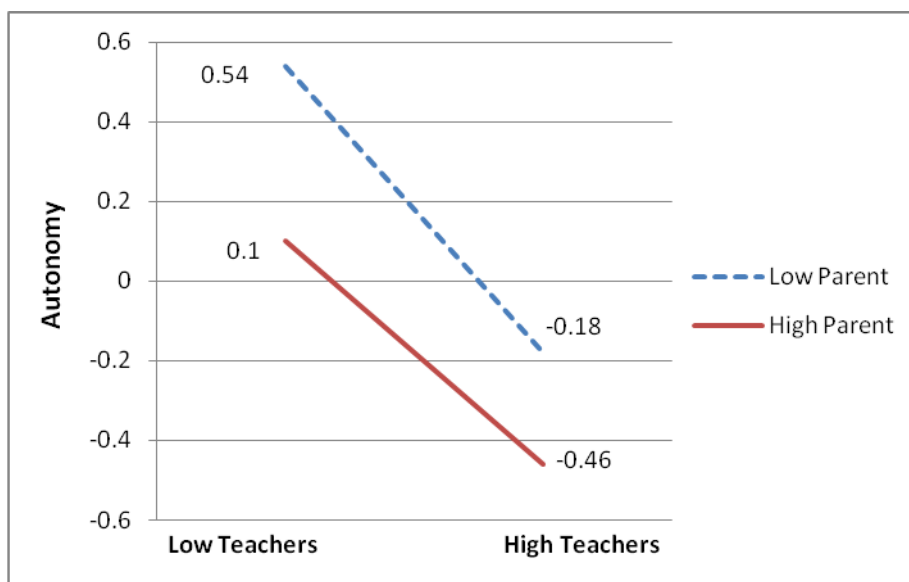


Figure 3. Interactive effects of Non-Supportive parents and Non-Supportive teachers on children's autonomy at Time 1

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the other line represented parents who were high on Non-Support (one standard deviation above the mean). Non-Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Non-Support and

one standard deviation above the mean for teachers who were high on Non-Support). The Y-axis represented children's scores on autonomy.

Follow up testing revealed that the lines were almost parallel on the profile plot. This can be an indication of a weak or even no interaction effect. However, as it was noted earlier, interactions can be difficult to detect. Given the exploratory nature of this study, detected statistical significance for interaction in regression analyses can be of the theoretical importance. In consequence, the results of the profile plot were used for the interpretation of the effects.

When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *amplifying* in their nature, suggesting that the effects of one context magnify the effects of the other context. It appears that:

1. The effects of Non-Supportive teaches on children's *autonomy* were magnified by Non-Supportive parents.
2. Children's *autonomy* was the highest when both parents and teachers were low on Non-Support.
3. Children's *autonomy* was the lowest when both parents and teachers were high on Non-Support.

Appendix H

Non-Supportive Parents, Non-Supportive Teachers, and Children's Autonomy at Time 2: Significant Interaction

Research question 1a. Are there interactive effects between Non-Supportive parents' and Non-Supportive teachers' influences on children's autonomy? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Non-Supportive teachers interact in their influences on children's autonomy (Time 2 measurement). Children's perceived autonomy was the dependent variable. Non-Supportive parents and Non-Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Non-Supportive Parent	}	→ Autonomy
	Non-Supportive Teacher		
Step2:	Non-Supportive Parent x Non-Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .28$, $F(2,1239) = 236$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived autonomy. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 1 percent of variance in children's self perception of autonomy while Non-Supportive teachers accounted for 12.7 percent of the variance. R^2 Change was also significant [R^2 Change = .02, $F(1,1238) = 33.31$, $p < .000$], suggesting that the interaction accounted for a significant 2 percent of variance in children's perceived autonomy over and above the unique effects of parents and

teachers. All β 's were significant in both steps of the hierarchical regression. The results of the test for significance of β values are presented in Table 4.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only 2 percent of the variance in children's autonomy. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Table 4

Summary of Hierarchical Regression for Non-Supportive Parents and Teachers, Predicting Children's Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.13*	-4.18
Non-Supportive Teachers	-.44*	-14.77
<u>Step 2</u>		
Non-Supportive Parents x Non-Supportive Teachers	.76*	5.97

Note. * $p < .000$.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were

conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Non-Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's autonomy and plotted on a graph (see Figure 4).

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the other line represented parents who were high on Non-Support (one standard deviation above the mean). Non-Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Non-Support and one standard deviation above the mean for teachers who were high on Non-Support). The Y-axis represented children's scores on autonomy.

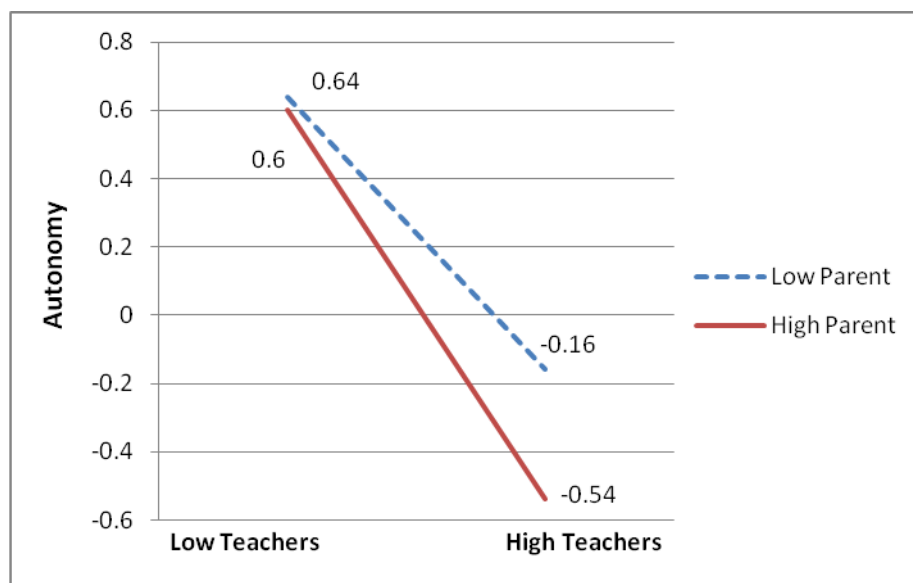


Figure 4. Interactive effects of Non-Supportive parents and Non-Supportive teachers on children's autonomy at Time 2

Follow up testing revealed that the lines were not parallel on the profile plot. This supported further the presence of interactive effects. When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *amplifying* in their nature. It appeared that:

1. The effects of Non-Supportive parents were magnified by the effects of Non-supportive teachers: the higher on Non-Support teachers were the lower children's *autonomy* was, especially if parents were high on Non-Support.
2. However, the lower on Non-Support teachers were, the less important it was to children's *autonomy* whether their parents were low or high on Support.
3. Children's *autonomy* was the highest when teachers were low on Non-Support, regardless of whether parents were high or low on Non-Support.
4. Children's *autonomy* was the lowest when both parents and teachers were high on Non-Support.

Appendix I

Supportive Parents, Non-Supportive Teachers, and Children's Relatedness at Time 2: Significant Interaction

Research question 1a. Are there interactive effects between Supportive parents' and Non-Supportive teachers' influences on children's relatedness? A hierarchical regression was performed testing whether the effects of Supportive parents and Non-Supportive teachers interacted in their influences on children's relatedness at Time 2. Children's perceived relatedness was the dependent variable. Supportive parents and Non-Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Supportive Parent	}	→ Relatedness
	Non-Supportive Teacher		
Step2:	Supportive Parent x Non-Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .51$, $F(2,1239) = 627$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived relatedness. Semi-partial correlations indicated that Supportive parents uniquely accounted for 20.8 percent of variance in children's sense of relatedness while Non-Supportive teachers accounted for 12.3 percent of the variance. $\underline{R^2}$ Change was also significant [$\underline{R^2}$ Change = .006, $F(1,1238) = 14.83$, $p < .000$], suggesting that the interaction accounted for a significant .6 percent of variance in

children's perceived relatedness over and above the unique effects of parents' and teachers'. All β 's were significant for both steps of hierarchical regression. The results of the test for significance of β values are presented in Table 5.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only .6 percent of the variance in children's relatedness. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to

Table 5

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Relatedness at Time 2

Context	β	t
<u>Step 1</u>		
Supportive Parents	.49*	22.72
Non-Supportive Teachers	-.37*	-17.47
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	.08*	3.85

Note. * $p < .000$.

the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Supportive parents' and Non-Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's relatedness and plotted on a graph.

Both lines on the graph represented parents. One line represented parents who were low on Support (one standard deviation below the mean) and the other line represented parents who were high on Support (one standard deviation above the mean). Non-Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Non-Support and one standard deviation above the mean for teachers who were high on the Non-Support). The Y-axis represented children's scores on relatedness (see Figure 5).

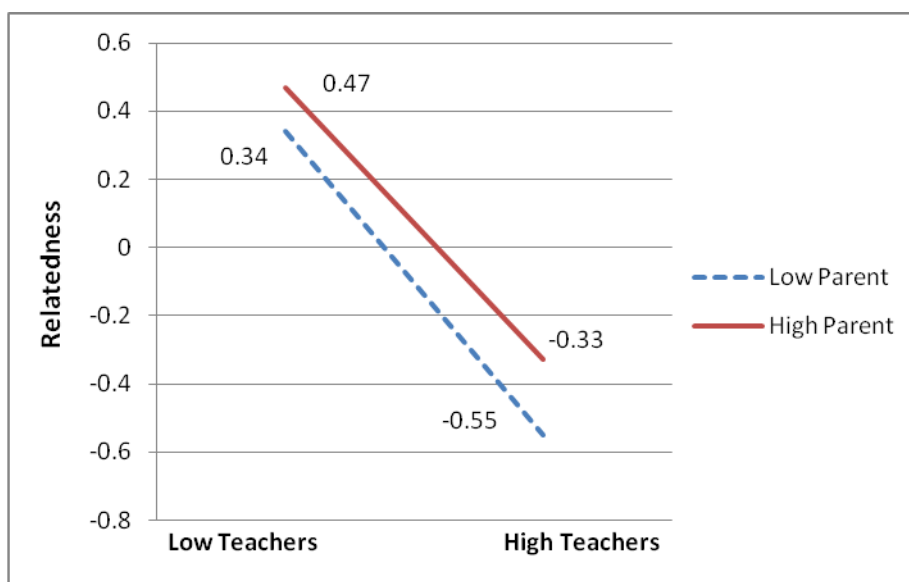


Figure 5. Interactive effects of Supportive parents and Non-Supportive teachers on children's relatedness at Time 2

Follow up testing revealed that the lines were almost parallel on the profile plot and positioned very close to one another. This can be an indication of very weak or no interaction effect. However, as it was noted earlier, interactions can be difficult to detect. Given the exploratory nature of this study, detected statistical significance for interaction in regression analyses can be of the theoretical importance. In consequence, the results of the profile plot were used for the interpretation of the effects.

When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *counterbalancing* in their nature: effects of Supportive parents were less important when the effects of teachers were in the opposite direction. It appears that:

1. Even though these children had Supportive parents, their scores on relatedness declined, as teachers' scores on Non-Support increased: the higher on Non-Support teachers were, the lower children's scores on relatedness were, even when parents were high on Support.
2. However, highly Supportive parents still benefited children who had highly Non-Supportive teachers.
3. Children's relatedness was the highest when parents were high on Support and teachers were low on Non- Support.
4. Children's relatedness was the lowest when parents were low on Support and teachers were high on Non-Support.

Appendix J

Supportive Parents, Non-Supportive Teachers, and Children's Competence at Time 1

Research question 1a. Are there interactive effects between Supportive parents' and Non-Supportive teachers' influences on children's competence? A hierarchical regression was performed testing whether the effects of Supportive parents and Non-Supportive teachers interact in their influences on children's competence (Time 1 measurement). Children's perceived competence was the dependent variable. Supportive parents and Non-Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Supportive Parent	}	→ Competence
	Non-Supportive Teacher		
Step2:	Supportive Parent x Non Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .31$, $F(2,1239) = 264$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived competence. Semi-partial correlations indicated that Supportive parents uniquely accounted for 4.8 percent of variance in children's sense of competence while Non-Supportive teachers accounted for 15.1 percent of the variance. $\underline{R^2}$ Change was also significant [$\underline{R^2}$ Change = .01, $F(1,1238) = 18.28$, $p < .000$], suggesting that the interaction accounted for a significant 1 percent of variance in

children's perceived competence over and above the unique effects of parents' and teachers'. All β 's were significant for both steps of hierarchical regression. The results of the test for significance of β values are presented in Table 6.

Table 6

Summary of Hierarchical Regression for Supportive Parents and Non-Supportive Teachers, Predicting Children's Competence for Time 1

Context	β	t
<u>Step 1</u>		
Supportive Parents	.27*	9.82
Non-Supportive Teachers	.23*	8.1
<u>Step 2</u>		
Supportive Parents x Non-Supportive Teachers	-.64*	-2.49

Note. * $p < .000$.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only 1 percent of the variance in children's competence. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Supportive parents' and Non-Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's competence and plotted on a graph (see Figure 6).

Both lines on the graph represented parents. One line represented parents who were low on Support (one standard deviation below the mean) and the other line represented parents who were high on Support (one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Non-Support and one standard deviation above the mean for teachers who were high on Non-Support). The Y-axis represented children's scores on competence.

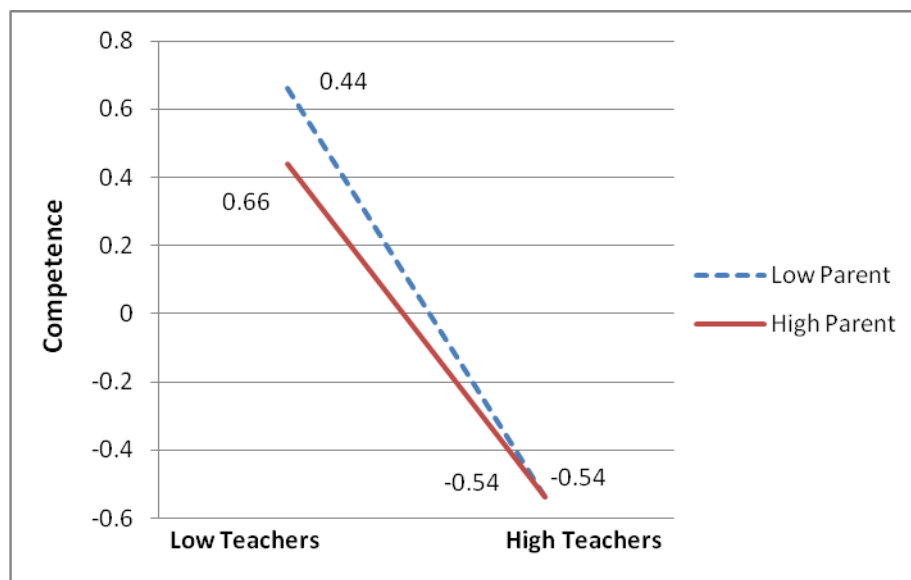


Figure 6. Interactive effects of Supportive parents and Non-Supportive teachers on children's competence at Time 1

Follow up testing revealed that the lines were not parallel, but crossed on the profile plot, confirming the presence of interactive effects. When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *counterbalancing* in their nature: although parents were Supportive, their influences were less important when teachers were Non-supportive. It appears that:

1. Even though these children had Supportive parents, their scores on competence declined, as teachers scores on Non-Support increased: the higher on Non-Support teachers were, the lower children's score on relatedness was.
2. However, the higher on Non-Support teachers were, the less important it was to children's competence whether their parents were low or high on Support.
3. Surprisingly, children of low on Non-Support teachers and low on Support parents had the highest scores on competence (not the children of high on Support parents).

Appendix K

Non-Supportive Parents, Supportive Teachers, and Children's Relatedness at Time 1

Research question 1a. Are there interactive effects between Non-Supportive parents' and Supportive teachers' influences on children's relatedness? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Supportive teachers interact in their influences on children's relatedness at Time 1. Children's perceived relatedness was the dependent variable. Non-Supportive parents and Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Non-Supportive Parent	}	→ Relatedness
	Supportive Teacher		
Step2:	Non-Supportive Parent x Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .51$, $F(2,1239) = 640$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived relatedness. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 20.4 percent of variance in children's relatedness while Supportive teachers accounted for 14 percent of the variance. R^2 Change was also significant [R^2 Change = .003, $F(1,1238) = 53.94$, $p < .01$], suggesting that the interaction accounted for a significant .3 percent of variance in children's perceived

relatedness over and above the unique effects of parents' and teachers'. All β 's were significant for both steps of hierarchical regression. The results of the test for significance of β values are presented in Table 7.

Table 7

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Relatedness at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.48**	-22.68
Supportive Teachers	.40**	18.80
<u>Step 2</u>		
Supportive Parents x Supportive Teachers	-.29*	2.82

Note. ** $p < .000$, * $p < .01$.

It is important to note that the effect size of the interaction was very small. The interaction accounted for only .3 percent of the variance in children's relatedness. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's relatedness and plotted on a graph (see Figure 7).

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the other line represented parents who were high on Non-Support (one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Support and one standard deviation above the mean for teachers who were high on Support). The Y-axis represented children's scores on relatedness.

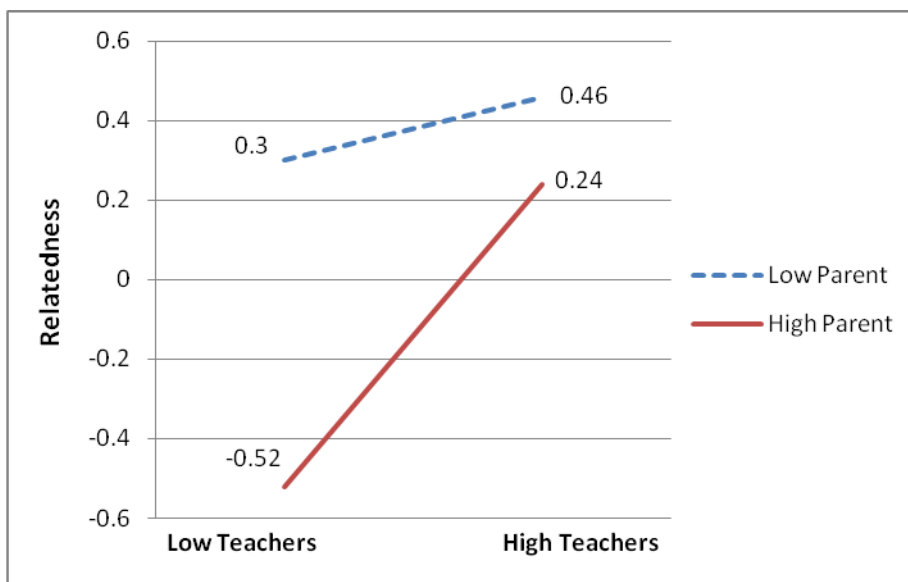


Figure 7. Interactive effects of Non-Supportive parents and Supportive teachers on children's relatedness at Time 1

Follow up testing revealed that the lines were not parallel on the profile plot. This supported further the presence of the interactive effects. When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *counterbalancing* in their nature: influences of Non-Supportive parents on children's relatedness were less important when teachers' practices were Supportive. It appears that:

1. When parents were Non-Supportive, highly Supportive teaches buffered children's perception of relatedness. Children of high on Non-Support parents benefitted the most from the Support of their teachers.
2. However, the higher on Support teachers were, the less important it was to children's relatedness whether their parents were low or high on Non-Support.
1. Children's relatedness was the highest when parents were low on Non-Support and teachers were high on Support.
5. Children's relatedness was the lowest when parents were high on Non-Support and teachers were high on Support.

Appendix L

Non-Supportive Parents, Supportive Teachers, and Children's Autonomy at Time 1

Research question 1a. Are there interactive effects between Non-Supportive parents' and Supportive teachers' influences on children's autonomy? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Supportive teachers interact in their influences on children's autonomy at Time 1. Children's perceived autonomy was the dependent variable. Non-Supportive parents and Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1:	Non-Supportive Parent	}	→ Autonomy
	Supportive Teacher		
Step2:	Non-Supportive Parent x Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .29$, $F(2,1239) = 265$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived autonomy. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 6.8 percent of variance in children's sense of autonomy while Supportive teachers accounted for 11.2 percent of the variance. R^2 Change was also significant [R^2 Change = .021, $F(1,1238) = 36.68$, $p < .000$], suggesting that the interaction accounted for a significant 2.1 percent of variance in children's

perceived autonomy over and above the unique effects of parents and teachers. All β 's were significant in both steps of regression, except the β for Non-Supportive parents. It was significant in the first step of hierarchical regression, but it became not significant in the second step. This suggested that when the interaction is accounted for, the main effects of Non-Supportive parents did not matter to children's sense of autonomy. The results of the test for significance of β values are presented in Table 8.

Table 8

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Perceived Autonomy at Time 1

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.28*	-10.74
Supportive Teachers	.35*	13.72
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.41*	-6.06

Note. * $p < .000$.

It is also important to note that the effect size of the interaction was very small. The interaction accounted for only 2.1 percent of the variance in children's autonomy. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why

the effect size was so small. On the other hand, interactions can be difficult to detect even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine a more precise nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's autonomy and plotted on a graph (see Figure 8).

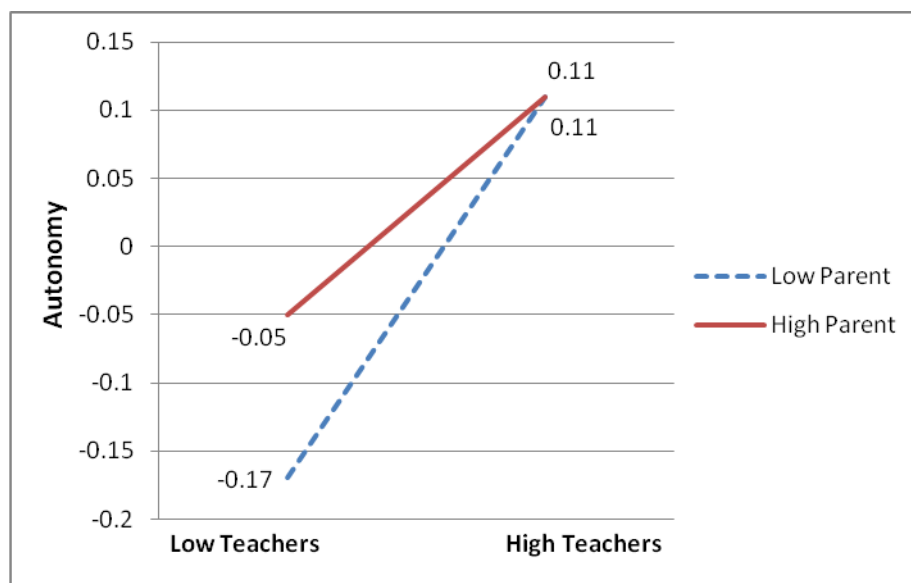


Figure 8. Interactive effects of Non-Supportive parents and Supportive teachers on children's autonomy at Time 1

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the

other line represented parents who were high on Non-Support (one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Support and one standard deviation above the mean for teachers who were high on Support). The Y-axis represented children's scores on autonomy.

Follow up testing revealed that the lines were not parallel on the profile plot, confirming the presence of interactive effects. When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *counterbalancing* in their nature. It appeared that:

1. When parents were Non-Supportive, Supportive teaches boosted children's perceived autonomy.
2. Surprisingly, children of low on Support teachers, had higher perceived autonomy if they had parents high on Non-Support. However, the higher on Support teachers were, the less important it was to children's perceived autonomy whether their parents were high or low on Non-Support.
3. Children's autonomy was the highest when teachers were high on Support, regardless of whether their parents were high or low on Non-Support.
4. Children's autonomy was the lowest when parents were low on Non-Support and teachers were low on Support.

Appendix M

Non-Supportive Parents, Supportive Teachers, and Children's Autonomy at Time 2

Research question 1a. Are there interactive effects between Non-Supportive parents' and Supportive teachers' influences on children's autonomy? A hierarchical regression was performed testing whether the effects of Non-Supportive parents and Supportive teachers interact in their influences on children's autonomy at Time 2. Children's perceived autonomy was the dependent variable. Non-Supportive parents and Supportive teachers were the predictors and they were entered in the first step of regression. The interaction term for these variables was entered in the second step.

Step1: Non-Supportive Parent	}	→ Autonomy
Supportive Teacher		
Step2: Non-Supportive Parent x Supportive Teacher		

R^2 for the overall model was significant [$R^2 = .29$, $F(2,1239) = 244$, $p < .000$], suggesting that both parents and teachers had significant unique effects on children's perceived autonomy. Semi-partial correlations indicated that Non-Supportive parents uniquely accounted for 7 percent of variance in children's sense of autonomy while Supportive teachers accounted for 13.4 percent of the variance. R^2 Change was also significant [R^2 Change = .007, $F(1,1238) = 11.82$, $p < .000$], suggesting that the interaction accounted for a significant .7 percent of variance in children's perceived autonomy over and above the unique effects of parents and teachers. All β 's were

significant in both steps of regression, except the β for Non-Supportive parents. It was significant in the first step of hierarchical regression but it became not significant in the second step. This suggested that when the interaction is accounted for, the main effects of Non-Supportive parents did not matter to children's sense of autonomy. The results of the test for significance of β values are presented in Table 9.

Table 9

Summary of Hierarchical Regression for Non-Supportive Parents and Supportive Teachers, Predicting Children's Perceived Autonomy at Time 2

Context	β	t
<u>Step 1</u>		
Non-Supportive Parents	-.28**	-11.07
Supportive Teachers	.38**	15.22
<u>Step 2</u>		
Non-Supportive Parents x Supportive Teachers	-.22*	-3.44

Note. * $p < .001$, ** $p < .000$.

It is also important to note that the effect size of the interaction was very small. The interaction accounted for only .7 percent of the variance in children's autonomy. Although statistically significant, the practical significance of such small effect size is questionable. It is possible that a significant interaction was detected simply due to the statistical power of the large sample size, which may explain why the effect size was so small. On the other hand, interactions can be difficult to detect

even in a substantial size sample. Thus, small size effects can be of a theoretical importance and therefore the precise nature of the effects should be investigated.

Research question 1b. What is the exact nature of the interactive effects?

Both main effects were significant in the hierarchical regression, which indicated the presence of partial dependence interactive effects. Follow up analyses were conducted to determine more precisely the nature of partial dependence interactive effects. Specifically, Non-Supportive parents' and Supportive teachers' scores at one standard deviation above and one standard deviation below the mean were calculated in correspondence to children's autonomy and plotted on a graph (see Figure 9).

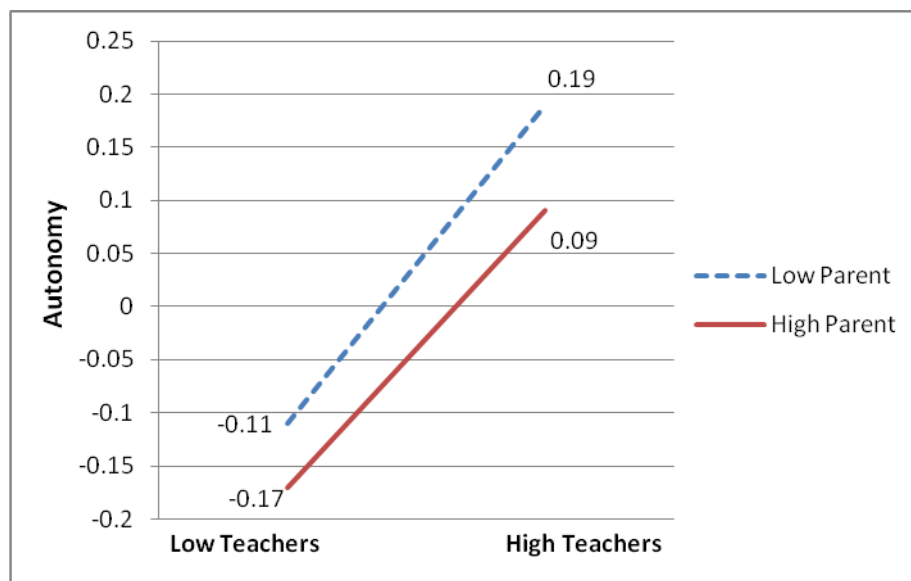


Figure 9. Interactive effects of Non-Supportive parents and Supportive teachers on children's autonomy at Time 2

Both lines on the graph represented parents. One line represented parents who were low on Non-Support (one standard deviation below the mean) and the

other line represented parents who were high on Non-Support (one standard deviation above the mean). Supportive teachers were plotted on X-axis (one standard deviation below the mean for teachers who were low on Support and one standard deviation above the mean for teachers who were high on Support). The Y-axis represented children's scores on autonomy.

Follow up testing revealed that the lines were almost parallel on the profile plot. This can be an indication of weak or no interaction effect. However, as it was noted earlier, interactions can be difficult to detect. Given the exploratory nature of this study, detected statistical significance for interaction in regression analyses can be of the theoretical importance. In consequence, the results of the profile plot were used for the interpretation of the effects.

When compared to the suggested JMCI framework conceptual models, these results revealed that the interactive effects are possibly *counterbalancing* in their nature: influences of Non-Supportive parents on children's autonomy were not as strong when teachers' practices were Supportive. It appears that:

1. Children of Non-Supportive parents had an improvement in their self-perception of autonomy if they had Supportive teachers. The higher on Supports teachers were, the higher children's autonomy was, especially if their parents were low on Non-Support. Similarly, the lower on Support teachers were, the lower children's autonomy was, especially if their parents were high on Non-Support.
2. Children's autonomy was the highest when parents were low on Non-Support and teachers were high on Support.

3. Children's autonomy was the lowest when parents were high on Non-Support and teachers were low on Support.

Appendix N

Overall Patterns of Interactive Effects

Since most Interactive Effects Models did not have strong empirical validation, the effects found in interactive models may not be very dependable. Thus, interpreting the effects in every model may be meaningless. However, the Interactive models have several consistent and general underlying tendencies. These trends and patterns can be of theoretical significance and valuable for future empirical investigations.

Combinations of social contexts. First, it was of interest to know if certain combinations of social contexts are more likely than others to generate interactive effects. Data revealed that the most interactive effects were found for the incongruent combinations of social contexts (seven out of eleven interactive models were found for incongruent contexts). It is not surprising that the effects of the *opposite* quality contexts would be more complex and interactive rather than additive and linear.

However, to conclude that the incongruence of social contexts is in itself predictive of the interactive influences would be inaccurate. Specifically, there were five interactive models found in the incongruent Non-Supportive parents/Supportive teachers combination, but only two interactive models were found in the incongruent Supportive parents/Non-Supportive teachers combination. Thus, the incongruence per se may not be indicative of the interactive influences. Rather, it is the specific combination of the incongruent contexts (Non-Supportive parents/Supportive teachers) that is more predictive of the interaction effects.

On the other hand, the fewest Interactive Effects Models were found for the congruent social contexts combinations (four out of eleven Interactive Models were found for the congruent contexts). It is possible that the effects of the similar quality contexts are more straightforward and additive in nature. The joint influences of similar contexts are possibly less complex and therefore less likely to interact. Interestingly, close examination of congruent models revealed a noticeable difference for Supportive and Non-Supportive combinations. The congruent Supportive parents/Supportive teachers combination had only one Interactive Model, but the congruent Non-Supportive parent/Non-Supportive teacher combination had three Interactive Models. Thus, it may not be the congruency per se that leads to fewer interactive effects, but rather the quality of the congruent combination: congruent Non-Supportive contexts appeared to be more predictive of the interactive effects and congruent Supportive contexts appeared to be less likely to interact in their joint influences.

Self-system processes. The study also investigated children's SSPs to identify an overall pattern of interactive influences. It was of interest to see if interactive effects were found more frequently for some SSPs than for others. The fewest Interactive Models were found for children's perceived *relatedness* (only two out of eight interactive models were found for *relatedness*). This possibly suggests that influences of parents and teachers are less likely to interact in their combined effects on children's perceived *relatedness* than they are for the other SSPs. Congruent contexts were the least likely to have interactive effects on *relatedness*.

A total of five interactive models were found for children's perceived *competence* (out of eight possible models). It is important to note that each combination of social contexts (Supportive parents/Supportive teachers, Non-Supportive parents/Non-Supportive teachers, Supportive parents/Non-Supportive teachers, and Non-Supportive parents/Supportive teachers) had at least one interactive model for *competence*. It is possible that when contextual influences are combined in one model (regardless of their quality) they are more likely to interact for children's perceived *competence* in comparison to the other SSPs.

Two Interactive Effects Models were found for children's perceived *autonomy* (out of eight possible models): one for the Non-Supportive parents/Non-Supportive teachers combination and one for the Non-Supportive parents/Supportive teachers combination. It is important to note that both models were replicated from Time 1 to Time 2. Models that were replicated across two time measurements were of special significance to this study, because replication of findings is indicative of *statistical conclusion validity* (the degree to which the findings can be relied upon and not attributed to random error in sampling and measurement).

Although interactive models for *autonomy* were replicated across two time measurements, the findings for Time 1 were not consistent with the findings for Time 2. If models are replicated, but they are not comparable, the validity of the findings is undermined. Thus, to conclude that the Non-Supportive parents/Non-Supportive teachers combination and the Non-Supportive parents/Supportive teachers combination are more predictive of interactive effects on children's *autonomy*, compared to other combinations, would be premature.

Finally, for every combination of social contexts unique or interactive effects of parents and teachers were found predicting changes in children's *competence* from fall to spring (interactive effects for the Supportive parents/Supportive teachers combination, unique effects of teachers for the Non-Supportive parents/Non-Supportive teachers combination, unique effects of parents for the Supportive parents/Non-Supportive teachers combination, and interactive effects for the Non-Supportive parents/Supportive teachers combination). Unique effects of parents and interactive effects of parents and teachers were found predicting changes in children's *competence* from fall to spring for the Non-Supportive parents/Supportive teachers combination. All found effects were not uniformed or consistent across found interactive models.

It is important to note that, although the above mentioned patterns provided valuable insight into the nature of interactive joint effects, future research is needed to verify the suggested patterns. For more conclusive findings, future studies should strive to have: (1) a larger interaction effect size, (2) lines that are not parallel or positioned too closely to one another on the profile plot of the follow up analyses, and (3) replication of comparable models across time measurements.

Specific interactive effects. Since most interactive models did not have sufficient empirical validation, discussion of the specific nature of the effects in every model appears to be problematic. Nevertheless, the specific effects of some models can be theoretically insightful and useful for future empirical investigations. After close evaluation, two models were selected for further examination of the specific nature of their interactive effects. These models were for children's

perceived *competence* in the Non-Supportive parents/ Supportive teachers combination at Time 1 and Time 2.

These models were selected based on the following criteria: (1) the lines for low and high parental Non-Support on the profile plots in the follow-up analyses were not parallel or placed too closely to one another, (2) models were comparable and replicated across the two time measurements.