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Kaisa Aunola

# Children's and Adolescents' Achievement Strategies, School Adjustment, and Family Environment

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UNIVERSITY OF JYVÄSKYLÄ

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# ABSTRACT

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The purpose of the present thesis is to examine the following research questions: (1) to what extent the achievement strategies adolescents deploy at school are associated with their school adjustment and problem behaviors; (2) to what extent adolescents´ achievement strategies are associated with the parenting styles they experience in their families; (3) to what extent parents´ social background, self-esteem and the use of an achievement strategy are associated with their parenting styles; (4) to what extent children´s use of a task-focused versus a task-avoidant achievement strategy predict their reading and math skill development during the first school year, and, conversely, to what extent children´s reading and math performance predict their subsequent strategy use; and (5) to what extent parental beliefs of their offsprings´ school competencies contribute to this development. Five studies based on five datasets were carried out. Four datasets were cross-sectional, focusing on adolescents or the parents of school-aged children. One set of cross-lagged longitudinal data included school-aged children and their parents. The sample size of the studies varied from 111 to 1185. A variety of measurements, such as self-report questionnaires, parent-reports, teacher observations and tests, were used. The results revealed that: (1) adolescents´ deployment of adaptive achievement strategies was associated with their overall high adjustment, whereas deployment of maladaptive strategies was related to maladjustment at school, and various problem behaviors; (2) adolescents who deployed adaptive strategies came from authoritative families, whereas those who used maladaptive strategies came from neglectful or authoritarian family environments; (3) parents´ high level of self-esteem and the use of an adaptive achievement strategy were associated with their authoritative parenting style, whereas their low level of education was associated with an authoritarian parenting style; (4) the cross-lagged associations between children´s achievement strategies and their school performance showed cumulative development during the first school year; (5) this cumulative cycle also extended to family influences - parents´ beliefs in their children´s school competencies increased their offsprings´ use of a task-focused achievement strategy, and via this, their reading and math performance. Children´s deployment of a task-focused strategy was further reflected in their parents´ high performance expectations. Parents´ low expectations, in turn, led to the opposite negative cycle.

Key words: achievement strategies, school adjustment, parenting styles, parental beliefs, developmental dynamic, learning difficulties

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This study was conducted during my assistantship in the Department of Psychology at the University of Jyväskylä. The study was also supported by the Ministry of Education through the Finnish Graduate School of Psychology.

Jyväskylä, April 2001 Kaisa Aunola

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## LIST OF PUBLICATIONS

I Aunola, K., Stattin, H., & Nurmi, J.-E. (2000). Adolescents´ achievement strategies, school adjustment, and externalizing and internalizing problem behaviors. *Journal of Youth and Adolescence, 29,* 289-306.

II Aunola, K., Stattin, H., & Nurmi, J.-E. (2000). Parenting styles and adolescents´ achievement strategies. *Journal of Adolescence, 23,* 205-222.

III Aunola, K., Nurmi, J.-E., Onatsu-Arvilommi, T., & Pulkkinen, L. (1999). The role of parents´ self-esteem, mastery-orientation and social background in their parenting styles. *Scandinavian Journal of Psychology, 40,* 307-317.

IV Aunola, K., Nurmi, J.-E., Lerkkanen, M.-K., & Rasku-Puttonen, H. (2000). Developmental dynamics of reading skills, achievement strategies, and parental beliefs. *Submitted for publication.*

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# 1 INTRODUCTION

School is one of the major developmental contexts for children and adolescents. For example, school achievement and adjustment, or learning problems, not only provide a basis for children´s and adolescents´ self-concept and mastery beliefs, but also have long-term consequences for an individual´s future life course (Entwisle & Hayduk, 1988; Roeser, Eccles, & Strobel, 1998). Research on the underlying mechanisms of underachievement and learning difficulties has traditionally focused on specific cognitive abilities (Lerner, 1993) and the neuropsychological basis of learning disabilities (Catts & Kamhi, 1998; Lyytinen, 1997).

However, it has been suggested that two other factors may play an important role in school achievement and learning problems. First, children and adolescents construct various beliefs about themselves on the basis of the feedback they receive in learning and achievement contexts (Wigfield & Guthrie, 1997). These then provide a basis for the strategic behaviors they deploy to deal with learning situations (Lehtinen, Vauras, Salonen, Olkinuora, & Kinnunen, 1995). Second, family and parents may play an important role. For example, it has been shown that parents´ child-rearing practices, parenting styles, parental beliefs, social background, and parental well-being are associated with children´s and adolescents´ school performance and learning difficulties (for a review, see Wentzel, 1994). One possibility is, in fact, that family environment provides a basis for children´s and adolescents´ achievement-related beliefs and behaviors, which then play a role in their school achievement, underachievement and learning problems.

The present thesis will focus on investigating the role of children´s and adolescents´ achievement beliefs and strategies in their school performance and overall adjustment, and the role that family and parents play in the development of such achievement strategies. A schematic representation of this conceptual framework is presented in Figure 1.

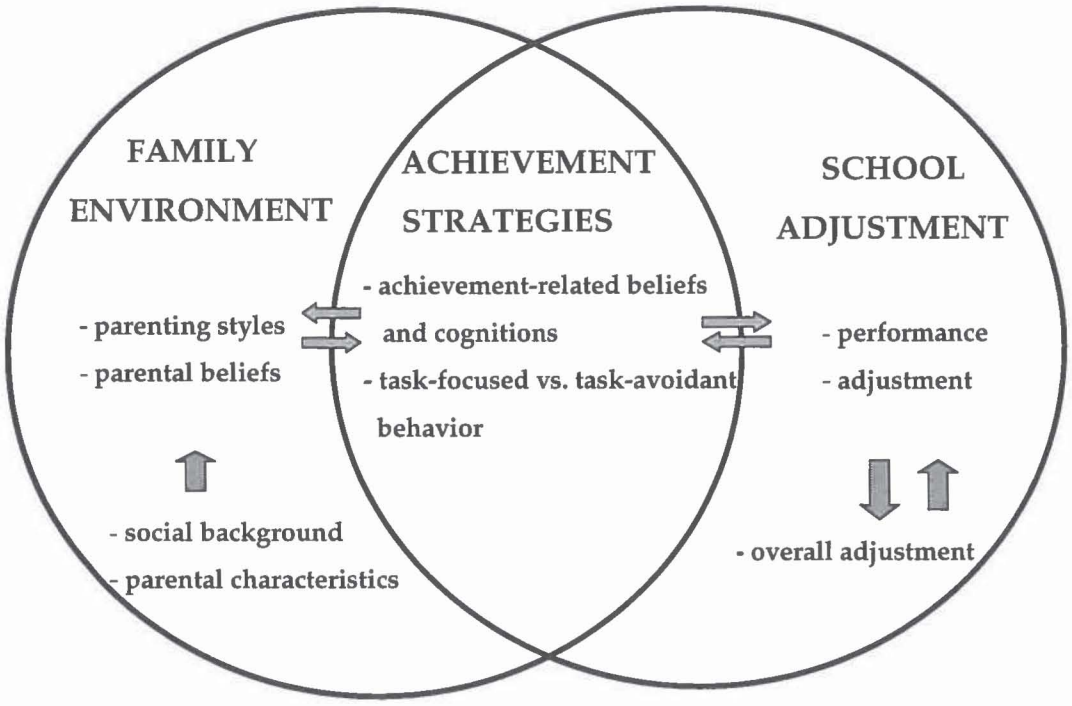


FIGURE 1 Schematic representation of the conceptual framework.

## 1.1 Achievement strategies

Individuals´ success and failure in achievement and learning situations are influenced, not only by their cognitive abilities, but also by various self- and task-related beliefs (Shell, Colvin, & Bruning, 1995; Wigfield & Guthrie, 1997) and subsequent behaviors (Chapman, 1988; Covington, 2000; Dweck, 1986). Such cognitive-behavioral patterns, referred to here as achievement strategies, have been described in terms of successive psychological processes (Cantor & Kihlstrom, 1987; Lehtinen et al., 1995; Nurmi, Salmela-Aro, & Ruotsalainen, 1994; Pintrich & De Groot, 1990). First, when individuals are faced with a challenging task or a demanding situation, the cognitive schemata and self-conceptions constructed in previous similar kinds of situations evoke expectations of what will happen (Bandura, 1993; Cantor, 1990; Diener & Dweck, 1978). These expectations and related emotions then guide the achievement-related cognitions and behavior individuals deploy. Individuals who anticipate success typically focus on planning and investing high effort in the task (Nurmi et al., 1994; Pintrich & De Groot, 1990), whereas those who anticipate failure tend to avoid the task, evidenced in withdrawal and passivity (Diener & Dweck, 1978; Dweck, 1986) or task-irrelevant behavior (Jones & Berglas, 1978; Midgley, Arunkumar, & Urdan, 1996). Finally, after receiving information about their success in dealing with the task, individuals typically interpret the outcomes of their behavior in terms of making causal attributions, such as those related to situation, skills and effort (Butkowsky & Willows, 1980; Jacobsen, Lowery, & DuCette, 1986; Taylor & Brown, 1988).

Although various conceptualizations have been used to describe the motivational and behavioral patterns individuals deploy in academic settings (Diener & Dweck, 1978; Jones & Berglas, 1978; Lehtinen et al., 1995; Nicholls, Cheung, Lauer, & Patashnick, 1989; Skaalvik, 1997), these seems to fall into two major categories (Onatsu-Arvilommi & Nurmi, 2000): adaptive task-focused strategies and maladaptive task-avoidant strategies. The adaptive task-focused strategies, such as mastery-orientation (Diener & Dweck, 1978; Dweck, 1986, 1990), 'illusory glow optimism' (Cantor, 1990), or task-orientation (Lehtinen et al., 1995; Salonen, Lepola, & Niemi, 1998; Skaalvik, 1997), are characterized by mastery beliefs, a high degree of task involvement (Cantor, 1990; Diener & Dweck, 1978; Skaalvik, 1997), persistence (Dweck & Leggett, 1988; Onatsu-Arvilommi & Nurmi, 2000), active problem-focused coping efforts in the face of obstacles (Dweck, 1990), and a self-enhancing attributional style (Cantor, 1990; Diener & Dweck, 1978).

In contrast, maladaptive task-avoidant strategies have been described either as a passive avoidance (Diener & Dweck, 1978; Dweck, 1990) or an active avoidance pattern (Jones & Berglas, 1978; Nicholls et al., 1989). Learned helplessness, for example, is characterized by a lack of belief in personal control, which leads to passivity (Diener & Dweck, 1978) and skill-related causal attributions after failure, and external attributions after success (Dweck, 1990). Typical of self-handicapping, on the other hand, is that a person does not trust in his or her ability to handle the situation, but rather expects failure, and therefore concentrates on creating excuses instead of formulating task-relevant plans (Jones & Berglas, 1978; Midgley et al., 1996; Zuckerman, Kieffer, & Knee, 1998). Although this may provide attributional benefits, it increases the likelihood of failure (Jones & Berglas, 1978).

The research on achievement strategies in academic environments has consistently shown that the deployment of adaptive achievement strategies is associated with success in an educational context (Cantor, 1990; Diener & Dweck, 1978; Elliot & Dweck, 1988; Skaalvik, 1997), whereas the use of maladaptive, avoidant types of achievement strategies, is related to various problems in academic settings, such as low- and underachievement, learning disabilities, negative attitudes toward education, and low academic satisfaction (Butkowsky & Willows, 1980; Carr, Borkowski, & Maxwell, 1991; Chapman, 1988; Diener & Dweck, 1978; Eronen, Nurmi, & Salmela-Aro, 1997; Midgley & Urdan, 1995; Nolen-Hoeksema, Girgus, & Seligman, 1986; Nurmi, Aunola, Salmela-Aro, & Lindroos, 2000; Nurmi, Onatsu, & Haavisto, 1995; Salonen et al., 1998; Zuckerman et al., 1998).

## 1.2 School adjustment and problem behavior

School achievement has important consequences for children´s and adolescents´ future academic career, and socio-emotional and behavioral adjustment (Entwisle & Hayduk, 1988; Roeser, Eccles, & Strobel, 1998). In turn, low achievement and

learning difficulties may lead to a variety of problem behaviors and overall maladjustment (Battin-Pearson, Newcomb, Abbott, Hill, Catalano, & Hawkins, 2000).

Problem behaviors have typically been divided into externalizing problem behavior, such as conduct disturbances, substance abuse and delinquency, and internalizing problem behavior, like depression or anxiety (Barber, Olsen, & Shagle, 1994; Zahn-Waxler, 1993). Externalized distress consists of negative emotions such as anger, frustration, and fear, which are directed against others; internalized distress includes negative emotions, such as sadness, anxiety, shame and guilt, which are directed toward the self (Roeser, Eccles, & Strobel, 1998).

There has been a growing interest in the role that a variety of cognitive-motivational processes may play in the development of children´s and adolescents´ emotional and behavioral problems (Brackney & Karabenick, 1995; Dodge, 1993; Finn, 1989; Perry & Weinstein, 1998; Roeser, Eccles, & Freedman-Doan, 1999; Roeser, Eccles, & Strober, 1998). However, only a few empirical studies have so far focused on investigating such associations, particularly in non-academic settings (Nurmi et al., 1994). Because individuals´ major control beliefs and the ways of coping might be assumed to generalize across various life-domains (Bandura, 1986), the strategies pupils deploy at school may also be reflected in their problem behaviors outside the school environment. The achievement-related beliefs and behavioral tendencies may lead to problem behavior also via low school achievement and related low adjustment or, particularly during adolescence, involvement with a deviant peer group (Brown, Mounts, Lamborn, & Steinberg, 1993; Määttä, Stattin, & Nurmi, 2000; Thornberry, Lizotte, Krohn, Farnworth, & Jang, 1994).

*Consequently, the first aim of the present thesis is to investigate the role of adolescents´ achievement strategies in their school adjustment, and how both of these are reflected in their problem behaviors in nonacademic contexts. Because self-esteem has been assumed to provide a basis for individuals´ strategy use (Cantor, 1990; Dweck & Leggett, 1988; Jones & Berglas, 1978; Nurmi et al., 1994; Rhodewalt, 1990; Tice, 1991; Zuckerman et al., 1998), school adjustment (Lau & Leung, 1992; Midgley et al., 1996) and of various problem behaviors (Battin-Pearson et al., 2000; Cicchetti & Toth, 1998; Levy, 1997), the extent to which its impact on school adjustment and problem behaviors is mediated by the achievement strategies adolescents deploy is also investigated.* (Study I).

## 1.3 The role of family environment

Parents play an important role in their offsprings´ academic socialization, for example, by providing learning opportunities and guidance, encouraging and reinforcing certain behaviors, communicating expectancies, and acting as a role model. Not surprisingly, the role of parenting styles (Baumrind, 1989, 1991; Maccoby & Martin, 1983) and, more recently, parental beliefs (Frome & Eccles, 1998; Murphey, 1992) have been investigated in the context of children´s and adolescents´ academic socialization.

### 1.3.1 Parenting styles

According to Baumrind (1971, 1989, 1991), and Maccoby and Martin (1983), parenting styles consist of two dimensions. *Demandingness* refers to the extent to which parents show control, maturity demands and supervision in their parenting. *Responsiveness* refers to the extent to which parents show affective warmth, acceptance and involvement. Based on these dimensions, four parenting styles have been described (Baumrind, 1991; Maccoby & Martin, 1983), which differ also according to their impact upon children.

*Authoritative* parenting, characterized by high levels of both demandingness and responsiveness, has been shown to provide a basis for children´s and adolescents´ adaptive development, such as high school performance, adjustment, self-reliance, and intrinsic motivation (Baumrind, 1991; Dornbusch, Ritter, Liederman, Roberts, & Fraleigh, 1987; Ginsburg & Bronstein, 1993; Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Strage & Brandt, 1999; Weiss & Schwartz, 1996). It has been suggested that the positive impact of authoritative parenting on child´s development is based on the support of autonomous behavior (Hess & McDevitt, 1984), and competence-promoting feedback, such as positive parental beliefs (Gottfried, Fleming, & Gottfried, 1994).

In contrast, *authoritarian* parenting, which is characterized by a high level of demandingness but a low level of responsiveness, has been shown to be associated with passivity (Steinberg et al., 1994), dependence on adults (Maccoby & Martin, 1983), and external control beliefs (Grolnick & Ryan, 1989) and extrinsic motivation (Ginsburg & Bronstein, 1993; Leung & Kwan, 1998) among children and adolescents. Consequently, it has been suggested that an authoritarian parenting style, particularly the excess control which is involved, detracts from learning by encouraging dependence on adult control and guidance (Hess & McDevitt, 1984).

Finally, there are two kinds of nondemanding parenting styles that vary in their level of responsiveness. *Permissive* (or indulgent) parents are low in demandingness but high in responsiveness. *Neglectful* parents are neither demanding nor responsive. It has been suggested that these kinds of undercontrolled family environments do not foster self-regulation in children, and may render them more impulsive (Barber, 1996). For example, permissive and neglectful parenting styles have been found to be related to children´s and adolescents´ underachievement (Onatsu-Arvilommi & Nurmi, 1997). Children and adolescents from neglectful families, in particular, have been shown to be disadvantaged in terms of academic achievement (Baumrind, 1991; Lamborn et al., 1991; Maccoby & Martin, 1983).

Some recent research has challenged many previous notions concerning the key mechanisms of parenting. For example, according to Kerr and Stattin (2000, p. 378), "the literature offers static, unidirectional views of how parental behaviors affect adolescents or of how adolescents perceive their parents´ behavior but few insights into the more realistic, bidirectional processes through which parents and children constantly shape and reshape each other through their mutual actions

and reactions." In this context, it is important to see the difference between parenting practices and parenting styles. Although parenting practices may be seen as unidirectional parental actions and behaviors in child-rearing situations, parenting styles may be seen rather as "a constellation of attitudes toward the child that are communicated to the child and that create an emotional climate in which the parents´ behaviors are expressed" (Darling & Steinberg, 1993, p. 493). According to Darling and Steinberg (1993), parenting style is best conceptualized as a *context* within which socialization occurs, rather than as a socialization practice itself. Thus, in a broad sense, parenting styles provide a basis for the mutual communication, actions and reactions between the child and the parent reflecting the emotional climate in which the parent´s specific practices as well as the behaviors that communicate emotional attitude (e.g. gestures, tone of voice) are expressed.

It might be assumed that parenting styles do not only contribute to children´s and adolescents´ school performance and self-conceptions, but that they also have an impact on children´s and adolescent´s achievement strategies, and possibly, particularly via these, to their school achievement. However, only a few studies have thus far investigated the role of parenting styles in achievement strategies. These studies seem to suggest that the authoritative kind of parenting provides a basis for children´s deployment of adaptive achievement strategies, such as task-focused behaviors at school (Onatsu-Arvilommi, Nurmi, & Aunola, 1998), whereas non-authoritative parenting fosters maladaptive strategies, such as helplessness beliefs and lack of persistence (Onatsu-Arvilommi et al., 1998), and external attributions to success and low ability attributions for failures (Glaskow, Dornbusch, Troyer, Steinberg, & Ritter, 1997). Because only a few studies have focused on the associations between achievement strategies and parenting styles, and because these studies have mainly focused on children, *one aim of this thesis is to examine the role of parenting styles in the achievement strategies adolescents deploy at school (Study II).*

### 1.3.2 Parental beliefs

Besides parenting styles, other aspects of family environment may also play an important role in the development of the achievement strategies children and adolescents deploy at school. For example, the role of parental beliefs in children´s school performance and, particularly, in their achievement-related beliefs (Frome & Eccles, 1998; Murphey, 1992) have recently gained increased attention. Previous research has shown that parents´ beliefs and expectations about their offsprings´ competencies and school abilities do not only provide a basis for children´s performance at school (Galper, Wigfield, & Seefeldt, 1997; Gottfried et al., 1994; Hess, Holloway, Dickson, & Price, 1984; Phillips, 1987; Seginer, 1983), but also for children´s own mastery beliefs, such as self-concept of ability, control beliefs, success expectations, and perceptions of task difficulty (Eccles, 1993; Frome & Eccles, 1998; Parsons, Adler, & Kaczala, 1982; Phillips, 1987; Stevenson & Newman, 1986): parents who believe in their children´s abilities to do well at school have children who show high school performance and have a positive self-concept of ability. One possibility is that the impact of parental beliefs on

children´s academic achievement is mediated via children´s mastery-beliefs and achievement strategies. Although this possibility has been discussed in the literature (Eccles, 1993; Phillips, 1987), it has not been investigated by using cross-lagged longitudinal data. *Consequently, the present thesis focuses on investigating the role of parental beliefs in children´s school performance and achievement strategies, and, particularly, the extent to which the impact of parental beliefs on children´s school performance is mediated by the achievement strategies children deploy at school (Study IV and Study V).*

### 1.3.3 Antecedents of parenting

Although a considerable amount of research has been carried out on the relationship between parenting behaviors and beliefs, and child outcomes, less is known about why parents adopt a certain child-rearing pattern (Abidin, 1985; Darling & Steinberg, 1993). The research on the origins of parental behaviors and beliefs has focused mainly on two issues (Belsky, 1984; Maccoby & Martin, 1983). First, social address variables, such as socio-economic status, level of education, occupational status, and financial resources, have been shown to provide a basis for various aspects of parenting. It has been shown, for example, that parents from lower socioeconomic backgrounds are less warm (Solis-Camara R. & Fox, 1996), employ harsher and more authoritarian discipline (Conger et al., 1992; Dodge, Pettit, & Bates, 1994; Lempers, Clark-Lempers, & Simons, 1989; McLoyd, 1998), have lower developmental expectancies concerning their children (Solis-Camara R. & Fox, 1996), and provide less cognitive stimulation (Liang & Sugawara, 1996) than parents with a higher socioeconomic status. Moreover, parents´ low social background, particularly low financial resources, is associated with feelings of incompetence as parents (Dix, 1991; McBride, 1991; McLoyd, 1998).

Second, parents´ psychological characteristics or intrapersonal factors, such as depression, self-esteem, and control-beliefs, have been shown to be related to parenting styles. According to Belsky (1984), only a mature adult who enjoys an adequate degree of well-being is able to adopt a nurturing orientation in parenting, and provide growth-promoting care. The empirical findings support this view: depressed mothers are less responsive, more hostile, critical and controlling, less involved and more avoidant in their parenting than nondepressed mothers (for a review, see Dix, 1991). Similarly, parents´ low self-esteem and self-efficacy (Coleman & Karraker, 1998; MacPhee, Fritz, & Miller-Heyl, 1996), and low control beliefs (Bugental, Blue, & Cruzcosa, 1989; Bugental & Johnston, 2000) are associated with hostility, irritablesness and negative emotions with children.

*Consequently, the present thesis aims at investigating parents´ social background and their psychological characteristics, including self-esteem and achievement strategies, as possible antecedents of their parenting styles. Because parental stress has been shown to be associated with ineffective parenting (McBride, 1991; Snyder, 1991; Webster-Stratton & Hammond, 1988) and negative outcomes in children (Onatsu-Arvilommi et al., 1998; Webster-Stratton & Hammond, 1988), the antecedents of parental stress in parents´ social background, and self-esteem and achievement strategies, are also investigated.* (Study III)

## 1.4 Cumulative development in the school and family environments

Learning to read is a basic academic skill, particularly in the early elementary school years, which provides one major foundation for success at school thereafter (Boland, 1993; Juel, 1988; Stanovich, 1986). According to Stanovich (1986), slow progress in reading acquisition may have various cognitive, behavioral, and motivational consequences that slow down the development of other cognitive skills as well. Consequently, a variety of factors contributing to early reading development, such as knowing the names or sounds of letters, and phoneme awareness, have been studied (Goswami & Bryant, 1990; Salonen et al., 1998; Stanovich, 1986).

Mathematics is another basic academic skill, although less attention has been given to the difficulties in learning mathematics than to those in reading (Ginsburg, 1997). Besides the cognitive prerequisites for learning mathematics, such as number sense (Bryant, 1994) and strategic knowledge (De Corte, 1995), learning math has been shown to be sensitive to various motivational, cognitive, and affective influences (De Corte, 1995; Hackett & Betz, 1989; Huntsinger, Jose, Liaw, & Ching, 1997; Pajares & Graham, 1999; Pajares & Miller, 1994; Wigfield & Meece, 1988).

It has been suggested that the achievement beliefs and strategies pupils deploy at school and their school performance form self-perpetuating (Groteluschen, Borkowski, & Hale, 1990) or cumulative cycles (Onatsu-Arvilommi & Nurmi, 2000; Salonen et al., 1998) that consist of both psychological and environmental factors (Lehtinen et al., 1995; Nurmi, 1997). On the one hand, low performance in learning situations and related negative feedback may provide a basis for negative self-perceptions and failure expectations, which foster the tendency to avoid the task in further learning situations. Conversely, success in academic situations and related positive feedback promote high control beliefs and expectations, and task-focused behaviors. On the other hand, the achievement strategies pupils deploy at school may have consequences for their performance. Failure expectations and task-avoidance increase the likelihood of failure, whereas success expectations and task-focused behaviors lead to success in various learning situations.

These kinds of cumulative developmental patterns may start to develop already in the early school career (Onatsu-Arvilommi & Nurmi, 2000). It might be assumed that the first year of schooling is a particularly important developmental period because, during this period, children are for the first time faced with the challenge to master the basic academic skills, namely to read and to do mathematics, and because they also begin to receive systematic feedback on their performance (Alexander & Entwisle, 1988; Onatsu-Arvilommi & Nurmi, 2000). However, only a few studies have investigated the developmental dynamics of children´s achievement strategies and the development of their basic academic skills by using a cross-lagged, longitudinal procedure (Onatsu-Arvilommi & Nurmi, 2000; Onatsu-Arvilommi, Nurmi, & Aunola, in press).

One further limitation of the research in this field is that little is known about

the role of family environment in the development of children´s achievement strategies and their basic academic skills. It has been suggested, however, that the feedback parents provide for their children may play an important role in children´s achievement strategies. For example, Stanovich (1986) and Spear-Swerling and Sternberg (1994) suggested that children who do well in reading and are motivated have parents and teachers who place high expectations on them, which then fosters subsequent good performance. It might be assumed that during the early school years, in particular, when children´s school histories are brief and their self-perceptions and other achievement related beliefs are still developing (Alexander & Entwisle, 1988; Shell et al., 1995), the role of parents´ beliefs and expectations may be particularly important in children´s academic socialization (Murphey, 1992). For example, one basic assumption in the field is that children internalize the perceptions parents provide them (Phillips, 1987). These internalized beliefs may then provide a basis for children´s strategy use and subsequent school performance (Eccles, 1993; Parsons et al., 1982; Phillips, 1987).

It is also possible, however, that children´s academic performance, and their achievement-related beliefs and behaviors, influence their parents´ beliefs. It has been shown, for example, that parents have a tendency to overestimate their children´s abilities at the beginning of their child´s school career, but that the parental accuracy increases as the children get older (Miller, 1988; Miller, Manhal, & Mee, 1991; Seginer, 1983). Thus, feedback of children´s performance and teachers´ perceptions may have a 'corrective' effect on parents´ expectations and beliefs (Seginer, 1983).

*Consequently, this thesis focuses on examining the developmental dynamics between children´s basic academic skills, their achievement strategies, and their mothers´ and fathers´ beliefs about their children´s school performance during the first year of primary school (Study IV and StudyV).*

# 2 SUMMARY OF THE FIVE EMPIRICAL STUDIES

The present thesis focuses on investigating the developmental antecedents and consequences of the achievement strategies pupils deploy at school. The first two studies focus on adolescents, particularly the role of adolescents´ achievement strategies in their school adjustment and problem behaviors (Study I), and the role that family parenting styles play in the development of such strategies (Study II). The third study examines the extent to which parents´ social background, and their psychological characteristics, including self-esteem and achievement strategies, are associated with the kinds of parenting styles and parental stress they report. The final two studies investigate the developmental dynamics between children´s achievement strategies and their reading skills (Study IV), and achievement strategies and mathematical skills (Study V), during the first year of primary school. The role of parents´ beliefs about their children´s school competencies in this development is also examined.

The methods of the five studies are summarized in Table 1.

TABLE 1 Summary of the methods used in the original studies (I-V).

| Study | Participants | Procedure | Measurements |
|---|---|---|---|
| I<br>Adolescents´ achievement strategies, school adjustment, and externalizing and internalizing problem behaviors | - 14-year-old adolescents (n=1185) and their parents | -cross-sectional | - achievement strategies (adolescent and parent report)[a]<br>- school adjustment (adolescent and parent report)[c]<br>- internalizing problem behavior (depression scale for adolescents)[c]<br>- externalizing problem behavior (adolescent and parent report)[c]<br>- self-esteem (adolescent report)[a] |
| II<br>Parenting styles and adolescents´ achievement strategies | - 14-year-old adolescents (n=354) and their parents | -cross-sectional | - achievement strategies (adolescent and parent report)[c]<br>- parenting styles (adolescent and parent report)[a]<br>- depression (adolescent report) [control]<br>- self-esteem (adolescent report) [control]<br>- concentration ability (adolescent report)[control] |
| III<br>The role of parents´ self-esteem, mastery-orientation, and social background in their parenting styles | - sample 1: parents of first-grade children (70 mothers, 54 fathers)<br>- sample 2: parents of at least one school-age child (121 mothers, 114 fathers) | - cross-sectional | - level of education [a]<br>- financial resources [a]<br>- parenting styles [c]<br>- parental stress [c]<br>- self-esteem [a]<br>- achievement strategies [a] |
| IV<br>Developmental dynamics of reading skills, achievement strategies, and parental beliefs | - first-grade children (n = 111) and their parents | - cross-lagged longitudinal | - parental beliefs (parent report)[ac]<br>- achievement strategies (teacher rating)[ac]<br>- reading skills (test)[ac]<br>- pre-reading skills (test) [control] |
| V*<br>The role of achievement-related behaviors and parental beliefs in children´s mathematical performance | - first-grade children (n = 111) and their parents | - cross-lagged longitudinal | - parental beliefs (parent report)[ac]<br>- achievement strategies (teacher rating)[ac]<br>- mathematical performance (test)[ac]<br>- pre-mathematical skills (test) [control] |

[c] variable treated as consequence; [a] variable treated as antecedent; [control] control variable; * Studies IV and V were based on the same database.

**Study I**
**Adolescents´ achievement strategies, school adjustment, and externalizing and internalizing problem behaviors.**

The study examined the following questions: (1) To what extent adolescents´ self-esteem, school adjustment and achievement strategies are directly associated with their internalizing and externalizing problem behaviors; (2) to what extent the impact of the achievement strategies on problem behaviors is mediated by school adjustment; and (3) to what extent the impact of self-esteem on school adjustment and problem behaviors is mediated by the achievement strategies adolescents deploy.

A total of 1185 14-to-15-year-old Swedish adolescents filled in the Strategy and Attribution Questionnaire (SAQ), Rosenberg`s Self-Esteem Scale, and scales measuring school adjustment, and measuring internalizing and externalizing problem behaviors. Adolescents´ parents were asked to evaluate their offsprings´ achievement strategies, school adjustment and externalizing problem behaviors. The research questions were tested by the use of structural equation modelling. A multi-sample procedure was used to investigate whether the tested models were identical for boys and girls.

The results revealed that the lower the level of self-esteem adolescents reported, the more they displayed maladaptive achievement strategies, consisting of a high level of failure expectations, task-irrelevant behavior, and passivity. Moreover, adolescents who deployed maladaptive strategies displayed a high level of maladjustment at school (e.g. dissatisfaction, poor teacher relations) and also high levels of internalizing (depressive symptoms) and externalizing (e.g. substance abuse, delinquency) problem behaviors. The association between adolescents´ maladaptive strategies and their externalizing problem behavior was partly mediated via their low school adjustment. The association between adolescents´ low self-esteem and externalizing problem behavior was mediated via their deployment of maladaptive achievement strategies and low school adjustment. Only a few gender differences were found. For example, the association between maladaptive achievement strategies and externalizing problem behavior was stronger among boys than among girls, whereas the association between achievement strategies and internalizing problem behavior was stronger among girls than among boys. The results suggest that the achievement strategies adolescents deploy provide a basis not only for their school adjustment, but also for their overall problem behavior and low adjustment.

**Study II**
**Parenting styles and adolescents´ achievement strategies.**

The aim of the study was to investigate the extent to which adolescents´ achievement strategies are associated with the parenting styles they experience in their families. Further aims were to investigate whether these associations would vary by gender, and whether controlling for adolescents´ self-esteem, depression, and concentration ability would influence any of the associations between

parenting styles and adolescents´ achievement strategies.

Three hundred and fifty-four 14-year-old Swedish adolescents filled in a Strategy and Attribution Questionnaire and a Family Parenting Style Inventory, which included subscales for Monitoring[1], Child Disclosure, Parental Control, Parental Trust, Parental Engagement, and Experienced Control. Adolescents also filled in scales measuring their self-esteem, depressive symptomatology, and concentration ability. The adolescents´ parents filled in questionnaires assessing their offsprings´ achievement strategies and the family parenting styles. The questionnaires were analogous to those filled in by the adolescents.

In order to identify homogeneous groups of adolescents´ families according to their parenting styles, a clustering by cases procedure was carried out using adolescent-reported parenting styles scores as criteria variables. Four groups of families were identified: authoritative, authoritarian, permissive, and neglectful. The results obtained on the basis of the parents´ questionnaire validated this solution. The comparison of the adolescents in the four different family groups showed that adolescents from authoritative families applied the most adaptive achievement strategies, which were characterized by low levels of failure expectation, task-irrelevant behavior and passivity, and the use of self-enhancing attributions. Adolescents from neglectful families applied the most maladaptive strategies, characterized by high levels of task-irrelevant behavior, passivity and a lack of self-enhancing attributions. Authoritarian parenting was also found to be associated with the deployment of maladaptive strategies, particularly passive behavior and a lack of the use of self-enhancing attributions. Adolescents from permissive families showed more adaptive strategies than those coming from neglectful families. However, they differed only with respect to their causal attributions from those coming from authoritarian families: they reported a higher level of self-enhancing attributions than adolescents from authoritarian families. The results were nearly identical for both the self-reported and parent-reported achievement strategies of adolescents. After controlling for the effects of self-esteem, depression, and concentration ability, parenting styles were still associated with adolescents´ parent-reported achievement strategies and self-reported passivity and task-irrelevant behavior. Gender differences revealed that girls reported a lower use of self-enhancing attributions and a higher level of failure expectation than boys. They also showed a lower level of self-enhancing attributions, according to their parents. However, according to the parents, boys showed more failure-expectations and task-irrelevant behaviors than girls.

Overall, the results suggest that family relations characterized by responsiveness, such as child disclosure, parental trust and engagement, on the one hand, and demandingness, such as parental control, on the other hand, seem to provide a basis for the adolescents´ adaptive achievement strategies. In contrast, family relations characterized either by an overall uninvolvement, or high demandingness but low responsiveness, seem to lead to the use of maladaptive achievement strategies among adolescents.

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[1] Based on Stattin and Kerr´s (2000) reinterpretation of the monitoring literature, the term 'monitoring' refers here to parental knowledge about their offsprings´ wherabouts rather than parents´ active surveillance efforts.

**Study III**
**The role of parents´ self-esteem, mastery-orientation and social background in their parenting styles.**

Two research questions were investigated: (1) the extent to which parents´ social background, including levels of education and financial resources, and psychological characteristics, such as self-esteem and the use of a mastery-oriented versus a task-avoidant achievement strategy, are associated with their parenting styles and parental stress; and (2) the extent to which the impact of background factors and self-esteem on parenting styles and parental stress would be mediated by the achievement strategies parents deploy. In order to control the impact of parents´ gender, this was included as an independent variable. To examine these questions, data from two samples were analyzed.

In the first sample, parents of 105 6-to-7-year old children were asked to fill in scales measuring their parenting styles and parental stress, self-esteem, achievement strategies, financial resources, and their level of education. In the second sample, 235 parents were asked to fill in the same scales. Two parenting styles, authoritative and authoritarian, and parental stress, were under investigation. Factor analyses were used to validate this theoretical distinction. The associations between the variables of interest were investigated by the use of path analyses.

An identical pattern of results was found for the two samples. Parents´ self-esteem and their use of a mastery-oriented strategy were found to be associated with authoritative parenting and low parental stress: parents who had a high level of self-esteem and who deployed a mastery-oriented strategy were less stressed in their parenting roles and reported a high level of authoritative parenting, characterized by positive attachment, the expression of affection, encouragement of the child´s independence, rational guidance, and supervision of the child. The impact of parents´ self-esteem on authoritative parenting and parental stress was partly mediated by their use of a mastery-oriented strategy. Parents´ low level of education was related to an authoritarian parenting style characterized by strict control. The results showed further that an authoritative parenting style was more typical of mothers than fathers. In the second sample, mothers were also more stressed by parenting than fathers, whereas fathers were more authoritarian in their parenting than mothers. These results suggest that an authoritative parenting style may have its basis in the individual´s personality characteristics and learning history, as evidenced in positive self-schemata and the use of adaptive achievement strategies, whereas authoritarian parenting may be more related to a set of cultural beliefs and values typical of a specific social class and educational background.

**Study IV**
**Developmental dynamics of reading skills, achievement strategies, and parental beliefs.**

The study investigated the following research questions: (1) To what extent does children´s use of a task-avoidant versus a task-focused achievement strategy

predict the development of their reading skills? (2) To what extent do children´s reading skills predict their subsequent use of a task-avoidant versus a task-focused achievement strategy? (3) To what extent do parents´ general beliefs about their children´s school performance, and skill-specific beliefs concerning reading, predict the children´s subsequent use of a task-avoidant versus a task-focused achievement strategy and their reading skills? (4) To what extent is the impact of parental beliefs on their children´s reading skills mediated by the children´s achievement strategies? (5) To what extent do the achievement strategies children deploy, and their reading skills, predict their parents´ subsequent general beliefs about their children´s school performance and skill-specific beliefs concerning reading?

One hundred and eleven 6-to-7-year-old children participated in the study. The children were examined five times during their first school year. First, their pre-reading skills were tested in August, just at the beginning of the school year. Then, they were subsequently tested four times during their first school year - in October, December, January and April - using the Reading Skill Test. In the same time periods, participants´ behavior in the classroom context was rated by their teacher using the Behavioral Strategy Rating Scale. Parents filled in questionnaires measuring their general beliefs about their child´s school competence and their reading-specific beliefs at the beginning and at the end of the school year. The research questions were investigated by the use of a structural equation model carried out separately for mothers´ and fathers´ data. A multi-sample procedure was used to investigate whether an identical model would fit for boys and girls.

The results found were similar for boys and girls. Also, the results were closely analogous for mothers and fathers. They showed, first, that both the task-avoidant versus task-focused achievement strategy children deployed in the classroom, and their level of reading skills, were substantially stable across the four measurements. Furthermore, children who deployed a task-avoidant rather than a task-focused achievement strategy at school performed less well in reading later on. Moreover, a low level of reading skills increased children´s subsequent task-avoidance, but only during the second half of the school year.

The results showed further that the beliefs parents had about their children´s overall school competence predicted the kinds of achievement strategy the children deployed at school, which further influenced the development of the children´s reading skills: parents´ high beliefs in their children´s school competence increased their children´s use of a task-focused strategy and, conversely, decreased task-avoidance. This then increased the children´s reading performance. The findings also revealed that the achievement strategies children deployed at school predicted their mothers´ and fathers´ general beliefs about the children´s school competence: children´s use of a task-avoidant strategy decreased parents´ subsequent beliefs in their children´s overall school competence, whereas children´s deployment of a task-focused strategy increased them. Results concerning parents´ skill-specific beliefs revealed that the children´s high level of reading skills increased the mothers´ high beliefs in their offsprings´ reading competence.

**Study V**
**The role of achievement-related behaviors and parental beliefs in children´s mathematical performance.**

The study investigated the following research questions: (1) To what extent do children´s deployment of a task-focused versus a task-avoidant behavior at school predict their subsequent mathematical performance, or is it rather the children´s mathematical performance that predicts their behaviors? (2) To what extent do parents´ general beliefs about their offsprings´ school competence, and their skill-specific beliefs concerning mathematics, predict their children´s mathematical performance later on? (3) To what extent do parents´ general beliefs and math-related beliefs predict their children´s use of a task-focused versus a task-avoidant behavior? And, in particular, to what extent is the impact of parental beliefs on children´s mathematical performance mediated by the behaviors children show at school? (4) To what extent does a task-focused versus a task-avoidant behavior children show at school, and their mathematical performance, contribute to their parents´ general and math-related beliefs of their offsprings´ school competence?

The data used in Study V was the same as that used in Study IV. One hundred and eleven 6-to-7-year-old children participated in the study. The children were examined five times during their first school year. Their pre-mathematical skills were first tested in August, just at the beginning of their first school year. Then, they were tested using the Mathematical Skill Test, and also rated by their teachers using the Behavioral Strategy Rating Scale, in October, December, January and April. Parents filled in questionnaires measuring their general beliefs about their children´s school performance and their math-specific beliefs at the beginning and at the end of the school year. The research questions were investigated by the use of a structural equation model carried out separately for mothers´ and fathers´ data. A multi-sample procedure was used to investigate whether an identical model would fit for boys and girls.

The results showed that it was children´s task-focused versus task-avoidant behaviors that seemed to predict their further math performance rather than vice versa: children who showed task-focused behavior rather than task-avoidance at school showed a higher performance in mathematics later on. The results showed further that there was an indirect impact from parents´ general beliefs to children´s math performance via children´s achievement-related behaviors: parents´ high beliefs in their children´s overall school competence increased their children´s task-focused behavior and, conversely, decreased task-avoidance. This then increased children´s mathematical performance later on. The results concerning parents´ skill-specific beliefs revealed that parents´ beliefs in their offsprings´ mathematical competence increased their children´s subsequent math performance, which further increased parents´ math-related beliefs.

Overall, the results of studies IV and V suggest that the cumulative developmental cycle between children´s achievement strategies and their school performance seems to extend to the family influences as well.

# 3 DISCUSSION

The studies on which the present thesis is based investigated the developmental antecedents and consequences of the achievement strategies pupils deploy at school. Overall, the results suggest that the parenting styles as well as mothers´ and fathers´ beliefs about their offsprings´ school competence play an important role in the development of children´s and adolescents´ achievement strategies. Moreover, the kinds of strategies the children deploy at school not only have major consequences for their school performance and overall adjustment but also contribute to the parents´ beliefs concerning their offsprings´ school performance.

## 3.1 Adolescents´ achievement strategies, school adjustment, and problem behavior

The results revealed that the kinds of achievement strategies adolescents deployed at school were associated with their adjustment in many ways. The results of Study I showed that adolescents who deployed maladaptive achievement strategies, evidenced in failure expectations, task-irrelevant behavior and passivity, were typified by low school adjustment, which was characterized by poor teacher relations and dissatisfaction with school work. They also showed a high level of externalizing problem behavior and normbreaking activity. This association between maladaptive achievement strategies and externalizing problem behavior was partly mediated via low school adjustment. Thus, it is possible that the use of maladaptive achievement strategies fosters low achievement and poor school adjustment, as evidenced in non-involvement in school activities (Cox, 1996; Lau & Leung, 1992; Leung & Lau, 1989; Vazsonyi & Flannery, 1997) and a lack of related future prospects (Nurmi, 1997; Rönkä, 1999). These may then increase adolescents´ vulnerability to various distress and adjustment problems in a nonacademic context (Roeser, Eccles, & Sameroff, 1998; Roeser, Eccles, & Strobel, 1998; Rosenberg, Schooler, & Schoenbach, 1989).

Another possibility is that use of maladaptive achievement strategies leads to association with deviant peers who may also deploy a similar maladaptive strategic pattern (Määttä et al., 2000). This involvement in a deviant peer group may then increase problem behavior, such as delinquent acts, substance abuse (Ary, Tildesley, Hops, & Andrews, 1993; Lerner & Galambos, 1998; Thornberry et al., 1994), and antisocial attitudes (Patterson, DeBaryshe, & Ramsey, 1989).

Adolescents who deployed maladaptive achievement strategies also reported a high level of internalizing problem behavior, operationalized here as depressive symptomatology. One possible explanation for this particular result is that the use of maladaptive achievement strategies and internalizing problem behavior are both characterized by negative cognitions, such as a negative attributional style (Abramson, Seligman, & Teasdale, 1978; Cicchetti & Toth, 1998; Nolen-Hoeksema et al., 1986; Peterson & Seligman, 1984), self-focused ruminative thinking (Pyszczynski & Greenberg, 1986), self-doubt (Bandura, Pastorelli, Barbaranelli, & Caprara, 1999) and low control beliefs (Cicchetti & Toth, 1998; Diener & Dweck, 1978; Hammen, 1988; Petersen, Compas, Brooks-Gunn, Stemmler, Ey, & Grant, 1993). The other possibility is that the maladaptive achievement strategies reflect an emotion-focused coping style (Jorgensen & Dusek, 1990; Rijaveck & Brdar, 1997), which has been shown to be related to depression and high psychological distress. Optimism (Taylor & Brown, 1988) and active coping efforts (Herman-Stahl & Petersen, 1996), on the other hand, have been found to be associated with an overall well-being.

Interestingly, the association between achievement strategies and externalizing problem behavior was found to be stronger among boys than among girls, whereas that between achievement strategies and internalizing problem behavior was stronger among girls than among boys. Boys also showed a higher level of externalizing problem behavior than girls, whereas girls reported more internalizing problems. These results accord well with previous research findings: males have been shown to be more prone than females to resorting to externalizing behaviors under stress, whereas females are more prone to report internalizing problem behavior (Cicchetti & Toth, 1998; Nolen-Hoeksema & Girgus, 1994; Rönkä, 1999). The gender differences in the achievement strategies adolescents deployed were also in accordance with these results: active task-avoidance was more typical of boys than girls, whereas girls were characterized by a higher level of negative cognitions and passive task-avoidance than boys (Studies I and II). Taken together, these results suggest that girls and boys have a tendency to use different kinds of dysfunctional achievement strategies, and these also seem to lead to different kinds of problem behavior.

Adolescents´ self-esteem has been shown to be one of the major predictors of low adjustment and a high level of problem behavior (Lau & Leung, 1992; Lerner, & Galambos, 1998). The results of the present study suggest that these associations between self-schemata and externalizing problem behavior are partly due to the fact that low self-esteem increases individuals´ use of maladaptive achievement strategies (Berglas, 1985; Cantor, 1990; Dweck & Leggett, 1988; Jones & Berglas, 1978; Midgley & Urdan, 1995; Nurmi et al., 1994, 1995; Rhodewalt, 1990; Rosenham & Seligman, 1984; Tice, 1991; Zuckerman et al., 1998) and low school achievement and related school maladjustment (Carr et al., 1991; Lau &

Leung, 1992; Midgley et al., 1996), which then predispose them to externalizing problem behavior.

Overall, earlier research has shown that adolescents´ deployment of maladaptive achievement strategies is associated with their low- and underachievement at school (Diener & Dweck, 1978; Midgley & Urdan, 1995). The present results add to this literature, showing that adolescents´ use of maladaptive achievement strategies is not only associated with their school performance and adjustment but also with their overall problem behaviors.

## 3.2 The family as the foundation for adolescents´ achievement strategies

The results of this thesis revealed that family parenting styles seem to provide a basis for adolescents´ achievement strategies in many ways. The results of Study II (Figure 2) showed that authoritative parenting was associated with adolescents´ use of adaptive achievement strategies: adolescents from these kinds of families showed low levels of failure expectations, task-avoidant behaviors and passivity. They also reported a frequent use of self-enhancing attributions. Consequently, encouragement of autonomy, opportunities to learn competencies in an atmosphere of acceptance and trust and competence-promoting feedback (e.g. positive parental beliefs; Studies IV and V) (Frome & Eccles, 1998; Litovsky & Dusek, 1985), all of which are typical of authoritative parenting (Maccoby & Martin, 1983), may be the major underlying mechanisms fostering adaptive strategies among adolescents. Another possibility is that the tendency of authoritative parents to provide optimal challenges (Maccoby & Martin, 1983) fosters adolescents´ control beliefs, encourages independent and active problem solving (Ginsburg & Bronstein, 1993; Hess & McDevitt, 1984), and related deployment of adaptive achievement strategies. It is also possible that authoritative parents provide positive experiences around academic tasks for their adolescent child by their own task-related engagement and acting as a positive role model. The results of Study III support this view by showing that authoritative parents reported a frequent use of adaptive achievement strategies and high self-esteem.

By contrast, neglectful parenting, characterized by an overall uninvolvement, a lack of parental trust, engagement and control, seemed to increase adolescents´ use of maladaptive achievement strategies, such as failure expectations, passivity, task-irrelevant behavior, and low use of self-enhancing attributions. Similarly, authoritarian parenting including a high level of control but lack of responsiveness, such as trust and child disclosure, was associated with the deployment of maladaptive achievement strategies among adolescents. This detrimental effect of authoritarian and neglectful parenting may be due to lack of parental encouragement and support, which will tend to foster young people´s doubts about their own competencies (Barber, 1996; Seligman & Peterson, 1986)

and, thereby, expose them to the use of task-avoidant strategies and negative causal attributions. Similarly, parents´ criticism and lack of trust may convince adolescents that they are not competent to solve difficult problems or that they lack the personal control to do so (Barber, 1996; Nolen-Hoeksema, Mumme, Wolfson, & Guskin, 1995; Seligman & Peterson, 1986).

The fact that both of the nonresponsive parenting styles - neglectful and authoritarian parenting styles - were associated with maladaptive strategies among adolescents (Figure 2) suggests that it may be the lack of responsiveness rather than demandingness that plays a key role in the development of maladaptive achievement strategies. The result that adolescents from permissive families showed more adaptive strategies than those coming from neglectful families, and that they also reported a higher level of self-enhancing attributions than those coming from authoritarian families, is in accordance with this notion. These findings fit well with the theories concerning the development of self-system (Cicchetti & Toth, 1998; Sroufe, 1990). For example, it has been suggested that parents´ accessibility and responsivity are important determinants of children´s self-representations as acceptable and valued, whereas parental unavailability or rejection relates to self-representations as unlovable and unworthy (Cicchetti & Toth, 1998). Individuals´ general and contingent self-worth, in turn, has been assumed to be the key determinant of achievement strategies (Burhans & Dweck, 1995; Heyman, Dweck, & Cain, 1992). For example, according to Burhans and Dweck (1995) it is a lack of the sense of contingent worth that is the earliest and most basic condition for such maladaptive response patterns as helplessness to occur.

In previous research parenting styles have been shown to be associated with young people´s school performance (Dornbusch et al., 1987; Lamborn et al., 1991; Steinberg et al., 1994; Weiss & Schwartz, 1996) and various problem behaviors (Baumrind, 1991; Slicker, 1998, for a review). The results of Study II concerning the role of parenting styles in adolescents´ achievement strategies provide a basis for understanding some possible mechanisms underlying the associations between parenting styles and adolescents´ problem behavior. It may be that parenting styles provide a basis for adolescents´ school performance and problem behavior specifically via their impact on adolescents´ achievement strategies.

Study III examined parents´ social background and psychological characteristics as antecedents of their parenting styles. The findings that parents´ high level of self-esteem and the use of an adaptive achievement strategy were associated with their authoritative parenting style and low level of parental stress suggest that an authoritative parenting style, as well as parental stress, may have their basis in the individual´s personality characteristics and learning history (Belsky, 1984). For example, it may be that parents with high self-esteem have been brought up according to an authoritative and supporting style, which is then reflected in their use of a similar type of parenting with their own children. Parents with a high self-esteem and who deploy a mastery-oriented strategy may also have more positive attitudes towards their own skills overall, and parenting skills in particular, than parents who have a lower level of self-esteem and who report maladaptive task-avoidant strategies. These mastery-oriented child-rearing beliefs may then help them to maintain positive affects and attachment toward

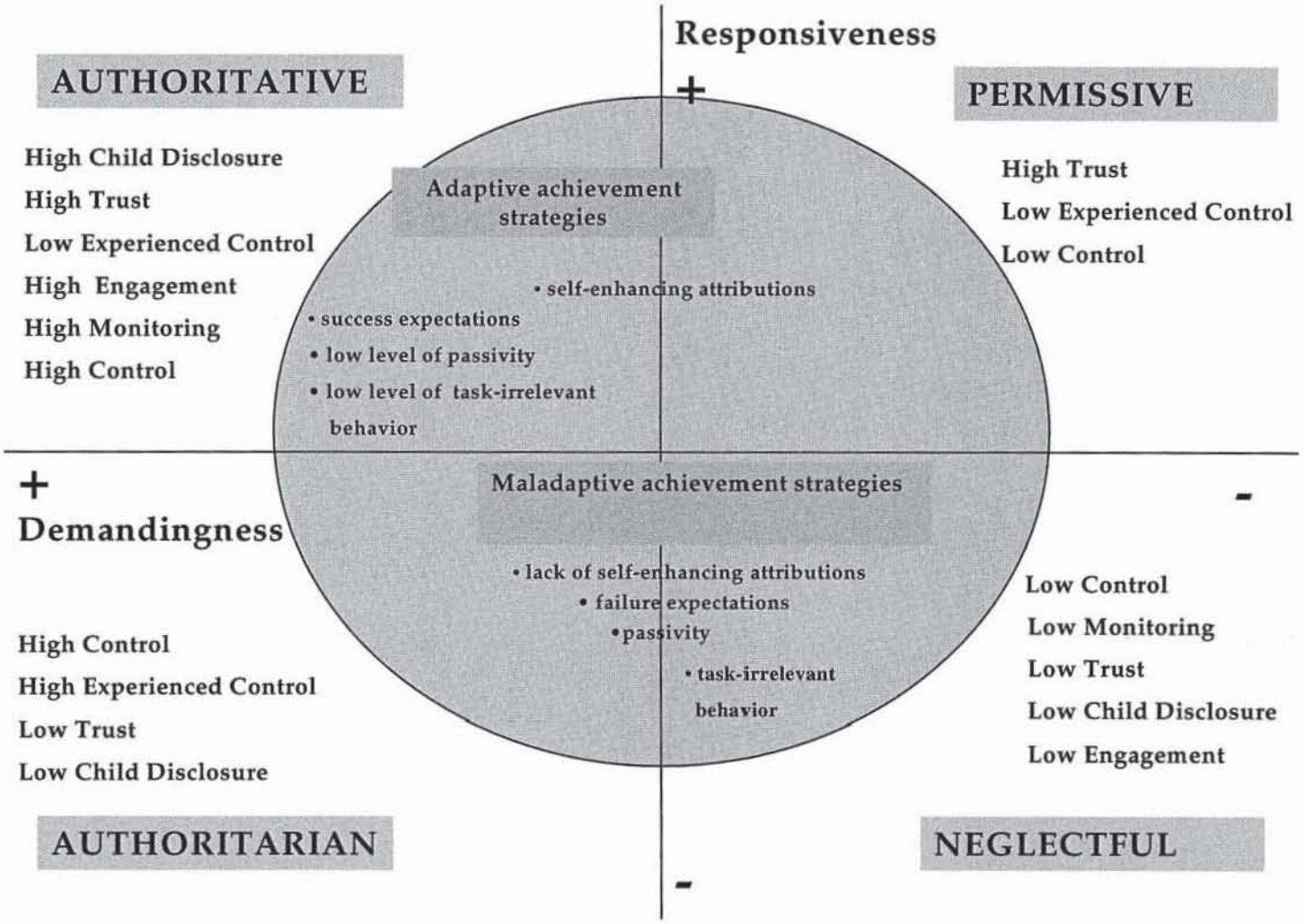




FIGURE 2 The role of parenting styles in adolescents´ achievement strategies.

their children even in cases of failure or in conflict situations. One further possibility is that mastery-oriented parents may try to teach similar kinds of strategic behavior to their children as they apply themselves. They may, for example, try to promote the child´s self-reliance by encouraging his or her independence, and by creating a warm and success-facilitating environment typical of authoritative parenting (Baumrind, 1989; Maccoby & Martin, 1983).

The fact that authoritarian parenting was found to be associated with parents´ low education rather than psychological characteristics, suggests that authoritarian parenting may be more related to a set of cultural beliefs and values typical of a specific social class and educational background than to parents´ individual characteristics and related learning history. It is possible, for example, that involvement in higher education provides people with knowledge and attitudes, favorable to softer child-rearing patterns than in the authoritarian parenting style (Goodnow, 1988; Schaeffer, 1991).

Overall, the research on the role of parenting styles in young peoples´ achievement strategies might be summarized as follows. First, a responsive but demanding family environment seems to provide a basis for adaptive strategies in children and adolescents. This kind of parenting is typical of parents who themselves report high well-being, e.g. deployment of an adaptive achievement strategy and high self-esteem. Second, family environments characterized by nonresponsiveness seem to lead to maladaptive achievement strategies in children and adolescents. This parental nonresponsiveness is associated with parents´ low well-being and, when related to an authoritarian parenting style in particular, parents´ low level of education.

## 3.3 Developmental dynamics of achievement strategies, basic academic skills, and parental beliefs during the first school year

The results revealed that children´s achievement strategies already had consequences for their school performance during the first school year: children who deployed task-focused behaviors in the classroom showed improvements in their reading (Study IV) and mathematical performance (Study V) later on. In contrast, those who showed task-avoidance performed less well in reading and mathematics. This accords with previous cross-sectional findings of the role of achievement-related beliefs and behaviors in school performance (Entwisle & Alexander, 1990; Galper et al., 1997; Pajares & Miller, 1994). These results suggest that, besides reading and math related cognitive skills, such as knowledge of the alphabet and phonemic awareness (Goswami & Bryant, 1990; Salonen et al., 1998; Stanovich, 1986) or number sense and strategic knowledge (Bryant, 1994; De Corte, 1995), the ways in which children deal with demanding tasks in the classroom provide a basis for how they progress in learning basic academic skills, and also the extent to which they show learning difficulties (Vauras, Lehtinen, Olkinuora, & Salonen, 1993).

It has been suggested that the achievement strategies children deploy at school and their basic academic skills form a cumulative developmental cycle during the first year of primary school (Onatsu-Arvilommi & Nurmi, 2000; Salonen et al., 1998). The results of the present study confirm this notion in the context of reading skill development: besides the fact that task-focused behaviors increased children´s subsequent reading performance, children´s high level of reading performance led to an increase in task-focused behaviors, whereas reading difficulties increased task-avoidance. However, this was evident only during the second half of the first school year. The finding that children´s math performance was not reflected in their strategy use, but reading performance was, may reflect the fact that during the first school year more time is devoted to teaching reading than mathematics. Consequently, children may receive more systematic feedback on their progress in reading compared to that in mathematics, and therefore this may be more influential for their subsequent strategy use. The role of mathematics may, however, increase later on during the school years.

The findings showed further that parental beliefs are also involved in this cumulative development: parents´ high beliefs in their children´s school competence seemed to increase their children´s use of a task-focused strategy and, conversely, decrease their task-avoidance, which was then reflected in the children´s subsequent reading and mathematical performance. This is in accordance with the earlier notion that children´s self-perceptions and task-orientations might mediate the impact of parental beliefs on children´s school achievement (Murphey, 1992; Phillips, 1987). There are many alternative ways in which parental beliefs may provide a basis for their children´s achievement strategies. For example, parents´ beliefs may provide a basis for children´s own self- and task-perceptions (Frome & Eccles, 1998; Parsons et al., 1982; Phillips, 1987; Stevenson & Newman, 1986) and, consequently, their task-focused or task-avoidant behavior, which is then reflected in their school performance. Another possibility is that parents´ general beliefs about their children´s academic competencies are associated with authoritative parenting styles (Murphey, 1992), effective scaffolding (Pratt, Green, MacVicar, & Bountrogianni, 1992) and rational guidance (Maccoby & Martin, 1983), which have been shown to motivate children´s active problem solving attempts (Ginsburg & Bronstein, 1993; Lyytinen, Rasku-Puttonen, Poikkeus, Laakso, & Ahonen, 1994) and subsequent school performance (Lyytinen et al., 1994). The results of this thesis concerning the role of parenting styles in adolescents´ achievement strategies (Study II) are in accordance with this view: adolescents from authoritative family environments deployed adaptive and task-focused achievement strategies.

However, the results also revealed that the strategies children deployed at school contributed to their parents´ general beliefs. Children´s use of a task-avoidant strategy decreased parents´ subsequent beliefs in their children´s competencies, whereas children´s deployment of a task-focused strategy increased them. This was true even after controlling for the level of parents´ earlier general beliefs and the level of children´s reading or mathematical performance. These results suggest that, besides school performance (Frome & Eccles, 1998; Seginer, 1983), also the strategies children deploy at school provide information for parents about how the child will do at school later on.

The fact that it was parents´ general beliefs, rather than their skill-specific beliefs concerning their offsprings´ reading or math skills, which contributed to the children´s strategy use and were also influenced by it, may be due to the fact that parents´ general beliefs about their children´s school performance reflect to a larger extent their 'core beliefs' concerning their children than the skill-specific beliefs do. Thus, parents´ general beliefs may be more comprehensively reflected in the ways parents treat their children, and also more comprehensively reflected in the interaction between the child and the parent.

Although a number of studies have shown that parents´ educational expectations and their beliefs in their children´s competence are associated with children´s school achievement and achievement related beliefs, most of the studies have been cross-sectional, and have not provided information about the prospective relationships between parental beliefs and child outcomes (for a review, see Murphey, 1992). The results of Studies IV and V add to the earlier literature by showing that the positive and negative cumulative cycles consisting of children´s achievement strategies, and their basic academic skills (Onatsu-Arvilommi & Nurmi, 2000), seem to extend to family influences as well. This is consistent with the notion of Nolen-Hoeksema et al. (1995), who suggested that the mutual interaction of children´s tendencies to helpless response patterns with parental behaviors and beliefs may create cycles of negative interaction.

In sum, the findings reported in this thesis suggest that parents´ beliefs, children´s achievement strategies and basic academic skills form cumulative developmental cycles, either positive or negative, during the children´s first school year: parents´ beliefs in their children´s school competencies increase their offsprings´ use of a task-focused achievement strategy, and via this, also impact their reading and math performance. Children´s deployment of a task-focused strategy is further reflected in their parents´ high performance expectations. Parents´ low expectations, in turn, lead to a negative cycle: i.e. task-avoidance and low performance.

## 3.4 Implications for intervention

The results of this thesis provide a basis for, at least, the following conclusions concerning interventions. Firstly, the achievement strategies children deploy provide a basis for, at least, part of their problems in learning from the beginning of the school years. This suggests that there may be a need to initiate interventions and preventive programs as early as possible. Secondly, the achievement strategies children and adolescents deploy do not only provide a basis for low- and underachievement but also different kinds of problem behavior. Thirdly, family environment seems to play an important role in the development of dysfunctional strategies and low achievement.

One possibility to build up a prevention program is to focus on enhancing pupils´ mastery and control beliefs in order to motivate them to deploy a task-focused rather than a task-avoidant behavior in classroom contexts. An increase

in task-focused response patterns in academic contexts might be assumed to lead to better academic performance and adjustment, which may then decrease pupils overall problem behavior as well. Vauras et al. (1993) have suggested that enhancing the meaningfulness of learning tasks, on the one hand, and modeling coping activities, such as persistence and active coping efforts in the face of difficulties, on the other hand, increase children´s motivation and task orientation in learning situations. It has also been suggested that environments that emphasize learning over performance may foster adaptive achievement strategies among children and adolescents (Roeser, Eccles, & Sameroff, 1998; Skinner & Belmont, 1993).

Early intervention with children who have learning difficulties in reading or mathematics may benefit from efforts to integrate motivational training into the training of cognitive skills (Vauras, Lehtinen, Kinnunen, & Salonen, 1992). More specifically, because the causal relationship between achievement strategies and reading skill development appears to be bidirectional, interventions should be targeted at both the deployment of maladaptive achievement strategies and reading difficulties and disabilities. In this context, scaffolding, where a more competent person helps the child to move from where the child is now, to where the child can be with help (Vygotsky, 1978), could be an effective way to foster adaptive development: providing optimal challenges and related success experiences in the area where the child has difficulties may lead to improvements both in particular skills as well as more positive control beliefs, self-perceptions and an increase in task-focused behaviors. Similarly, providing experiences of success in a particular school subject may lead to improvements in self-perceptions and control beliefs that then generalize to other subjects as well.

The results of this thesis also suggest that interventions focusing on the family may be helpful in promoting pupils´ school performance and related adjustment, and assisting them with learning difficulties. Such family-oriented interventions may be targeted to encourage parental beliefs and behaviors that promote positive self- and achievement-related beliefs and task-focused behavior in children and adolescents. The results of the present study and of some previous ones (Glaskow et al., 1997; Onatsu-Arvilommi et al., 1998) suggest that instructing parents on practices that emphasize both responsiveness and demandingness and, more specifically, encouragement of active problem solving attempts, parental involvement, opportunities to learn in a positive, supporting atmosphere, and optimal challenges in relation to the skill level of the child, may all support the development of children´s adaptive achievement strategies. Moreover, family-oriented interventions that foster parents´ positive beliefs about their children´s school performance may strengthen children´s task-focused efforts and decrease their task avoidance and, in this way, improve their school performance and related adjustment. The findings of Study III suggest that such parental behaviors and beliefs might be enhanced by focusing on parental well-being. Because low parental well-being and personal distress are risk factors for various difficulties in parenting (Cicchetti & Toth, 1998; Coleman & Karraker, 1998; McLoyd, 1998), and parents with negative emotions also appraise their children more negatively (Bugental & Johnston, 2000; Dix, 1991), it is particularly important to focus on the factors that enhance parental well-being and personal resources. The fact that the

authoritarian parenting style was found to be associated with parents´ low level of education, perhaps reflecting their cultural beliefs, suggests that its negative effect on young people´s development might best be prevented by providing parents with guidance about alternative child rearing styles and their positive impacts.

In addition to the specific interventions and preventive programs suggested here the results of the present thesis may also have broader implications for educational policy, teacher education, and family work. If children´s achievement strategies already develop before the first school year, as the studies presented here suggest (Study IV and Study V), this would mean that children start their school career not only with different levels of cognitive skills but also with different levels of personal resources and motivational tendencies to cope with learning tasks. From the educational point of view, this means that besides good didactic skills, teachers may need skills and tools to deal with these motivational differences between children. This then raises new challenges for teacher education. For example, one educational goal might be to encourage teachers to promote children´s adaptive development in a holistic way which takes into account both the development of cognitive skills and achievement related beliefs and behaviors. Similarly, there is a need to raise the issues concerning the collaboration between school and family to a more central position already in teacher education.

The results of the present thesis have some implications for family work as well. The results showing that parental beliefs impact children´s achievement strategies and performance suggest that one has to be careful in the kind of information that is given to the parents concerning a child´s competence. For example, testing a child, and providing general information about his or her low competence, without specifying the problems, may in fact lead to an increase rather than a decrease in child problems at school. Similarly, the findings that parental well-being plays an important role in parenting styles and parental stress, and that children´s performance and behavioral patterns are reflected in parents´ expectations, suggest that emphasis should be put on recognizing the family as a system when providing professional consultation in parenting issues. For example, providing support for parents´ own competence and positive feedback about their children may produce more positive results than giving only information about supportive parenting styles. In fact, consultation in parenting issues without taking account of parents´ personal resources may lead to opposite outcomes than those expected because they may increase parental stress and feelings of incompetence. These may then be reflected negatively in the whole family system.

## 3.5 Limitations

There are at least five limitations which should be taken into account when generalizing the findings of this thesis. The first limitation is that Studies I, II, and

III were cross-sectional. Thus, no conclusions can be drawn concerning the causal relationships between the variables. For example, although it was assumed that the maladaptive achievement strategies lead to various kinds of maladjustment, it is also possible that it is the maladjustment and problem behavior which lead to the use of certain kinds of achievement strategies. Similarly, it is possible that adolescents´ achievement strategies influence their parents´ child-rearing styles rather than vice versa. Cross-lagged longitudinal designs are needed to confirm the hypothesized antecedents and consequences of the achievement strategies adolescents deploy.

The second limitation is that the sample size of the data used in Studies IV and V was relatively small. This was the case particularly with the fathers´ data. Thus, the results of structural equation modeling must be interpreted with caution. An additional limitation of Studies IV and V was that although the findings were based on a cross-lagged longitudinal data, it is possible that there are some other variables behind the obtained path coefficients. For example, it is possible that there is a shared genetic background behind the parents´ and children´s math and reading performance, which may be reflected in their attitudes (Miller, 1988).

One further limitation of the thesis is that in Study I, only one indicator was used to measure internalizing problem behavior, namely depressive symptomatology. However, there are other indicators of internalizing problem behaviors as well, such as anxiety or psychosomatic problems (Achenbach, 1982).

Finally, in Study II, the parenting styles reported by parents were rated by either the mother or the father, or both together. This was not an ideal choice, since the mother and the father in the same family may show different kinds of parenting. Mothers´ and fathers´ parenting styles may also play a different role in their offsprings´ achievement strategies. Consequently, there is a need to replicate the findings of Study II, measuring parenting styles separately for mothers and fathers.

## 3.6 Future directions

Previous research on the consequences of achievement strategies has focused mainly on academic outcomes rather than on broader and interrelated patterns of academic, cognitive, socio-emotional, and behavioral functioning (Perry & Weinstein, 1998). The results of this study showed that the achievement strategies adolescents deployed were associated with their maladjustment in many ways (Study I). However, the problems evident in adolescence may start to develop earlier during the school career. For example, Roeser et al. (1999) have recently shown that academic problems and low motivation, and emotional and behavioral problem behaviors, often co-occur and persist from a very early point of schooling. Consequently, there is an obvious need to investigate the prospective relationships of problem behaviors, learning difficulties, and cognitive motivational processes over time in order to understand the complex nature of the development during the early school years (Roeser, Eccles, & Strobel, 1998).

The fact that achievement strategies are already influential during the first school year and have consequences for early reading and math development (Studies IV and V) leads to the question of when and how such strategies start to develop. For example, do children´s experiences in learning language, motor development, and play during early childhood provide a basis for their mastery-beliefs and task-oriented behaviors or, conversely, failure expectations, anxiety, and task-avoidance? Or is it rather that children´s strategies develop just after entering the primary school because of the systemic feedback they receive in the context of learning basic academic skills (Onatsu-Arvilommi & Nurmi, 2000; Onatsu-Arvilommi et al., in press)? The experimental studies of Heyman et al. (1992) and Burhans and Dweck (1995) have shown that children as young as four to seven are prone to maladaptive behavior pattern in a failure context. However, children´s achievement beliefs, such as the understanding of effort and ability, attributions, and expectations for future success are still developing during the early school years (Shell et al., 1995; Wigfield & Eccles, 1994). Thus, a major direction for future research would be to investigate the developmental dynamic of children´s achievement beliefs and strategies, and skill development and adjustment, already before the first school year, for example, during the pre-school period (Nurmi & Aunola, 1999).

If children´s achievement strategies develop already before the first school year, the feedback parents provide for their children in everyday learning situations may be one of the key foundations for children´s further strategy use. In the present study the role of family environment in the children´s and adolescents´ achievement strategies was investigated from different angles. Study II focused on the role of parenting styles, Study III investigated the role of parents´ social background and parental characteristics in their parenting styles, and Studies IV and V focused on parental general and skill-specific beliefs. One future challenge when investigating the role of family is to investigate the dynamics of these various aspects of the family environment and how they together influence the development of achievement strategies. For example, are parents´ expectations reflected in their parenting behaviors and via these behaviors in children´s achievement strategies, or is it rather that parental beliefs have a direct impact on children´s development (Huntsinger et al., 1997), suggesting that children internalize the perceptions parents provide them (Phillips, 1987)? Another future challenge is to find out which are the most important aspects of the family environment for children´s strategy development. For example, what are those resiliences in the family environment which support children´s adaptive development despite the parents´ low education level or psychological distress? The third challenge is to investigate the role of mother-father consistency in their parenting styles and parental beliefs for children´s and adolescents´ achievement strategies.

Besides the family environment, there are other important social forces for child and adolescent development, such as school and peers (Kurdek & Sinclair, 2000; Perry & Weinstein, 1998; Roeser, Eccles, & Strober, 1998; Skinner & Belmont, 1993). The rapid development of statistical methods provides new tools to investigate these kinds of influences. For example, multilevel modeling provides a basis for investigating the fact that pupils are nested in classrooms and

classrooms are nested within schools (Goldstein, 1995). By using these models it is possible to investigate both how the child is influencing and influenced by the school environment, for example by the academic and social climate, and thus separate child effects from classroom effects (Perry & Weinstein, 1998). These methods also provide an option to examine interaction between the child and the context.

Similarly, the role of peer groups in the development of achievement strategies is an important topic for further research (Määttä et al., 2000). As suggested in the context of Study I, one mechanism behind the association between adolescents´ maladaptive achievement strategies and their externalizing problem behaviors may be the involvement of deviant peers who share similar kinds of maladaptive strategies. In this context, the social aspect of adjustment should also be investigated, for example by the use of peer sociometric evaluations.

Overall, there are a variety of important methodological challenges for future research. First, cross-lagged longitudinal studies including assessments of all the major variables at initial as well as follow-up periods are needed in order to understand the causal mechanisms underlying the associations of interest and how individual differences in these develop over time (Hinshaw, 1992). This may be particularly important during the first school years when the development of individual trajectories is rapid (Jimerson, Egeland, & Teo, 1999). Second, in order to investigate the early development of achievement strategies, multi-informant methods are necessary. Self-report measures provide information about how individuals perceive their ways of dealing with situations (Pintrich, Roeser, & DeGroot, 1994; Wigfield & Guthrie, 1997), but not about how the strategies are reflected in the individual´s behavior. Using data on both children´s self-reported beliefs and their observed behaviors also makes it possible to examine the extent to which the impacts of children´s beliefs on their performance and adjustment is mediated by the behaviors they show.

Third, in the future there is also a need to complement the results of variable-oriented methods with a person-oriented approach (Aunola, Leskinen, Onatsu-Arvilommi, & Nurmi, 2000; Bergman, 1998; Roeser, Eccles, & Sameroff, 1998; Roeser, Eccles, & Strobel, 1998; Roeser et al., 1999), particularly when studying the cumulative processes behind school adjustment. This approach could provide opportunities to find subgroups with different developmental trajectories and to examine, for example, how large a proportion of a sample follows a certain kind of cumulative pattern. Studying different subgroups of children and adolescents will be necessary for identifying the factors influencing different achievement trajectories across time, and the protective factors that turn negative development toward a positive one among some of the children (Masten & Coatsworth, 1998; Masten, Coatsworth, Neemann, Gest, Tellegen, & Garmezy, 1995). On the other hand, person-oriented approaches are needed to investigate whether there are subgroups of pupils who differ according to their patterns of adjustment and problem behaviors and what the risk factors in the family environment are which lead to the co-occurrence of various problems.

In conclusion, the findings of the present work suggest, on the one hand, that the achievement strategies pupils deploy at school have major influences on

their school adjustment and skill development, and overall problem behaviors. On the other hand, parenting styles and parental beliefs seem to play an important role in the development of achievement strategies. Since children´s achievement strategies and school adjustment may, in the long run, form a self-perpetuating cycle, future efforts are needed to find out when and how the negative and positive cycles of adaptation begin to develop and what the underlying mechanisms in family and school environments are which contribute to such developments, and, finally, what those protective factors are in the social environment and in possible intervention that may turn a negative accumulation into a positive one in some of the children (Masten & Coatsworth, 1998).

# YHTEENVETO

Viime aikoina on esitetty, että heikon koulumenestyksen ja oppimistilanteisiin liittyvien vaikeuksien taustalla vaikuttavat kognitiivisten valmiuksien ja spesifien oppimisvaikeuksien lisäksi myös oppilaiden koululuokassa käyttämät ajattelu- ja toimintatavat, suoritusstrategiat. Tyypillistä hyvin koulussa menestyville oppilaille on, että he uskovat omiin kykyihinsä ja keskittyvät aktiivisesti ja sitkeästi vaikeidenkin tehtävien ratkaisuun. Sen sijaan heikosti menestyvät oppilaat pelkäävät epäonnistumista ja pyrkivät tämän vuoksi vetäytymään tai välttelemään haasteellisia tehtäviä ja oppimistilanteita. Vaikka oppilaiden omaksumilla suoritusstrategioilla voi olla kauaskantoisia vaikutuksia heidän myöhemmälle koulu-uralleen, tiedetään näiden kehityksestä perhe- ja kouluympäristöissä vielä varsin vähän.

Väitöskirjatyössäni tarkastelin perhettä ja koulua lasten ja nuorten suoritusstrategioiden ja kouluvaikeuksien kehitysympäristöinä. Tavoitteenani oli tutkia: (1) kuinka nuorten koulussa käyttämät suoritusstrategiat ovat yhteydessä heidän koulusopeutumiseensa ja myös laajemmin heidän ongelmakäyttäytymiseensä? (2) Kuinka perheympäristö ja vanhempien kasvatustyylit ovat yhteydessä nuorten käyttämiin suoritusstrategioihin? (3) Kuinka vanhempien sosiaalinen tausta, itsetunto ja suoritusstrategiat ovat yhteydessä heidän käyttämiinsä kasvatustyyleihin? (4) Missä määrin lasten koulussa käyttämät suoritusstrategiat vaikuttavat heidän luku- ja laskutaitonsa kehitykseen ja oppimisvaikeuksiin ensimmäisellä luokalla koulussa? Missä määrin puolestaan edistyminen näissä taidoissa vaikuttaa lasten suoritusstrategioiden kehitykseen? (5) Missä määrin vanhempien lapsensa koulusuoriutumista koskevat uskomukset vaikuttavat suoritusstrategioiden ja luku- ja laskutaidon kehitykseen? Missä määrin lasten suoritusstrategiat ja taitotaso vaikuttavat vanhempien uskomuksiin?

Tutkimus koostui viidestä osatutkimuksesta, joissa käytettiin viittä eri aineistoa. Tutkimuksista kolme ensimmäistä olivat poikkileikkaustutkimuksia. Näissä kahdessa ensimmäisessä tutkittavina olivat nuoret. Kolmannessa tutkimuksessa tutkittavina olivat kouluikäisten lasten vanhemmat. Kahdessa viimeisessä tutkimuksessa käytettiin samaa pitkittäistutkimusaineistoa, jossa lasten kehitystä ja heidän vanhempiensa uskomuksia seurattiin ensimmäisen kouluvuoden ajan. Otoskoko tutkimuksissa vaihteli 111:sta 1185:een. Tutkimusmenetelminä käytettiin kyselylomakkeita, vanhempien arviota, opettaja-arviota sekä testejä.

Tutkimus osoitti ensinnäkin, että nuorten koulussa käyttämät epämielekkäät suoritusstrategiat olivat yhteydessä koulusopeutuvuuteen ja ongelmakäyttäytymiseen monin tavoin: tyypillistä nuorille, joiden strategista toimintaa koulussa luonnehti epäonnistumisen ennakointi, passiivisuus ja tehtävän välttely, oli tyytymättömyys koulunkäyntiin, huonot suhteet opettajiin sekä sisäänpäin suuntautunut (depressiivinen oirehdinta; yhteys etenkin tytöillä) että ulospäinsuuntautunut (esim. päihteiden käyttö, rikollinen toiminta; yhteys etenkin pojilla) ongelmakäyttäytyminen. Osa suoritusstrategioiden vaikutuksesta ulospäinsuuntautuneeseen ongelmakäyttäytymiseen välittyi koulusopeutuvuuden kautta.

Toiseksi perheympäristö ja vanhempien kasvatustyylit olivat yhteydessä

nuorten käyttämiin suoritusstrategioihin. Onnistumisennakoinnit koulussa ja tehtäväsuuntautuneisuus olivat tyypillisimpiä nuorille, joiden perheympäristö oli auktoritatiivinen. Näitä perheitä luonnehti toisaalta myönteinen tunneilmasto, luottamus ja avoimuus, toisaalta toiminnan valvonta ja kontrolli. Sen sijaan sekä laiminlyövä että autoritaarinen perheympäristö, jotka erosivat toisistaan kontrolloivuuden suhteen mutta joille kummallekin ominaista oli myönteisen tunneilmaston puute, näyttivät luovan pohjan nuorten koulussa käyttämille epämielekkäille suoritusstrategioille.

Vanhempien oma hallintasuuntautuneisuus ja hyvä itsetunto olivat yhteydessä emotionaalisesti lämpimään, mutta valvovaan ja ohjaavaan auktoritatiiviseen kasvatustyyliin. Vanhemman heikko itsetunto ja epämielekkäät suoritusstrategiat olivat puolestaan yhteydessä lämpimyyden ja ohjaavuuden puutteeseen ja myös vanhemmuuden aiheuttamaan stressiin ja voimattomuuskokemuksiin. Autoritaarinen kasvatus, jota luonnehti tiukka kontrolli ja tottelevaisuuden vaateet, oli yhteydessä vanhempien alhaiseen koulutustasoon.

Lasten koulussa käyttämät suoritusstrategiat ja koulusuoriutuminen muodostivat positiivisia ja negatiivisia kumuloituvia kehiä jo lasten ensimmäisen kouluvuoden aikana: lasten tehtäväsuuntautuneisuus koululuokassa ennusti myönteistä luku- ja laskutaidon kehitystä. Hyvä lukutaidon taso puolestaan lisäsi lapsen myöhempää tehtäväsuuntautuneisuutta. Vastaavasti tehtävää välttävät toimintatavat ennakoivat heikkoa luku- ja laskutaidon kehitystä ja heikko lukutaito edelleen vahvisti taipumusta tehtävää välttäviin toimintatapoihin. Nämä myönteiset ja kielteiset kumuloituvat kehät laajenivat myös perheympäristöön: vanhempien myönteiset uskomukset lapsensa suoriutumisesta tukivat lapsen tehtäväsuuntautuneisuutta ja tätä kautta myös luku- ja laskutaidon kehitystä. Vanhempien vähäinen usko lapsensa kykyihin sen sijaan lisäsi lapsen tehtävää välttäviä toimintatapoja ja heijastui tätä kautta kielteisesti myös lapsen perustaitojen kehitykseen. Toisaalta lasten koulussa käyttämät suoritusstrategiat heijastuivat vanhempien uskomuksiin: lasten tehtäväsuuntautuneisuus vahvisti vanhempien uskoa lapsensa kykyihin pärjätä koulussa, kun taas lasten tehtävää välttävät strategiat heijastuivat kielteisesti vanhempien uskomuksiin.

Tulokset antavat viitteitä siitä, että lasten ja nuorten hyvinvoinnin, oppimisvaikeuksien ja alisuoriutumisen taustalla vaikuttavat kognitiivisten valmiuksien lisäksi monet emotionaaliset ja motivationaaliset tekijät. Intervention suunnittelussa tulisi kiinnittää huomiota paitsi heikosti koulussa menestyvien oppilaiden spesifeihin oppimisvaikeuksiin ja sopeutumisongelmiin myös heidän minäkäsitykseensä ja oppimista koskeviin uskomuksiinsa sekä heille ominaiseen tapaan toimia koululuokassa. Tulokset antavat viitteitä myös siitä, että erityisesti perheympäristöön kohdistuva interventio voisi olla tuloksekas. Lasten ja nuorten tehtäväsuuntautuneisuutta ja koulunkäyntiä voidaan tukea lisäämällä vanhempien tietoa kehitystä tukevasta kasvuympäristöstä, rohkaisemalla vanhempien myönteisiä odotuksia lapsensa pärjäämisestä ja tukemalla vanhempia omassa vanhemmuuden roolissaan.

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I

# Adolescents´ achievement strategies, school adjustment, and externalizing and internalizing problem behaviors

by

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# Adolescents' Achievement Strategies, School Adjustment, and Externalizing and Internalizing Problem Behaviors

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*The present study investigated the relationships between the achievement strategies adolescents deploy in a school context, and their self-esteem, school adjustment, and internalizing and externalizing problem behaviors. A total of 1185 14-to-15-year-old adolescents filled in the Strategy and Attribution Questionnaire (SAQ), Rosenberg's Self-Esteem Scale, and scales measuring school adjustment, depression and externalizing problem behavior. The adolescents' parents were also asked to evaluate their children's achievement strategies, school adjustment and, externalizing problem behavior. The results revealed that low self-esteem was associated with adolescents' use of maladaptive achievement strategies which, in turn, was associated with their maladjustment at school, and internalizing and externalizing problem behaviors. Moreover, the association between adolescents' maladaptive strategies and their externalizing problem behavior was partly mediated via their school adjustment. The results suggest that the achievement strategies adolescents deploy are reflected not only in their school adjustment but also in their overall problem behavior.*

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## INTRODUCTION

It has been suggested that the achievement strategies adolescents deploy in academic settings provide a basis for their school performance (Jacobsen *et al.*, 1986; Midgley *et al.*, 1996; Nurmi *et al.*, 1995a). For example, pupils who are afraid of failure, feel anxious and helpless, and avoid a task are likely to show poor achievement (Chapman, 1988; Diener and Dweck, 1978; Midgley and Urdan, 1995; Nurmi *et al.*, 1995a; Onatsu-Arvilommi and Nurmi, in press) and learning difficulties at school (Butkowsky and Willows, 1980; Carr *et al.*, 1991). These may then lead to other kinds of problems, such as frequent substance use (Schulenberg *et al.*, 1996), delinquency (Hurrelmann and Engel, 1992; Patterson *et al.*, 1989; Vazsonyi and Flannery, 1997) or depression (Cicchetti and Toth, 1998). In turn, pupils who are optimistic, focus on the task at hand and invest a high level of effort are likely to show high achievement (Diener and Dweck, 1978; Onatsu-Arvilommi and Nurmi, in press), which is likely to lead to overall adjustment (Masten and Coatsworth, 1998; Roeser *et al.*, 1998; Skinner *et al.*, 1990). The present study was aimed at examining the associations between adolescents' achievement strategies and their school adjustment, and how these are reflected in their problem behavior in nonacademic contexts.

### Achievement Strategies

The strategies individuals deploy in academic contexts might be described in terms of 3 stages (Cantor, 1990; Dweck and Leggett, 1988; Nurmi *et al.*, 1994). First, when the individuals are faced with a challenging situation, it typically evokes expectations of what will ensue. These are based on individuals' self-conceptions and earlier experiences in similar situations (Bandura, 1993; Cantor, 1990; Diener and Dweck, 1978). These expectations then provide a basis for the second stage of strategies. Individuals who anticipate success typically focus on planning and investing high effort in the task (Nurmi *et al.*, 1994; Pintrich and De Groot, 1990), whereas those who anticipate failure tend to avoid the task, which is evidenced by withdrawal (Diener and Dweck, 1978; Dweck, 1986) or task-irrelevant behavior (Jones and Berglas, 1978; Midgley *et al.*, 1996). Third, after receiving information about their success in dealing with a task, individuals typically begin to think about the possible causes of this in terms of causal attributions (Cantor, 1990; Diener and Dweck, 1978; Dweck, 1986).

Various types of strategies have been described in previous literature. Adaptive achievement strategies have been conceptualized, for example, as mastery orientation (Diener and Dweck, 1978; Dweck, 1986), "illusory glow optimism" (Cantor, 1990) and task orientation (Nicholls *et al.*, 1989; Skaalvik, 1997). Despite differences in terminology, these are all characterized by optimism, mastery beliefs, a high degree of task involvement (Cantor, 1990; Diener and Dweck, 1978; Skaalvik, 1997), and persistence in the face of obstacles (Dweck, 1990; Dweck and

Leggett, 1988; Onatsu-Arvilommi and Nurmi, in press). These adaptive achievement strategies have also been shown to lead to success in educational contexts (Cantor, 1990; Diener and Dweck, 1978; Nurmi *et al.*, 1999).

Maladaptive strategies have been described in terms of various concepts, such as learned helplessness (Diener and Dweck, 1978; Dweck, 1990), self-handicapping (Jones and Berglas, 1978; Zuckerman *et al.*, 1998), work-avoidant goal orientation (Nicholls *et al.*, 1989), and task-avoidant behaviors (Nurmi *et al.*, submitted; Onatsu-Arvilommi and Nurmi, in press). All these strategies are characterized by a lack of a belief in personal control, failure expectations, and an avoidance of the task at hand. Helpless individuals, for example, lack a belief in personal control, which leads to passivity and task avoidance (Diener and Dweck, 1978). This, in turn, increases the likelihood of failure in the future task. On the other hand, typical of a person deploying a self-handicapping strategy is that he/she does not trust his/her ability to handle the situation but rather expects failure, and therefore concentrates on creating excuses for it instead of investing effort in the task at hand (Jones and Berglas, 1978; Snyder, 1990). Although this may provide attributional benefits, it increases the likelihood of failure (Jones and Berglas, 1978).

## Consequences of Maladaptive Achievement Strategies

Most of the research on achievement strategies has been carried out in school environments. Pupils applying adaptive strategies have been found to show a high level of school achievement and an intrinsic motivation to learn (Diener and Dweck, 1978; Elliot and Dweck, 1988; Skaalvik, 1997). The maladaptive, avoidant types of achievement strategies, in turn, have been shown to be related with several kinds of problems in academic settings, such as a low- and underachievement (Butkowsky and Willows, 1980; Carr *et al.*, 1991; Diener and Dweck, 1978; Nolen-Hoeksema *et al.*, 1992; Nurmi *et al.*, 1995a; Midgley and Urdan, 1995; Zuckerman *et al.*, 1998), learning disabilities (Butkowsky and Willows, 1980; Chapman, 1988), negative attitudes toward education (Midgley *et al.*, 1996), and a low academic satisfaction at university (Eronen *et al.*, 1997; Nurmi *et al.*, 1999).

Only a few studies have so far focused on investigating the associations between the use of achievement strategies and problem behavior in nonacademic settings (Nurmi *et al.*, 1994), particularly among adolescents. However, the strategies adolescents deploy at school might be assumed to be also reflected in their problem behavior outside the school environment. For example, research on coping styles has shown that an individual's tendency to avoid difficult situations is associated with various problem behaviors, such as depression (Herman-Stahl and Petersen, 1996), low psychosocial adjustment (Jorgensen and Dusek, 1990; Rijavec and Brdar, 1997) and substance use (Geisthardt and Munsch, 1996; Windle and Windle, 1996). Consequently, the first aim of this study was to investigate the extent to which the maladaptive achievement strategies adolescents deploy are

associated with their problem behavior in a nonacademic context. Because problem behaviors have typically been divided into *internalizing* problem behavior, such as depression or anxiety, and *externalizing* problem behavior, such as aggression, substance use, and delinquency (Achenbach, 1982; Barber *et al.*, 1994; Rutter and Garmezy, 1983; Zahn-Waxler, 1993), both these variables were included in the present study.

Because maladaptive achievement strategies have been found to be associated with low academic performance (Diener and Dweck, 1978; Midgley and Urdan, 1995; Nurmi *et al.*, 1995a) on the one hand, and low achievement with problem behaviors (Hurrelmann and Engel, 1992; Patterson *et al.*, 1989; Vazsonyi and Flannery, 1997) on the other, it may be possible that the impact of pupils' achievement strategies on their problem behavior is mediated by their school adjustment. For example, the deployment of maladaptive strategies may lead to low achievement and school maladjustment (Butkowsky and Willows, 1980; Carr *et al.*, 1991; Midgley *et al.*, 1996; Midgley and Urdan, 1995; Nurmi *et al.*, 1995a; Zuckerman *et al.*, 1998), which further provide a basis for internalizing (Achenbach, 1982; Zahn-Waxler, 1993) and externalizing problem behavior at a more general level (Cox, 1996; Lau and Leung, 1992; Leung and Lau, 1989; Schulenberg *et al.*, 1996; Vazsonyi and Flannery, 1997). Consequently, one further aim of this study was to investigate the extent to which the impact of maladaptive strategies on more general problem behavior is mediated via adolescents' school adjustment.

It has also been suggested that individuals' self-esteem provides a basis for their deployment of achievement strategies. For example, people who have a high self-esteem and have confidence in their own abilities to cope with a challenging task are likely to apply adaptive strategies (Dweck and Leggett, 1988; Gottfried, 1985). Low self-esteem, in turn, is an important precursor of the use of maladaptive strategies (Cantor, 1990; Dweck and Leggett, 1988; Jones and Berglas, 1978; Nurmi *et al.*, 1994), such as self-handicapping (Berglas, 1985; Midgley and Urdan, 1995; Tice, 1991; Tice and Baumeister, 1990; Rhodewalt, 1990; Weary and Williams, 1990; Zuckerman *et al.*, 1998), learned helplessness (Rosenhan and Seligman, 1984), and a failure-trap strategy (Nurmi *et al.*, 1994). However, self-concept and self-esteem have been found to be important precursors of school achievement and related adjustment (see Miller (1975) for a review; Carr *et al.*, 1991; Lau and Leung, 1992; Midgley *et al.*, 1996), and of various problem behaviors in a nonacademic context, such as depression (Cicchetti and Toth, 1998) and delinquency (Levy, 1997). Consequently, our final goal was to examine whether some of the impacts of self-esteem on school adjustment and problem behaviors would be mediated by the achievement strategies adolescents deploy.

This study investigates the following research questions: first, the extent to which self-esteem, school adjustment and achievement strategies would be directly associated with adolescents' externalizing and internalizing problem behaviors; second, the extent to which the impacts of the achievement strategies on problem behaviors would be mediated by school adjustment; and, third, whether the

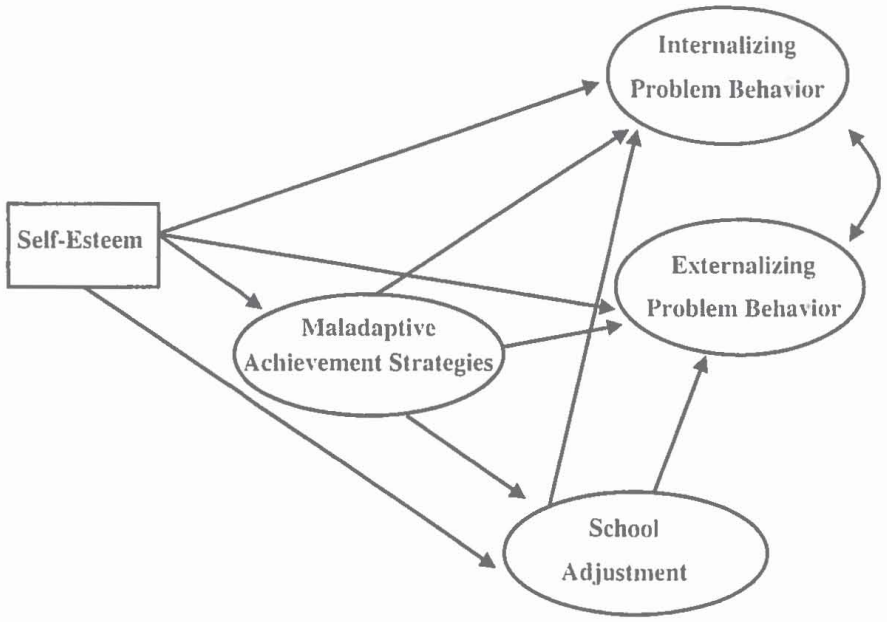


**Fig. 1.** Schematic path model.

impact of self-esteem on problem behaviors would be mediated by the achievement strategies. These research questions were tested by the use of structural equation modelling (Fig. 1).

## METHODS

### Participants

The participants were 1185 eighth-grade adolescents (637 girls, 548 boys; *median age* 14) and their parents from a midsized community in central Sweden. The original sample consisted of all eighth-grade pupils ($n = 1279$) in this community. On the day of the data collection, 1185 students were present and answered the questionnaires concerning their achievement strategies, school adjustment, problem behaviors, and self-esteem. Questionnaires were filled in during the adolescents' regular school hours. Of the participants, 75.4% lived with both their biological parents, 13.3% with their mothers, 2.5% with their fathers, 6.5% with their mothers and a step-father, 1.3% with a father and a step-mother, and the others (0.9%) lived with relatives, foster parents, or in other living arrangements.

The participants' parents were contacted by mail. The questionnaire was addressed to the child's biological parents or legal guardians in the home where the child lived during the school week. Parents were asked to fill out a questionnaire (one for each family) measuring their adolescent's achievement strategies, school adjustment and externalizing problem behavior, and to return it by mail. A total of

1077 (83.9%) parents returned the questionnaire. In 73.4% of cases, the mothers filled out the questionnaire alone, in 18.0% of cases the fathers filled it, in 7.6% of cases, mothers and fathers filled it out together, and in 0.9% of cases, a guardian other than a parent filled out the questionnaire.

## Measurements

### *Adolescents' Questionnaires*

*Achievement Strategies.* Adolescents' achievement strategies were measured with a Strategy and Attribution Questionnaire (SAQ; Nurmi *et al.*, 1995b) revised for the present study (Nurmi and Stattin, 1998a). It consisted of 20 items, to which the adolescents responded on a 4-point rating scale (1 = "Strongly disagree," 4 = "Strongly agree"). The scale consisted of 3 subscales: (1) *Failure expectations* (6 items; e.g. "When I face a new task at school, I am often afraid it will go wrong"), (2) *Task-irrelevant behavior* (8 items; e.g. "If something begins to go wrong with my school work, I quickly disappear to some other place"), and (3) *Passivity* (6 items; e.g. "If I have a difficult task before me, I notice that often I do not really try"). The Cronbach alpha reliabilities for these 3 subscales were .85, .81, and .75, respectively. Retest correlations across a 6-month period for these 3 scales have been shown to be .74, .48, and .70, respectively (Nurmi *et al.*, 1995b). They have also been shown to correlate in moderately and theoretically meaningful ways with the observational data of strategic behaviors, and other strategy measures (Nurmi *et al.*, 1995b).

*Internalizing Problem Behavior.* Adolescents' internalizing problem behavior was assessed as a depressive symptomatology using the Center for Epidemiological Studies (CES-DE) questionnaire (Olsson, 1998). In this scale, adolescents were asked to rate 20 items assessing their depression during the past week (e.g. "I have been bothered about things which usually do not bother me."; "I have felt I wanted to cry.") on a 4-point scale (1 = "not at all," 4 = "often"). The Cronbach alpha reliability for this scale was .88.

*Externalizing Problem Behavior.* Adolescents' externalizing problem behavior was measured with 14 items (e.g. "Have you been in a physical fight during the past year?"; "Have you smoked hash?") comprised Problem Behavior scale for adolescents (Stattin, 1997). Adolescents were asked to rate these on a 5-point scale (1 = "No, that has not happened"; 5 = "More than ten times"). The items assessed adolescents' delinquency, substance use and normbreaking behaviors. The Cronbach alpha reliability for the scale was .81.

*School Adjustment.* Adolescents' school adjustment was assessed by 12 questions (Kerr and Stattin, in press), which were rated on a 5-point scale. Five of these items measured adolescents' (1) *Adaptation to school* (e.g. "Do you try your best

at school?"; "Do you enjoy school?"; "Do you think that school feels like a necessity?," reversed), and 7 items which measured their (2) *Teacher relationships* ("Do you think that your teachers are fair with you?"; "Do you think that your teachers like you as a student?"). The Cronbach alpha reliabilities for these 2 summary scores were .80 and .85, respectively.

*Self-Esteem.* Adolescents' self-esteem was measured with Rosenberg's Self-Esteem Scale (Rosenberg, 1979). The scale consisted of 10 unidimensional items (e.g. "Are you able to do things as well as others?"; "For the most part, do you see yourself as positive?"), which were rated on a 4-point scale (1 = "not at all true of me," 4 = "very true of me"). The items were reversed, when necessesary, so that high scores indicated high self-esteem. The Cronbach alpha reliability for this scale was .88.

### *Parents' Questionnaire*

*Adolescents' Achievement Strategies.* Parents filled in the Strategy and Attribution Scale for Parents (SAQ-P; Nurmi and Stattin, 1998b) in which they evaluated their adolescent children's achievement strategies. The scale consisted of 14 items, which parents responded to on a 4-point scale (1 = "Very untypical of him/her," 4 = "Very typical of him/her"). The scale consisted of 2 subscales: (1) *Failure expectations* (6 items; e.g. "When he/she faces a new task at school, he/she is often afraid it will go wrong.") and (2) Task-irrelevant behavior (8 items; e.g. "What often occurs is that he/she finds something else to do when he/she has a difficult task in front of him/her."). The Cronbach alpha reliabilities for these subscales were .75 and .88, respectively.

*Externalizing Problem Behavior.* Parents evaluated their adolescent children's externalizing problem behaviors on 8 items (e.g. "Has the child ever been in trouble or contact with the police for any offense?"; "Has the child ever been in a physical fight in the city?") consisting of closely similar items to those used in the adolescents' questionnaire. Parents were asked to rate these on a 3-point scale (1 = "No, it has never happened"; 3 = "Yes, several times"). The Cronbach alpha reliability for parent-reported externalizing problem behavior was .58.

*School Adjustment.* Parents were asked to assess their adolescent children's school adjustment with 5 questions. These questions were identical to those used in the adolescents' questionnaire concerning *Adaptation to school* (e.g. "Does your child try his/her best at school?"; "Does your child like school?") The Cronbach alpha reliability for the summary score of parent-reported school adjustment was .82.

All the measured variables were standardized before the calculation of summary scores. The means and standard deviations, and Pearson correlations between the variables are presented in Table 1, separately for boys and girls.

**Table I.** Pearson Product–Moment Correlations Between Manifest Variables, their Means ($M$), and Standard Deviations ($SD$), separately for Boys ($n = 548$) and Girls ($n = 637$)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | $M$ | $SD$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Self-esteem | | −.56 | −.26 | −.48 | −.24 | −.55 | .38 | .23 | .26 | −.21 | −.14 | −.57 | 0.13 | 0.65 |
| Failure expectations | | | | | | | | | | | | | | |
| 2. Self-report | −.61 | | .51 | .62 | .39 | .66 | −.46 | −.39 | −.33 | .19 | .17 | .47 | −0.07 | 0.64 |
| 3. Parent report | −.38 | .59 | | .39 | .73 | .35 | −.30 | −.54 | −.25 | .19 | .26 | .26 | 0.07 | 0.74 |
| Task avoidance | | | | | | | | | | | | | | |
| 4. Self-report | −.46 | .65 | .42 | | .39 | .63 | −.52 | −.39 | −.46 | .34 | .22 | .45 | −0.02 | 0.63 |
| 5. Parent report | −.28 | .45 | .74 | .43 | | .30 | −.32 | −.61 | −.28 | .27 | .31 | .25 | 0.14 | 0.74 |
| 6. Passivity | −.53 | .65 | .45 | .68 | .36 | | −.39 | −.34 | −.30 | .23 | .17 | .46 | 0.01 | 0.65 |
| School adjustment | | | | | | | | | | | | | | |
| 7. Self-report | .52 | −.56 | −.43 | −.58 | −.54 | −.54 | | .55 | .67 | −.28 | −.20 | −.31 | −0.07 | 0.76 |
| 8. Parent report | .35 | −.43 | −.54 | −.39 | −.51 | −.37 | .59 | | .42 | −.21 | −.22 | −.22 | −0.08 | 0.81 |
| 9. Teacher relations | .33 | −.38 | −.27 | −.47 | −.30 | −.32 | .61 | .45 | | −.36 | −.26 | −.27 | −0.03 | 0.74 |
| Externalizing problem behavior | | | | | | | | | | | | | | |
| 10. Self-report | −.18 | .22 | .16 | .40 | .27 | .23 | −.40 | −.24 | −.41 | | .43 | .26 | 0.14 | 0.79 |
| 11. Parent report | −.14 | .16 | .19 | .16 | .24 | .12 | −.12 | −.15 | −.15 | .35 | | .17 | 0.06 | 0.52 |
| 12. Depressive symptomatology | −.65 | .55 | .37 | .51 | .32 | .56 | −.55 | −.38 | −.37 | .32 | .11 | | −0.13 | 0.48 |
| $M$ | −0.11 | 0.07 | −0.06 | 0.02 | −0.14 | −0.00 | 0.06 | 0.11 | 0.02 | −0.11 | −0.08 | 0.11 | | |
| $SD$ | 0.70 | 0.69 | 0.75 | 0.66 | 0.70 | 0.67 | 0.73 | 0.70 | 0.70 | 0.33 | 0.25 | 0.60 | | |

*Note.* All the correlations are statistically significant at the level of $p < .01$. The correlations for boys are above the diagonal and for girls below the diagonal.

### Structural Equation Modeling

The statistical analyses were carried out by the use of Structural Equation Modelling (SEM) with a LISREL8-statistical package (Jöreskog and Sörbom, 1993). This approach consists of 2 parts: a measurement model and a structural equation model (Fergusson, 1997). The measurement model specifies how the hypothetical constructs (latent variables) are measured in terms of observable variables, whereas the structural part of the modelling specifies the hypothesized causal relations between these constructs (Fergusson, 1997).

The parameters of the model were estimated using the Generalized Least Square (GLS) procedure. This procedure yields an approximate chi-square test under somewhat less restrictive assumptions of multivariate normality than some alternative procedures (Loehlin, 1987). The goodness-of-fit was evaluated using 3 indicators, $\chi^2$/df, Bentler's Comparative Fit Index (*CFI*) (Bentler, 1990), and Bentler and Bonnet's Non-Normed Fit Index (*NNFI*) (Bentler, 1990), as suggested by Gerbing and Anderson (1993). In order to investigate whether an identical model would fit for boys and girls, a multisample procedure suggested by Jöreskog and Sörbom (1993) was used.

## RESULTS

### Measurement Models

We started the model construction by testing a one-construct-measurement model for the achievement strategies. The self-reported failure expectations, task-avoidance, and passivity, and the parent-reported failure expectations and task-avoidance, were used as indicators of the maladaptive achievement strategies. The model fits the data relatively well ($\chi^2(20) = 372.66$; $CFI = 0.97$; $NNFI = 0.97$). The modification indices suggested, however, that allowing the error variances of parent-reported failure expectations and task-avoidance to correlate would increase the fit of the model. Because they may have joint measurement variance, their error variances were let to correlate. Moreover, the modification indices suggested that allowing the error variances between self- and parent-reported failure expectations, on one hand, and self- and parent-reported task-avoidance, on the other hand, for girls to correlate, would increase the fit of the model. Consequently, these parameters were estimated for girls. After these specifications the model fitted the data well ($\chi^2(17) = 49.08$; $CFI = 1.00$; $NNFI = 1.00$). The parameter estimates of the measurement model in its final form are presented in Table II.

Next, a one-construct-measurement model for school adjustment was tested. The self-reported adaptation to school and teacher relationships, and parent-reported adaptation to school, were used as indicators of the latent school adjustment. The fit indices for this model were $\chi^2(6) = 18.06$; $CFI = 0.99$; $NNFI = 0.99$ (Table II).

**Table II.** Parameter Estimates for the Manifest Variables

| Variable | Final Model |
|---|---|
| Achievement strategies | |
| Failure expectations | |
| Self-report | 0.52 |
| Parent report | 0.33 |
| Task-irrelevant behavior | |
| Self-report | 0.53 |
| Parent report | 0.30 |
| Passivity | |
| Self-report | 0.52 |
| School adjustment | |
| School adaptation | |
| Self-report | 0.64 |
| Parent report | 0.40 |
| Teacher relations | |
| Self-report | 0.48 |
| Externalizing problem behavior | |
| Self-report | 0.32 (girls)/0.37 (boys) |
| Parent report | 0.11 (girls)/0.13 (boys) |
| Internalizing problem behavior | |
| Depressive symptomatology | 0.53 (girls)/0.49 (boys) |

Because the measurement model for internalizing problem behavior (depression) and self-esteem both consisted of only one indicator, their loadings were set as equal to 1 with an error term 0. The measurement model for externalizing problem behavior consisted of two indicators: self- and parent-reported externalizing problems.

## Structural Model

Next, a structural model was constructed to examine the hypothesized direct and indirect paths presented in Fig. 1. All structural paths in the model were first set as identical for boys and girls. The fit for the original model was: $\chi^2(121) = 700.97$; $CFI = 0.97$; $NNFI = 0.97$. Examination of the modification indices suggested that estimating the structural paths from self-esteem and achievement strategies to internalizing problem behavior, and from achievement strategies to externalizing problem behavior, separately for boys and girls would increase the fit of the model. Moreover, modification indices suggested that estimating the error terms of self- and parent-reported externalizing problem behavior differently for boys and girls would increase the fit of the model. After these specifications, the model fitted the data well ($\chi^2(116) = 472.22$; $CFI = 0.98$; $NNFI = 0.98$). After omitting non-significant paths the fit was: $\chi^2(118) = 473.93$; $CFI = 0.98$; $NNFI = 0.98$. The standardized path coefficients for the final model are presented in Fig. 2.

The results showed first that adolescents' self-esteem had a direct impact on their use of achievement strategies: the lower the level of self-esteem adolescents

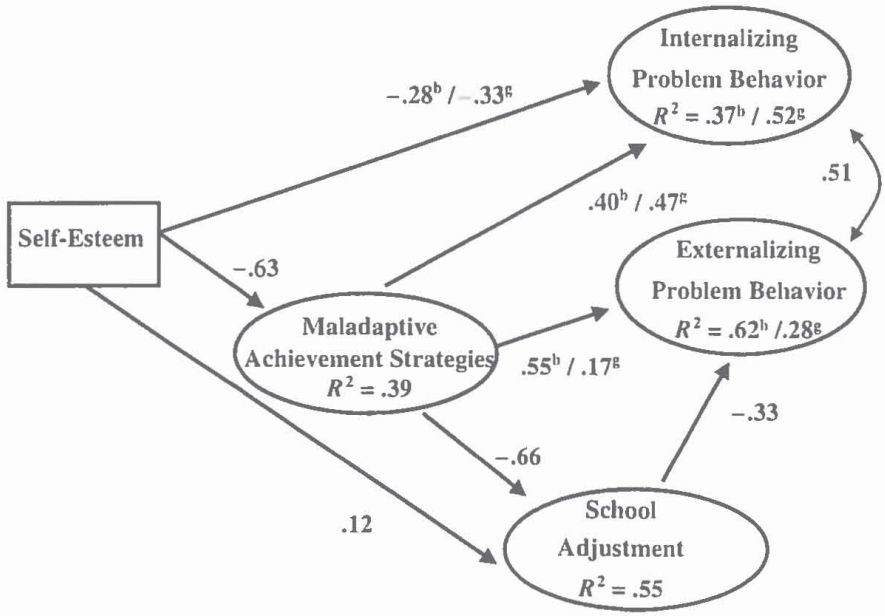


**Fig. 2.** Significant path coefficients (standardized *beta*) for the tested model ([g] for girls, [b] for boys).

reported, the more they displayed maladaptive strategies. Second, adolescents' achievement strategies also had direct impact on their school adjustment: the more maladaptive strategies adolescents showed, the more they displayed maladjustment at school. Furthermore, the use of achievement strategies seemed to mediate a part of the impact of self-esteem on school adjustment (indirect effect .41, $p < .001$): adolescents who had low self-esteem displayed more maladaptive strategies, which, in turn, was reflected in their maladjustment at school. However, self-esteem also had a direct impact on school adjustment: adolescents who reported a low level of self-esteem showed also a low level of adjustment at school.

Third, adolescents' achievement strategies had direct impacts on their problem behaviors: the more maladaptive strategies adolescents deployed, the more they reported both internalizing and externalizing problem behavior. There was also an indirect effect from maladaptive strategies on externalizing problem behavior via school adjustment (indirect effect .26, $p < .01$ for girls; and .19, $p < .01$ for boys): a high level of the use of maladaptive strategies increased maladjustment at school, which further increased adolescents' externalizing problem behavior in a nonacademic context.

Fourth, the impact of self-esteem on externalizing problem behavior was mediated by adolescents' achievement strategies and school adjustment (indirect effect −.50, $p < .01$ for girls; and −.32, $p < .001$ for boys). Although the impact of self-esteem on internalizing problem behavior was partly mediated by the achievement strategies (indirect effect −.25, $p < .01$ for girls; and −.29, $p < .01$ for boys), it also had a direct effect on internalizing problem behavior.

All reported paths were found to be significant for both boys and girls. However, the strength of some structural paths was different: the impacts of self-esteem and the use of achievement strategies on internalizing problem behavior were stronger for girls than for boys. Conversely, the impact of achievement strategies on externalizing problem behavior was stronger for boys than for girls.

### Comparison of Means between Boys and Girls

To examine the gender differences in the variable means, *t*-tests were carried out to compare boys and girls (see means in Table II). The results showed that although girls reported a higher level of school adaptation ($t = -3.04$, $p < .01$) and fewer externalizing problems ($t = 6.99$, $p < .001$) than boys, they still reported a lower level of self-esteem ($t = 5.91$, $p < .001$), a higher level of failure expectation ($t = -3.58$, $p < .001$), and a higher level of depressive symptomatology ($t = -7.61$, $p < .001$) than boys. However, according to parents, boys showed more failure expectations ($t = 2.67$, $p < .01$), task avoidance ($t = 5.92$, $p < .001$), and externalizing problems ($t = 5.17$, $p < .001$), and a lower level of school adjustment ($t = -3.90$, $p < .001$) than girls.

## DISCUSSION

Previous research has shown that the achievement strategies adolescents deploy at school have consequences on their school performance and adjustment (Midgley *et al.*, 1996; Midgley and Urdan, 1995; Nurmi *et al.*, 1995a). The present study adds to this literature by showing that adolescents' achievement strategies are not only associated with their school adjustment, but also with their overall externalizing and internalizing problem behavior, and that the association between strategies and problem behavior is partly mediated by adolescents' school adjustment. Moreover, the results also revealed that part of the associations between self-esteem and problem behavior is mediated via adolescents' achievement strategies.

The results of the present study suggested, first, that adolescents' achievement strategies seem to provide a basis for their school adjustment: success expectations and task-focused behavior were associated with high adjustment, whereas failure expectations and task-avoidant behavior were related to maladjustment. Although these results are along the lines of previous studies (Diener and Dweck, 1978; Midgley and Urdan, 1995), only a few studies have focused so far on investigating how the achievement strategies adolescents deploy at school are reflected in their problems in a nonacademic context (Nurmi *et al.*, 1994). The present study revealed that the achievement strategies adolescents deploy contributed to their externalizing problem behaviors: those who deployed maladaptive strategies, evidenced in failure expectations, task-irrelevant behaviors and passivity, showed a higher level

of normbreaking behaviors, such as substance use and delinquency, than those who deployed more adaptive achievement strategies. One possible mechanism for this relation is that the use of maladaptive achievement strategies leads to an association with deviant peers who show a similar maladaptive strategic pattern at school. This involvement in a deviant peer group may then increase deviant behaviors, such as delinquent acts and substance use (Ary *et al.*, 1993; Hansen *et al.*, 1987; Patterson *et al.*, 1989), and antisocial attitudes (Patterson *et al.*, 1989), and provide opportunities for engaging in specific deviant acts (Patterson *et al.*, 1989).

Interestingly, the results further showed that part of the association between the achievement strategies and externalizing behavior problems was mediated via school adjustment. It may be possible that these results reflect a more general negative cumulative cycle: the use of maladaptive achievement strategies fosters poor school adjustment, as evidenced in noninvolvement in school activities (Cox, 1996; Lau and Leung, 1992; Leung and Lau, 1989; Schulenberg *et al.*, 1996; Vazsonyi and Flannery, 1997) and a lack of related future prospects (Nurmi, 1997; Rönkä, 1999). These may then increase adolescents' vulnerability to externalizing behaviors in a nonacademic context.

The results also revealed that the achievement strategies adolescents deployed were associated with their internalizing problem behavior, operationalized as a depressive symptomatology: the more maladaptive strategies adolescents deployed, the more they also reported depressive symptomatology. This result was true even after controlling for the impacts of self-esteem and school adjustment. In previous studies, a high level of depressive symptomatology has been shown to be associated with task-avoidant and helplessness behavior (Abramson *et al.*, 1978; Cicchetti and Toth, 1998; Rosenhan and Seligman, 1984). However, contrary to the results found for externalizing problem behavior, the impact of achievement strategies on internalizing problem behavior was not found to be mediated by adolescents' school adjustment.

There are several possible ways in which achievement strategies may contribute to internalizing problem behaviors. First, the use of maladaptive achievement strategies may be associated with internalizing problem behavior, since both are characterized by negative cognitions, such as a negative attributional style (Abramson *et al.*, 1978) and self-focused ruminative thinking (Pyszczynski and Greenberg, 1986). For example, a lack of use of self-serving attributions typical of learned helplessness (Abramson *et al.*, 1978) has been shown to be associated also with depressive symptomatology (Bennett and Bates, 1995; Craighead, 1991; Kaslow *et al.*, 1984; Nolen-Hoeksema *et al.*, 1986). Second, a lack of feelings of control, which is a characteristic of maladaptive strategies (Diener and Dweck, 1978; Dweck, 1986), has been shown to be related to depression and anxiety (see Petersen *et al.*, 1993). Thus, it is possible that adolescents who apply maladaptive strategies do not believe in personal control in educational settings, which increases their vulnerability to internalizing problem behavior in

other settings. Third, the maladaptive achievement strategies may also reflect emotion-focused coping, which has been shown to be related with depression and an overall low adjustment (Jorgensen and Dusek, 1990; Rijavec and Brdar, 1997). In turn, optimism (Taylor and Brown, 1988), mastery, and active coping efforts (Herman-Stahl and Petersen, 1996) have been associated with an overall well-being.

It has been suggested that individuals' self-concept is an important antecedent of the kinds of achievement strategies they deploy (Berglas, 1985; Cantor, 1990; Dweck and Leggett, 1988; Jones and Berglas, 1978; Midgley and Urdan, 1995; Nurmi *et al.*, 1994, 1995a,b; Rhodewalt, 1990; Rosenhan and Seligman, 1984; Tice, 1991; Tice and Baumeister, 1985; Weary and Williams, 1990; Zuckerman *et al.*, 1998). The results of the present study were in accordance with this notion: adolescents with low self-esteem showed a high level of maladaptive strategies, whereas those with high self-esteem reported the use of adaptive strategies. As has been found in previous research (Leung and Lau, 1989; Levy, 1997; Cicchetti and Toth, 1998), the results also showed that adolescents' self-esteem was positively related with school adjustment and negatively with internalizing problem behavior. However, the results also showed that low self-esteem contributed to adolescents' externalizing problems only to the extent to which it was evidenced in their achievement strategies and school adjustment. This result suggests that part of the relations between self-schemata and externalizing problem behavior is due to the fact that a low self-esteem increases individuals' use of maladaptive achievement strategies and school maladjustment, which then increases externalizing problem behavior.

Overall, only a few gender differences were found in the associations between achievement strategies, school adjustment and problem behavior. For example, the use of maladaptive strategies was highly associated with externalizing problem behavior among boys, whereas the association was lower among girls. However, several gender differences, which accord well with earlier findings, were found at the level of variables: depressive symptomatology and low self-esteem were found to be more common in girls than boys, whereas externalizing problems were more typical of boys than girls (c.f. Obeidallah *et al.*, 1996; Rutter and Garmezy, 1983; Zahn-Waxler, 1993; see Peterson *et al.*, 1991 for a review). Similarly, girls reported a higher level of failure expectation than boys, as also shown previously (Dweck *et al.*, 1978; Peterson and Seligman, 1984). Moreover, parent-reported failure expectations and task-avoidant behaviors were more typical of boys than girls (c.f. Jones and Berglas, 1978; Midgley and Urdan, 1995; Onatsu-Arvilommi and Nurmi, in press).

There are at least 6 limitations which should be taken into account in any attempt to generalize the findings of this study. First, because the study was correlational, no conclusion can be drawn concerning the causal relationships between the variables. For example, although we assumed that the maladaptive achievement strategies lead to maladjustment at school, it is also possible that it

is the maladjustment and problem behavior that lead to the use of certain kinds of achievement strategies. The same is true for the relationship between self-esteem and achievement strategies. For example, the use of maladaptive strategies may well lead to academic failure which decreases adolescents' self-esteem (Nurmi, 1993). Second, the study was carried out in 1 particular society in Sweden. It is possible that due to specific features of schooling, educational system and traditions of instruction, the associations between adolescents' achievement strategies, school adjustment and problem behaviors may differ in other cultural environments. Third, some of the measurement models tested included only one indicator for a particular theoretical construct. For example, only depression was used as an index of internalizing problem behavior, although other indicators, such as anxiety or psychosomatic problems, have previously been connected to internalizing problem behaviors (Achenbach, 1982). Fourth, although the Cronbach alpha reliabilities for the scales of the strategy measure (SAQ) were good, the test–retest correlation for one of them, task-irrelevant behavior, was somewhat low. This should be considered in any interpretation of the results. However, this particular scale was used only as 1 indicator of the maladaptive strategy construct. Moreover, Cronbach alpha reliability for parent-reported externalizing behaviors was somewhat low, which should also be considered in the interpretation of the results. Again, however, this particular scale was used as 1 of the 2 indicators of externalizing problem behaviors. Finally, Rosenberg Self-Esteem Scale was used in this study. Because it provides only a unidimensional measure of self-esteem, it would be interesting in future studies to include a multidimensional self-esteem measure to investigate, for example, the extent to which the results found here are true for the academic self-esteem, in particular, but not for other domains of it.

Overall, the results revealed that adolescents who deployed maladaptive achievement strategies were not only typified by low school adjustment but were also prone to internalizing and externalizing problem behavior in nonacademic settings. Part of the association between maladaptive strategies on externalizing problem behavior was, in fact, mediated by school adjustment. These are important findings because they suggest that achievement strategies not only provide a basis for school problems but also for more general maladjustment and behavioral problems.

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II

# Parenting styles and adolescents´ achievement strategies

by

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# Parenting styles and adolescents' achievement strategies

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The aim of the study was to investigate the extent to which adolescents' achievement strategies are associated with the parenting styles they experience in their families. Three hundred and fifty-four 14-year-old adolescents completed a Strategy and Attribution Questionnaire and a family parenting style inventory. Analogous questionnaires were also completed by the adolescents' parents. Based on adolescents' report of the parenting styles, four types of families were identified: those with Authoritative, Authoritarian, Permissive, and Neglectful parenting styles. The results further showed that adolescents from authoritative families applied most adaptive achievement strategies characterized by low levels of failure expectations, task-irrelevant behaviour and passivity, and the use of self-enhancing attributions. Adolescents from neglectful families, in turn, applied maladaptive strategies characterized by high levels of task-irrelevant behaviour, passivity and a lack of self-enhancing attributions. The results provide a basis for understanding some of the processes by which parenting styles may influence adolescents' academic achievement and performance. © 2000 The Association for Professionals in Services for Adolescents

## Introduction

It has been suggested that the achievement strategies adolescents deploy at school play a significant role in their academic achievement and performance (Dweck, 1990; Nurmi *et al.*, 1995*a*; Onatsu-Arvilommi and Nurmi, 1998). For example, helplessness beliefs and related passivity (Diener and Dweck, 1978), being afraid of failure, task-irrelevant behaviour (Nurmi *et al.*, 1995*a*), and internal attributions, such as a lack of ability, in response to failure (Glaskow *et al.*,1997), have been found to lead to low achievement. Although a substantial amount of research has been carried out on these strategies in the school context (Butkowsky and Willows, 1980; Jacobsen *et al.*, 1986; Wagner *et al.*, 1989; Carr *et al.*, 1991; Nurmi *et al.*, 1995*a*; Onatsu-Arvilommi and Nurmi, in press.), only few studies have focused on the role that other life-domains, such as family environment, may play in the development of adolescents' achievement strategies. Consequently, this study focuses on investigating the extent to which family parenting styles are associated with the strategies adolescents apply in achievement contexts.

## Achievement strategies

Achievement strategies might be described in terms of three substages (Dweck and Leggett, 1988; Cantor, 1990; Nurmi *et al.*, 1995*b*). First, when confronting a challenging achievement situation, individuals anticipate either failure or success fostered by their earlier experiences in similar situations (Diener and Dweck, 1978; Cantor, 1990). Second, on the basis of these expectations individuals either orientate themselves toward the task by planning and

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investing effort (Pintrich and De Groot, 1990; Nurmi *et al.*, 1994) or try to avoid the task by withdrawing (Dweck, 1986), passivity (Diener and Dweck, 1978) or task-irrelevant behavior (Jones and Berglas, 1978; Midgley *et al.*, 1996). Third, after succeeding or failing in the situation, individuals evaluate the outcomes in terms of causal attributions (Diener and Dweck, 1978; Dweck, 1986; Cantor, 1990).

Various types of strategies have been described in the earlier literature. Adaptive achievement strategies have been conceptualized, for example, as mastery-orientation (Diener and Dweck, 1978; Dweck, 1986), "illusory glow optimism" (Cantor, 1990) and task-orientation (Skaalvik, 1997). Despite differences in terminology, these are all characterized by master beliefs, a high degree of task involvement (Diener and Dweck, 1978; Cantor, 1990; Skaalvik, 1997), persistence (Dweck and Leggett, 1988; Onatsu-Arvilommi and Nurmi, in press), and generating effective strategies in the face of obstacles (Dweck, 1990). Moreover, people applying adaptive strategies have been shown to apply a self-enhancing (self-serving) attribution style (Diener and Dweck, 1978; Cantor, 1990). In adolescents these adaptive strategies have been found to be associated with a high level of school achievement (Diener and Dweck, 1978; Elliot and Dweck, 1988; Skaalvik, 1997).

Similarly, maladaptive strategies have been described in terms of various concepts, such as learned helplessness (Diener and Dweck, 1978; Dweck, 1990), self-handicapping (Jones and Berglas, 1978) and a task-avoidance orientation (Nicholls *et al.*, 1989). Helpless individuals, for example, have been thought to lack a belief in personal control, which leads to passivity and task-avoidance (Diener and Dweck, 1978). This, in turn, increases the likelihood of failure in the future task. Moreover, adolescents using this strategy do not apply self-enhancing causal attributions (Dweck, 1990). On the other hand, typical of self-handicapping is that a person does not trust his or her competence to handle the situation but rather expects failure, and therefore concentrates on creating excuses for it instead of formulating task-relevant plans (Jones and Berglas, 1978; Midgley *et al.*, 1996). Although this may provide attributional benefits, it increases the likelihood of failure in the task at hand (Nurmi, 1993). In earlier studies learned helplessness and self-handicapping have been associated with children's and adolescents' low and underachievement at school (Diener and Dweck, 1978; Butkowsky and Willows, 1980; Chapman, 1988; Carr *et al.*, 1991; Nurmi *et al.*, 1995*a*). In this study, adolescents' achievement strategies were measured in terms of failure expectations, task-irrelevant behaviours, helpless passivity, and the use of self-enhancing attributions.

Most of the research on achievement strategies has been carried out in school environments. However, it might be assumed that family environments and parenting practices are also important for the development of adolescents' achievement strategies.

## Parenting styles

According to Baumrind (1971, 1989), and Maccoby and Martin (1983), parenting styles consist of two dimensions. *Demandingness* refers to the extent to which parents show control, maturity demands and supervision in their parenting; *responsiveness* refers to the extent to which parents show affective warmth, acceptance and involvement. Based on these two dimensions, a four-fold classification of child-rearing patterns has been described (Maccoby and Martin, 1983; Baumrind, 1991). *Authoritative* parents are both demanding and responsive. This means that they are controlling but not restrictive. The child-centeredness

typical of them includes high parental involvement, such as interest and active participation in the child's life (Grolnick and Ryan, 1989; Paulson, 1994), a high level of open communication (Maccoby and Martin, 1983), trust toward the child (Pulkkinen, 1982), parental acceptance (Maccoby and Martin, 1983), encouragement of psychological autonomy (Ginsburg and Bronstein, 1993), and high behavioural and monitoring control, including awareness of where their children are, whom they are with, and what they are doing (McCord, 1979; Steinberg *et al.*, 1989; Barber, 1996). *Authoritarian* parents are demanding but not responsive. They show fewer affiliative relationships with their children compared with authoritative parents. Typical of their parenting is a low level of trust and engagement toward their child, a discouraging of open communication, and a strict control which is more adult- than child-centered (Pulkkinen, 1982; Maccoby and Martin, 1983). Moreover, authoritarian families are characterized by a high level of psychological control, which can be described from the adolescent's point of view as a feeling of being controlled, devalued and criticized (Baumrind, 1971; Barber, 1996). *Permissive* parents, in turn, are responsive but not demanding. They generally have a warm accepting and child-centered attitude toward their child (Maccoby and Martin, 1983; Baumrind, 1989). However, unlike authoritative parenting, permissive parenting is characterized by non-demanding parental behaviour and a lack of parental control. Parents characterized by this parenting style do not require mature behaviour from their children, but allow them to behave autonomously and independently (Baumrind, 1991). Neglectful parents are neither responsive nor demanding. They do not support or encourage their child's self-regulation, and also often fail to monitor or supervise the child's behaviour (Maccoby and Martin, 1983). Typical of them, in addition to a non-controlling attitude, is an overall uninvolvement (Maccoby and Martin, 1983; Baumrind, 1991).

These four parenting styles have been shown to differ also according to their impact upon children. Authoritative parenting have been found to be associated with children's and adolescents' school adjustment; high level of performance (Dornbusch *et al.*, 1987; Lomborn *et al.*, 1991; Steinberg *et al.*, 1994; Weiss and Schwartz, 1996), strong school engagement (Pulkkinen, 1982; Grolnick and Ryan, 1989; Steinberg *et al.*, 1992), and positive attitudes towards school (Pulkkinen, 1982; Maccoby and Martin, 1983; Steinberg *et al.*, 1989). The positive impact of authoritative parenting styles has been assumed to be based on the encouragement of independent problem solving and critical thinking (Hess and McDevitt, 1984). In turn, it has been suggested that authoritarian parenting detracts from learning by discouraging active exploration and problem solving, and encouraging dependence on adult control and guidance (Hess and McDevitt, 1984). Consequently, authoritarian parenting styles, particularly the element of excess control, have been associated with children's passivity (Steinberg *et al.*, 1994, Barber, 1996), and a lack of interest in school (Pulkkinen, 1982). Instead, it has been suggested that undercontrolled environments, typical of neglectful and permissive homes, do not foster self-regulation in children, and may leave them more impulsive (Barber, 1996). Consequently, permissive and neglectful parenting styles have been associated with children's and adolescents' underachievement (Onatsu-Arvilommi and Nurmi, 1997). Adolescents from neglectful families, in particular, have been shown to be at a disadvantaged in terms of academic achievement (Maccoby and Martin, 1983; Baumrind, 1991; Lamborn *et al.*, 1991).

This research on family parenting styles and adolescents' school-relevant outcomes has, however, several limitations. First, only a few studies have focused on how parenting styles are reflected in children's achievement strategies (Hokodan and Fincham, 1995;

Nolen-Hoeksema *et al.*, 1995; Onatsu-Arvilommi *et al.*, 1998). Moreover, all these studies have focused on early elementary school children, although it has been found that parents maintain their influence on the academic performance of their children in adolescence (Baumrind, 1991; Leung and Kwan, 1998). Consequently, the aim of this study was to investigate the extent to which parenting styles are associated with adolescents' achievement strategies.

Second, although parenting styles have been described as patterns typical of certain families (Baumrind, 1989, 1991), most studies have applied a variable-oriented approach focusing on the associations between different parenting and outcome variables. However, it may be that a person-oriented approach (Hinde and Dennis, 1986; Magnusson, 1992) would be more useful in the investigation of the typology of parenting styles, because this approach focuses on identifying homogenous subgroups that share similar patterns of characteristics. Consequently, a person-oriented approach was used in this study to identify different types of families according to their parenting styles.

Third, in most earlier studies parenting styles have been measured by parental reports or by using observational data (Baumrind, 1971, 1989; Maccoby and Martin, 1983), although young people's own experience may be more influential on their behaviour. For example, achievement among adolescents have been shown to be more highly related to their own perceptions of parenting than to what parents thought they were doing (Paulson, 1994). Thus, self-reports from adolescents may be the most valid way of measuring parenting styles since feeling controlled, devalued or criticized is very much a subjective experience (Litovsky and Dusek, 1985; Wentzel, 1994; Barber, 1996). Consequently, the focus of this study was on the ways adolescents see their parents' child-rearing styles, although parental reports were also gathered.

## Aims of the study

In this study, the following research problems were investigated:

(1) To what extent family parenting styles are associated with adolescents' achievement strategies. We expected that adolescents from authoritative homes would show the lowest level of failure expectation, passivity and task-avoidance (Dornbusch *et al.*, 1987; Steinberg *et al.*, 1989; Lamborn *et al.*, 1991; Hokodan and Fincham, 1995; Ontasu-Arvilommi *et al.*, 1998). They were also expected to apply a higher level of self-enhancing attributions than others (Glaskow *et al.*, 1997). In turn, adolescents from authoritarian, neglectful, and permissive homes were expected to show higher levels of maladaptive achievement strategies, including failure expectation, task-avoidant and passive behavior, and a lack of self-enhancing attributions, than those from authoritative homes (Maccoby and Martin, 1983; Hess and McDevitt, 1984; Steinberg *et al.*, 1994; Nolen-Hoeksema *et al.*, 1995; Glaskow *et al.*, 1997). Adolescents from neglectful families were expected to display the most maladaptive strategy-pattern (Baumrind, 1991; Lamborn *et al.*, 1991).

(2) To what extent these associations vary across gender. Because it has been suggested that parenting styles have different influences on boys and girls (Baumrind, 1971, 1989; Grolnick and Ryan, 1989; Maccoby and Martin, 1983), gender was included as a moderating variable in the study.

(3) To what extent controlling the effects of adolescents' self-esteem, depression, and concentration ability would influence any of the associations between parenting styles and

adolescents' achievement strategies. The major reason for including this research question is that because, on the one hand, self-esteem, depression (Diener and Dweck, 1978; Jones and Berglas, 1978) and concentration ability (Rutter and Garmezy, 1983) have been thought to underlie adolescents' strategy use, and, on the other hand, family parenting styles have been shown to be associated with adolescents' well-being (see Maccoby and Martin, 1983), it is possible that the associations found between parenting styles and achievement strategies might be explained by young people's well-being or concentration ability.

## Method

### *Participants*

*Adolescents.* The participants were 354 eighth-grade pupils (177 girls, 177 boys; Median age 14) from the schools of a middle-sized community in central Sweden. All students in this community were invited to take part in the study ($n=373$). However, when the pupils' parents were asked to give their permission for the study, four parents refused. On the day of the data collection, 354 students (94·9% of the initial sample) were present and answered the questionnaires. These participants were asked to fill in a set of questionnaires during their regular school hours concerning their achievement strategies, well-being, and the parenting styles of their families.

*Parents.* Participants' parents were contacted by mail. They were asked to fill in a questionnaire (one for each family) measuring parenting styles and the achievement strategies deployed by their child. No information was given on who should complete the questionnaire. A total of 313 parents returned the questionnaire (88·4% of the pupils who filled out their questionnaires). The questionnaire was filled in by the mother in the case of 213 families, by the father in the case of 43 families, by some other adult in five cases and by the mother and father together in 52 cases.

### *Measurements*

### *Adolescents' questionnaire*

*Achievement strategies.* Adolescents' achievement strategies were measured with a Strategy and Attribution Questionnaire (SAQ; Nurmi *et al.*, 1995*b*) revised for the present study (Nurmi and Stattin, 1998*a*). It included 23 items, to which adolescents responded on a 4-point rating scale (1="Strongly disagree", 4="Strongly agree"). The scale consisted of four subscales: (1) Failure Expectations (8 items; e.g. "When I face a new task at school, I am often afraid it will go wrong"); (2) Task-irrelevant Behaviour (7 items; e.g. "If something begins to go wrong with my school work, I quickly disappear to some other place"); and (3) Passivity (6 items; e.g. "If I have a difficult task before me, I notice that often I do not really try"). The Cronbach alpha reliabilities for these three subscales were 0·76, 0·84, and 0·81, respectively.

Retest correlations across a six-month period for these three scales have been shown to range from 0·48 to 0·74 (Nurmi *et al.*, 1995*b*). They have also been shown to correlate in moderately and theoretically meaningful ways with the observational data of strategic behaviours, and other strategy measures (Nurmi *et al.*, 1995*b*).

The SAQ included also a scale measuring (4) Self-enhancing attributions. This scale consisted of two items: (a) Internal Attribution for Success ("Try to remember a situation in which things went well and which ended up in success. Think about the possible reasons why this happened. How much was this due to you?"); (b) Internal Attribution for Failure ("Try to remember a situation in which things did not go well and which ended up in failure. Think about the possible reasons why this happened. How much was this due to you?"). Participants responded to these on a 5-point rating scale (1="not at all to me", 5="very much to me"). To calculate a summary score for self-enhancing attributions, the internal attribution for failure score was substracted from the internal attribution for success score.

*Depression.* Adolescents' depression was assessed using IDA Depression Scale (Magnusson *et al.*, 1975). In this scale, adolescents were asked to rate 9 items (e.g. "I often feel sad and down without knowing the reason why") on a 5-point scale (1="not at all true of me", 5="very true of me"). The Cronbach alpha reliability for this scale was 0·86.

*Self-esteem.* Adolescents' self-esteem was measured with a Swedish version of Rosenberg's Self-Esteem Scale (Rosenberg, 1979). The scale consisted of five positive e.g. "Are you able to do things as well as others?") and five negative statements ("Sometimes, do you think that you are no use to anyone?") concerning the self which were rated on a 4-point scale (1="not at all true of me", 4= "very true of me"). The items were reversed, when necessary, so that high scores indicated high self-esteem. The Cronbach alpha reliability for this scale was 0·88.

*Concentration ability.* Adolescent's concentration ability was assessed using the Concentration Ability Scale (Stattin, 1997). In this scale, adolescents were asked to make a choice for each of 9 sets of alternative statements (e.g. "It is easy for me to concentrate on any tasks", "I sometimes have difficulty in concentrating on certain tasks"). Cronbach's alpha reliability for the scale was 0·69.

*Parenting styles.* In order to assess parenting styles in adolescents' families, the adolescents were asked to fill in the Örebro Parenting Style Inventory for Adolescents (Stattin, 1996*a*; Stattin and Kerr, in press). It consists of 36 statements rated on a 5-point scale (1="always", 5="never"). The inventory included six scales: (1) Monitoring (9 items; e.g. "Do your parents know what do you do during your free time?"), (2) Child Disclosure (5 items; e.g. "Do you spontaneously tell your parents about your friends"), (3) Parental Control (6 items; e.g. "Do your parents demand to know where you are in the evenings, who you are meeting and what you do together?"), (4) Parental Trust (6 items; e.g. "Do your parents trust you not to do anything foolish in your free time?"), (5) Parental Engagement (5 items; e.g. "How often do your parents ask you about what happened during your free time?") and (6) Experienced Control (5 items; e.g. "Do you think that your parents control everything in your life?"). Cronbach's alpha reliabilities for the scales were 0·86, 0·82, 0·78, 0·85, 0·77, and 0·81, respectively.

## *Parents' questionnaire*

*Adolescents' achievement strategies.* Parents filled in the Strategy and Attribution Scale for Parents (SAQ-P; Nurmi and Stattin, 1998*b*) which focussed on adolescents' achievement strategies. The scale included 19 items, which parents responded to on a 4-point scale (1="Very untypical of him/her", 4="Very typical of him/her"). The scale

consisted of three subscales: (1) Failure Expectations (8 items; e.g. "When he/she faces a new task at school, he/she is often afraid it will go wrong.") and (2) Task-irrelevant Behaviour (7 items; e.g. "What often occurs is that he/she finds something else to do when he/she has a difficult task in front of him/her."). The Cronbach alpha reliabilities for these subscales were 0·82 and 0·90, respectively.

The third scale was aimed to measure adolescents' Self-enhancing Attributions. It consisted of four items: (a) Internal *vs.* External Attributions for Success (2 items; e.g. "When something good happens, he/she thinks it was due to him or her.") and (b) Internal *vs.* External Attributions for Failure (2 items; e.g. "When problems arise, he/she easily blames himself/herself."). A summary score for self-enhancing attributions was calculated by subtracting the internality attributions for failure from the internality attributions for success.

*Parenting styles.* Parents were asked to fill the Örebro Parenting Style Inventory for Parents (Stattin, 1996*b*) which consisted of 31 statements rated on a 5-point scale (1="always", 5="never"). This inventory consisted of the same scales and same items as the adolescents' form of the inventory, except that it did not include the scale for Experienced Control. The Cronbach alpha reliability was 0·89 for Monitoring, 0·84 for Child Disclosure, 0·73 for Control, 0·89 for Trust, and 0·75 for Engagement.

## Results

### *Parenting style groups*

In order to identify homogeneous groups off adolescents' families according to their parenting styles, a clustering-by-cases procedure was carried out. In this procedure, the following parenting style scores reported by the adolescents were used as criteria variables: (1) child disclosure, (2) parents' engagement directed to adolescent, (3) parents' monitoring behaviour, (4) parental control, (5) parental trust and, finally, (6) experience of being controlled by parents.

To form the final cluster solution, we went through the following steps: (1) at the beginning, the variables were standardized to make sure that the differences in standard deviations did not affect the distances in forming clusters (Aldenderfer and Blashfield, 1984). (2) In order to make a decision about the number of clusters, a hierarchical cluster analysis was carried out, selecting the squared Euclidian distance as a similarity measure and using Ward's method to form the initial clusters without restricting their number. These analyses produced a dendogram based on the distance between the clusters. To find the cluster solution that yielded an ideal number of subgroups, we first made a "subjective inspection of the different branches of the dendogram" (Aldenderfer and Blashfield, 1984), ending up with a four-cluster solution. This seemed to fit both the theory and earlier research in the field. (3) Once the number of clusters had been determined, a Quick Cluster Analysis was used to form the final groups. This selects initial cluster centers according to MacQueen's k-means clustering method. Since the cluster solution in this approach depends on the order of cases in the file (SPSS Reference Guide, 1990), the quick cluster was run several times until the solution was stabilized. In this process, the final centers of each earlier solution were saved and used as initial centers in the next run.

On the basis of this procedure, four groups of families were identified: families which were characterized by Authoritative ($n$=93), Authoritarian ($n$=77), Neglectful ($n$=70), and

Permissive ($n=114$) parenting. The groups Means and Standard Deviations for the parenting style variables and the result of the analysis of variance are presented in Table 1.

Adolescents from authoritative families reported a higher level of child disclosure, parental monitoring behavior, parental trust and parental engagement than adolescents from the other types of families. Moreover, they reported a higher level of parental control than adolescents from neglectful or permissive families but lower level of experienced control than adolescents from authoritarian or neglectful families.

Parenting in neglectful families was characterized by a higher level of perceived distrust and a lower level of perceived parental engagement, monitoring and control than parenting in the other three groups. The experienced control of adolescents in these families was higher than in permissive or authoritative families but lower than in authoritarian families.

Adolescents from permissive families reported a lower level of parental control and engagement than adolescents from authoritative or authoritarian families, and a higher level than adolescents from neglectful families and a lower level than those from authoritative families of child disclosure and parental monitoring. Moreover, they felt more trusted by parents than adolescents from authoritarian or neglectful families but, however, less trusted than adolescents from authoritative families.

The group of authoritarian families differed from the others in adolescent feelings of being controlled, which was highest in these families. In addition, typical of these families was a higher level of parental control than in neglectful or permissive families, and a lower level of trust than in authoritative or permissive families.

A chi-square analysis showed a statistically significant association between cluster membership and gender, $\chi^2(3, n=354)=10{\cdot}41$, $p<0{\cdot}05$: girls were over represented in authoritative families, whereas boys were over represented in neglectful families.

Next, to validate this cluster solution, the four family groups were compared according to parents' report of parenting styles. Besides parenting style group, adolescents' gender was also

**Table 1** *Means (M) and standard deviations (S.D.) of parenting style variables for the four parenting style groups*

| | | Parenting style group | | | | |
|---|---|---|---|---|---|---|
| | | Authoritative parenting | Neglectful parenting | Permissive parenting | Authoritarian parenting | F |
| Monitoring | M | $0{\cdot}81^a$ | $-1{\cdot}31^b$ | $0{\cdot}16^c$ | $0{\cdot}02^c$ | 161·64*** |
| | S.D. | 0·51 | 0·74 | 0·62 | 0·62 | |
| Child disclosure | M | $1{\cdot}01^a$ | $-1{\cdot}23^b$ | $-0{\cdot}00^c$ | $-0{\cdot}10^c$ | 171·30*** |
| | S.D. | 0·64 | 0·69 | 0·59 | 0·63 | |
| Control | M | $0{\cdot}50^a$ | $-0{\cdot}79^b$ | $-0{\cdot}53^b$ | $0{\cdot}75^a$ | 84·52*** |
| | S.D. | 0·87 | 0·62 | 0·71 | 0·76 | |
| Trust | M | $0{\cdot}72^a$ | $-0{\cdot}95^b$ | $0{\cdot}37^c$ | $-0{\cdot}45^d$ | 82·20*** |
| | S.D. | 0·50 | 1·03 | 0·52 | 0·99 | |
| Engagement | M | $0{\cdot}99^a$ | $-0{\cdot}93^b$ | $-0{\cdot}52^c$ | $0{\cdot}23^d$ | 113·54*** |
| | S.D. | 0·79 | 0·78 | 0·69 | 0·70 | |
| Experienced control | M | $-0{\cdot}38^a$ | $0{\cdot}02^b$ | $-0{\cdot}55^a$ | $1{\cdot}06^c$ | 69·77*** |
| | S.D. | 0·83 | 1·00 | 0·54 | 0·87 | |

*Note.* Group means with different superscripts show a statistically significant difference ($p<0{\cdot}05$) when tested with Tukey's b-procedure.

***$p<0{\cdot}001$, **$p<0{\cdot}01$, *$p<0{\cdot}05$.

included as an independent variable. The 4 (Group) × 2 (Gender) between subjects multivariate analyses of variance (MANOVA) revealed significant (Pillais' criterion) main effects for the parenting style group ($F(15,999)=7{\cdot}48$, $p<0{\cdot}001$) and for gender ($F(5,331)=2{\cdot}38$, $p<0{\cdot}05$). The Group × Gender interaction ($F(15,999)=0{\cdot}58$, $p=0{\cdot}90$) did not reach statistical significance. Consequently, several univariate ANOVAs were carried out separately for each variable (Table 2).

The results obtained on the basis of parents' questionnaire provided support for the cluster-solution: Parents from authoritative families reported more monitoring behavior, child disclosure, trust, and engagement than parents from the other family groups. Parents of neglectful families, in turn, showed the lowest level of trust and engagement. Moreover, child disclosure and trust reported by parents were more typical of permissive families than neglectful or authoritarian families. Parental control, instead, was most typical of the authoritarian families and most atypical of parents in the neglectful and permissive families.

Univariate analysis for gender revealed that to girls parents reported a higher level of child disclosure ($M=0{\cdot}17$, S.D.$=0{\cdot}68$) and trust ($M=0{\cdot}16$, S.D.$=0{\cdot}65$) than to boys (for child disclosure, $M=-0{\cdot}08$, S.D.$=0{\cdot}74$, $t_{348}=3{\cdot}32$, $p<0{\cdot}001$; for trust, $M=-0{\cdot}07$, S.D.$=0{\cdot}68$, $t_{352}=3{\cdot}23$, $p<0{\cdot}001$).

## *Parenting styles and adolescents' achievement strategies*

*Adolescent-reported strategies.* To investigate the extent to which adolescents' achievement strategies are associated with the parenting styles typical of their families, the participants from the four types of families were compared according to their self-reported failure expectations, task-irrelevant behavior, passivity, and self-enhancing attributions. A 4 (parenting style group) × 2 (gender) multivariate analysis of variance (MANOVA) revealed significant main effects (Pillais' criterion) both for group ($F(12,972)=55{\cdot}33$, $p<0{\cdot}001$) and for gender ($F(4,322)=4{\cdot}66$, $p<0{\cdot}001$) but not for Group × Gender interaction

**Table 2** *Means (M) and standard deviations (S.D.) for parents' report of parenting style variables for the four parenting style groups*

| | | Parenting style group | | | | |
|---|---|---|---|---|---|---|
| | | Authoritative parenting | Neglectful parenting | Permissive parenting | Authoritarian parenting | F |
| Monitoring | M | $0{\cdot}34^{a}$ | $-0{\cdot}26^{b}$ | $0{\cdot}10^{c}$ | $-0{\cdot}05^{c}$ | 21·59*** |
| | S.D. | 0·39 | 0·62 | 0·46 | 0·52 | |
| Child disclosure | M | $0{\cdot}44^{a}$ | $-0{\cdot}31^{b}$ | $0{\cdot}08^{c}$ | $-0{\cdot}15^{b}$ | 20·06*** |
| | S.D. | 0·54 | 0·76 | 0·62 | 0·76 | |
| Control | M | $0{\cdot}05^{a}$ | $-0{\cdot}15^{b}$ | $-0{\cdot}14^{b}$ | $0{\cdot}28^{a}$ | 8·41*** |
| | S.D. | 0·67 | 0·63 | 0·65 | 0·53 | |
| Trust | M | $0{\cdot}44^{a}$ | $-0{\cdot}37^{b}$ | $0{\cdot}11^{c}$ | $-0{\cdot}15^{b}$ | 26·90*** |
| | S.D. | 0·49 | 0·73 | 0·55 | 0·70 | |
| Engagement | M | $0{\cdot}33^{a}$ | $-0{\cdot}21^{b}$ | $-0{\cdot}10^{b}$ | $-0{\cdot}07^{b}$ | 11·78*** |
| | S.D. | 0·51 | 0·65 | 0·65 | 0·74 | |

*Note.* Group means with different superscripts show a statistically significant difference ($p<0{\cdot}05$) when tested with Tukey's b-procedure.

***$p<0{\cdot}001$, **$p<0{\cdot}01$, *$p<0{\cdot}05$.

($F(12,972)=1{\cdot}58$, $p=0{\cdot}09$). Consequently, several univariate ANOVAs were carried out separately for each variable.

As shown in Table 3, adolescents from authoritative families showed lower levels of task-irrelevant behaviour and passivity than those from the other types of families. They also reported less failure expectation and a higher level of self-enhancing attributions than those from neglectful or authoritarian families. In turn, adolescents from neglectful families reported a higher level of task-irrelevant behaviour than those from the other family types. They were also more passive and reported less use of self-enhancing attributions than adolescents from authoritative or permissive families. Adolescents from permissive families reported a higher level of task-irrelevant behaviour and passivity than those from authoritative families but a lower level than those from neglectful families. Adolescents from authoritarian families reported more failure expectations, passivity and task-irrelevant behaviours than those from authoritative families, but less task-irrelevant behaviours than those from neglectful families. Moreover, they showed less use of self-enhancing attributions than adolescents from authoritative or permissive families.

Gender comparisons revealed that girls reported a higher level of failure expectations ($M=2{\cdot}24$, S.D.$=0{\cdot}52$) and a lower level of self-enhancing attributions ($M=0{\cdot}45$, S.D.$=1{\cdot}05$) than boys (for failure expectation, $M=2{\cdot}09$, S.D.$=0{\cdot}47$, $t_{247}=2{\cdot}87$, $p<0{\cdot}05$; for self-enhancing attributions, $M=0{\cdot}77$, S.D.$=1{\cdot}21$, $t_{341}=2{\cdot}62$, $p<0{\cdot}01$).

**Table 3** *Means (M) and standard deviations (S.D.) of the different strategy variables for the four parenting style groups*

| SAQ-variable parenting | | Parenting style group | | | | F |
|---|---|---|---|---|---|---|
| | | Authoritative parenting | Neglectful parenting | Permissive parenting | Authoritarian parenting | |
| Failure expectation | | | | | | |
| Adolescent | M | $2{\cdot}02^{a}$ | $2{\cdot}31^{b}$ | $2{\cdot}15^{ab}$ | $2{\cdot}23^{b}$ | 4·99*** |
| | S.D. | 0·52 | 0·52 | 0·44 | 0·50 | |
| Parent | M | $1{\cdot}89^{a}$ | $2{\cdot}28^{b}$ | $2{\cdot}19^{b}$ | $2{\cdot}18^{b}$ | 9·74*** |
| | S.D. | 0·51 | 0·53 | 0·48 | 0·48 | |
| Task-irrelevant behavior | | | | | | |
| Adolescent | M | $1{\cdot}81^{a}$ | $2{\cdot}47^{b}$ | $2{\cdot}16^{c}$ | $2{\cdot}24^{c}$ | 19·35*** |
| | S.D. | 0·56 | 0·56 | 0·54 | 0·59 | |
| Parent | M | $1{\cdot}57^{a}$ | $2{\cdot}20^{b}$ | $1{\cdot}87^{c}$ | $2{\cdot}08^{bc}$ | 17·92*** |
| | S.D. | 0·51 | 0·70 | 0·56 | 0·64 | |
| Passivity | | | | | | |
| Adolescent | M | $1{\cdot}85^{a}$ | $2{\cdot}32^{b}$ | $2{\cdot}07^{c}$ | $2{\cdot}16^{bc}$ | 10·05*** |
| | S.D. | 0·61 | 0·56 | 0·50 | 0·55 | |
| Self-enhancing attributions | | | | | | |
| Adolescent | M | $0{\cdot}85^{a}$ | $0{\cdot}36^{b}$ | $0{\cdot}72^{a}$ | $0{\cdot}40^{b}$ | 3·62* |
| | S.D. | 1·31 | 1·03 | 1·12 | 1·00 | |
| Parent | M | $-0{\cdot}17^{a}$ | $0{\cdot}46^{ab}$ | $-0{\cdot}21^{ac}$ | $0{\cdot}36^{a}$ | 3·78* |
| | S.D. | 1·66 | 1·64 | 1·52 | 1·78 | |

*Note.* Group means with different superscripts showed a statistically significant difference ($p<0{\cdot}05$) when tested with Tukey's b-procedure.

***$p<0{\cdot}001$, **$p<0{\cdot}01$, *$p<0{\cdot}05$.

*Parent-reported strategies.* The four groups were next compared according to parents' report of adolescents' failure expectations, task-irrelevant behaviour and self-enhancing attributions. A 4(Group) × 2(Gender) MANOVA revealed significant (Pillais' criterion) main effects for group ($F(9,1011)=5{\cdot}83$, $p<0{\cdot}001$) and for gender ($F(3,335)=4{\cdot}41$, $p<0{\cdot}01$) but not for group × gender interactions ($F(9,1011)=1{\cdot}63$, $p=0{\cdot}10$). The univariate ANOVAs indicated (Table 3) that adolescents from authoritative families showed lower levels of both failure expectations and task-irrelevant behaviour than those in the other family types. Parents in neglectful families, in turn, perceived their children as engaging in more task-irrelevant behaviour than parents in permissive or authoritative families, and using a higher level of self-enhancing attributions than parents from permissive families.

The analyses for gender showed that parents' reported higher levels of failure expectation ($M=2{\cdot}18$, S.D.$=0{\cdot}51$) and task-irrelevant behaviour ($M=2{\cdot}04$, S.D.$=0{\cdot}67$) for boys than girls (for failure expectation, $M=2{\cdot}07$, S.D.$=0{\cdot}52$, $t_{348}=-2{\cdot}04$, $p<0{\cdot}05$; for task-irrelevant behaviour, $M=1{\cdot}76$, S.D.$=0{\cdot}57$, $t_{352}=-4{\cdot}21$, $p<0{\cdot}001$) but a lower level of self-enhancing attributions for girls ($M=-0{\cdot}13$, S.D.$=1{\cdot}55$) than boys ($M=0{\cdot}23$, S.D.$=1{\cdot}75$, $t_{343}=-2{\cdot}06$, $p<0{\cdot}05$).

## *Controlling for the impacts of self-esteem, depression and concentration ability*

Next, the four parenting style groups were compared according to adolescents' self-esteem, depression, and concentration ability. Univariate analyses of variance (ANOVAs) for self-esteem indicated main effects for group ($F(3,346)=13{\cdot}26$, $p<0{\cdot}001$) and gender ($F(1,346)=71{\cdot}50$, $p<0{\cdot}001$) but not for group × gender interaction ($F(3,346)=2{\cdot}18$, $p=0{\cdot}09$): adolescents from authoritative homes ($M=0{\cdot}30$; S.D.$=0{\cdot}65$) had higher self-esteem than adolescents from neglectful ($M=-0{\cdot}15$; S.D.$=0{\cdot}78$), authoritarian ($M=-0{\cdot}11$; S.D.$=0{\cdot}64$) or permissive ($M=0{\cdot}00$; S.D.$=0{\cdot}64$) families. Moreover, girls reported a lower level of self-esteem ($M=-0{\cdot}20$; S.D.$=0{\cdot}73$) than boys ($M=0{\cdot}28$; S.D.$=0{\cdot}55$).

Univariate analysis (ANOVAs) showed that group also had a statistically significant main effect for depression ($F(3,346)=20{\cdot}92$, $p<0{\cdot}001$) and concentration ability ($F(3,345)=10{\cdot}31$, $p<0{\cdot}001$). Gender had a statistically significant main effect for depression ($F(3,346)=42{\cdot}93$, $p<0{\cdot}001$) but not for concentration ability ($F(1,345)=2{\cdot}69$, $p=0{\cdot}10$). However, because the effect for group × gender interaction was statistically significant for depression ($F(3,346)=3{\cdot}70$, $p<0{\cdot}05$) and concentration ability ($F(3,345)=2{\cdot}68$, $p<0{\cdot}05$), analyses were carried out separately for girls and boys. The results are presented in Table 4.

The one-way analysis of variance indicated first that girls from neglectful and authoritarian families were more depressed than the others. By contrast, girls in authoritative families reported the lowest level of depression. Also for boys, the level of depression was highest in neglectful and authoritarian families. However, boys from authoritative and permissive families did not differ from each other in their level of depressive symptomalogy. Secondly, girls from authoritative families reported the highest level of concentration ability. No differences in concentration ability were found between girls from neglectful, permissive and authoritarian families. Boys from authoritarian families, instead, reported a lower level of concentration ability than boys from authoritative or permissive families.

Next, we wanted to examine whether controlling for the effect of concentration ability, depression, or self-esteem would have an impact on the associations between parenting styles and the adolescents' achievement strategies. Consequently, 4 (Group) × 2 (Gender)

**Table 4** *Means (M) and standard deviations (S.D.) of girls and boys depression and concentration ability for the four parenting style groups*

| | | Parenting style group | | | | |
|---|---|---|---|---|---|---|
| | | Authoritative parenting | Neglectful parenting | Permissive parenting | Authoritarian parenting | F |
| Depression | | | | | | |
| Girls | M | $-0{\cdot}24^{a}$ | $0{\cdot}78^{b}$ | $0{\cdot}08^{c}$ | $0{\cdot}43^{b}$ | 17·62*** |
| | S.D. | 0·60 | 0·70 | 0·70 | 0·71 | |
| Boys | M | $-0{\cdot}40^{a}$ | $-0{\cdot}03^{b}$ | $-0{\cdot}28^{a}$ | $-0{\cdot}00^{b}$ | 5·15** |
| | S.D. | 0·52 | 0·66 | 0·48 | 0·53 | |
| Concentration ability | | | | | | |
| Girls | M | $1{\cdot}57^{a}$ | $1{\cdot}26^{b}$ | $1{\cdot}42^{b}$ | $1{\cdot}40^{b}$ | 7·87*** |
| | S.D. | 0·31 | 0·23 | 0·27 | 0·31 | |
| Boys | M | $1{\cdot}58^{a}$ | $1{\cdot}44^{ab}$ | $1{\cdot}51^{a}$ | $1{\cdot}32^{b}$ | 5·32** |
| | S.D. | 0·30 | 0·33 | 0·27 | 0·26 | |

*Note.* Group means with different superscripts show a statistically significant difference ($p<0{\cdot}05$) when tested with Tukey's b-procedure.
***$p<0{\cdot}001$, **$p<0{\cdot}01$, *$p<0{\cdot}05$.

univariate covariate analyses (ANCOVA) for the adolescents' self-reported achievement strategies were carried out using: (1) concentration ability; (2) depressive symptomalogy; and (3) self-esteem as covariates. The first ANCOVA revealed that, after controlling for the effect of concentration ability, the group main effects for self-reported failure expectations ($F(3,342)=1{\cdot}68$, $p=0{\cdot}17$) and self-enhancing attributions ($F(3,336)=2.79$, $p=0{\cdot}07$) were no longer significant. The group effects for task-irrelevant behaviour ($F(3,343)=12{\cdot}53$, $p<0{\cdot}001$) and passivity ($F(3,341)=4{\cdot}62$, $p<0{\cdot}01$), however, remained. Secondly, the main effect for gender was significant for all the strategy variables.

The second set of univariate analyses of covariance showed that after controlling for the effect of depression, the group main effect for failure expectations ($F(3,343)=1{\cdot}06$, $p=0{\cdot}37$) and self-enhancing attributions ($F(3,337)=2{\cdot}23$, $p=0{\cdot}08$) were no longer significant, However, the main effect of the group remained for task-irrelevant behaviour ($F(3,345)=10{\cdot}49$, $p<0{\cdot}001$) and for passivity ($F(3,343)=2{\cdot}70$, $p<0{\cdot}05$).

The third set of univariate analyses of covariance showed that after controlling for the effect of self-esteem, the group main effect for failure expectations ($F(3,343)=0{\cdot}91$, $p=0.44$) and self-enhancing attributions ($F(3,337)=1{\cdot}71$, $p=0{\cdot}17$) were no longer significant, but that the main effect of the group remained for task-irrelevant behaviour ($F(3,345)=12{\cdot}87$, $p<0{\cdot}001$) and for passivity ($F(3,343)=4{\cdot}23$, $p<0{\cdot}01$).

For the parent-reported achievement strategies, the results showed first that after controlling for the effect of concentration ability, the main effect for the group remained for all the strategy variables. However, the main effect of the gender was no longer statistically significant in the case of self-enhancing attributions ($F(1,338)=3{\cdot}07$, $p=0{\cdot}08$).

Second, after conrolling for the effect of depression, the main effects for the group and for gender remained for all the strategy variables. Third, after controlling for the level of self-esteem, all the other effects remained except the main effect for gender in the case of self-enhancing attributions ($F(1,339)=0{\cdot}80$, $p=0{\cdot}32$).

## Discussion

It has been suggested that the achievement strategies adolescents apply in classroom settings play an important role in their academic performance and learning (Cantor, 1986; Dweck, 1990; Nurmi *et al.*, 1995*a*; Onatsu-Arvilommi and Nurmi, in press). Because most studies investigating the developmental antecedents of these strategies have focused on school environments (Butkowsky and Willows, 1980; Jacobsen *et al.*, 1986; Wagner *et al.*, 1989; Carr *et al.*, 1991; Nurmi *et al.*, 1995*a*; Onatsu-Arvilommi and Nurmi, in press), this study was aimed at examining the extent to which family parenting styles provide a basis for adolescents' achievement strategies. The results revealed that parenting styles were associated with adolescents' use of adaptive and maladaptive strategies in many ways: young people from authoritative families were found to most often apply adaptive, task-oriented strategies, whereas those from neglectful families deployed most maladaptive, task-avoidant strategies. These are important findings because they suggest that the associations between adolescents' school achievement and family parenting styles found in earlier studies may be mediated by the achievement strategies and causal attributions adolescents deploy at school. Moreover, the use of maladaptive strategies and the low achievement related to these (Nurmi *et al.*, 1995*a*) may also lead to other types of problem behaviour, such as dropping out of school and subsequent unemployment (Nurmi, 1993; Nurmi *et al.*, 1994).

The results showed first that it was possible to differentiate four family types along the lines described by Baumrind (1971, 1991) and Maccoby and Martin (1983) according to adolescent-reported parenting styles: families with authoritative, authoritarian, permissive and neglectful parenting. Authoritative families were characterized by a high level of responsiveness and child-centredness but also a high level of demandingness. Instead, typical of neglectful families was a low level in all these: they were neither controlling nor responsive. Although permissive families were also characterized by a low level of parental control, they were more child-centred than neglectful families. Typical of authoritarian families, in turn, was a high level of parental control and a low level of parental trust. These family types were further validated by the parents reports.

Adolescents coming from these four family types differed in several ways in their achievement strategies. First, adolescents from authoritative families seemed to apply the most adaptive, task-oriented strategies in achievement situations. Typical of them were low levels of failure expectations, task-irrelevant behaviour and passivity. Moreover, they reported a frequent use of self-enhancing attributions. These results are similar to those found earlier among school children (Hokodan and Fincham, 1995; Glaskow *et al.*, 1997; Onatsu-Arvilommi *et al.*, 1998). There are several ways in which authoritative parenting might be assumed to influence adolescents' strategies. For example, positive encouragement and competence-promoting feedback, such as positive parental beliefs and attributions emphasizing children's abilities (Holloway and Hess, 1982), may support adolescents' autonomous behaviour. Moreover, a parental tendency to provide optimal challenges typical of authoritative parenting may foster adolescents' self-regulation and control beliefs, and, consequently, encourage independent and active problem solving, intrinsic motivation (Hess and McDevitt, 1984; Ginsburg and Bronstein, 1993), and related master behaviour. Moreover, it is also possible that authoritative parents provide positive experiences around academic tasks by their own task-related engagement, instruction and support, and being a role model. Finally, authoritative parenting which provides opportunity to learn competencies in an atmosphere of acceptance may foster adolescents' self-esteem (Litovsky

and Dusek, 1985) and, consequently, boost their tendency to apply adaptive strategies (Cantor, 1990).

In turn, adolescents from neglectful families seemed to display the most maladaptive task-avoidant strategy: typical of them were both high levels of passivity and task-irrelevant behaviour. Moreover, they did not use self-enhancing attributions. These results accord well with the findings of Glaskow *et al.* (1997), who found that neglectful parenting was related to adolescents' internal attributions for failure and external attributions for success. It is possible that environments which do not provide encouragement, parental involvement or support, foster young people's doubts about their own competence and thus expose them to the use of task-avoidant strategies and negative causal attributions.

Authoritarian parenting, also, was found to be associated with the deployment of maladaptive strategies, particularly passive behaviour and a lack of use of self-enhancing attributions, typical of learned helplessness (Diener and Dweck, 1978). It has also been found earlier that helplessness among children is associated with non-responsive, critical, hostile and discouraging parenting styles (Baumrind, 1971; Maccoby and Martin, 1983; Nolen-Hoeksema *et al.*, 1995). Deci and Ryan (1987) suggested that the excess control typical of authoritarian parenting may undermine the motivation to engage in interesting tasks. Moreover, parents' criticism and lack of trust may convince adolescents that they are not competent to solve difficult problems or that they lack the personal control to do so (Barber, 1996; Seligman and Peterson, 1986).

Adolescents from permissive families differed only with respect to their casual attributions from those coming from authoritarian families: they reported a higher level of self-enhancing attributions than adolescents from authoritarian families. This suggests that parental responsiveness may have particular significance for adolescents' causal attributions. It is possible that responsive and child-centred parents encourage their child's self-enhancing attributions by providing child-supporting feedback and communicating their positive attitudes toward the child. Adolescents from permissive families showed lower levels of task-irrelevant behaviours and passivity, and higher levels of self-enhancing attributions than those from neglectful families.

The findings were very similar for both the self-reported and parent-reported achievement strategies of adolescents. The only exception concerned adolescents' self-serving attributions: adolescents from authoritative and permissive families more frequently reported the use of self-enhancing attributions than did those from neglectful or authoritarian families. However, according to parents, adolescents from neglectful families applied a higher level of self-enhancing attributions than those from permissive families. These results may be due to the fact that parents have a tendency to see self-enhancing attributions in a negative light: attributing success to oneself and blaming others for failure may be thought to be selfish and is thus not valued.

Even after controlling the effect of self-esteem, depression, and concentration ability parenting styles' were still associated with adolescents' self-reported passivity and task-irrelevant behaviour. However, parenting styles were no longer related to adolescents' self-reported failure expectations or self-enhancing attributions, suggesting that parenting may influence these strategies through adolescents' self-esteem and depression. Controlling for the effect of self-esteem, depression, or concentration ability did not influence the associations between parenting styles and adolescents' parent-reported strategies.

Our findings also showed some gender differences. First, girls reported a lower use of self-enhancing attributions and a higher level of failure expectations than boys. They also showed

lower level of self-enhancing attributions, according to parents. These results are consistent with earlier findings (Dweck *et al.*, 1978; Peterson and Seligman, 1984). However, failure expectations and task-irrelevant behaviours, according to parents, were more typical of boys than girls (Jones and Berglas, 1978; Onatsu-Arvilommi and Nurmi, in press). These results may be due to difference in boys' and girls' tendencies to handle difficult situations: acting out and externalizing problems have been shown to be more typical of boys than girls, whereas girls are more prone to internalizing problems (Rutter and Garmezy, 1983). Second, as earlier studies (Maccoby and Martin, 1983; Grolnick and Ryan, 1989) have shown, girls were over represented in authoritative families. Also, girls' parents reported a more authoritative kind of parenting in terms of child disclosure and parental trust than boys' parents. Boys, however, were over represented in neglectful families.

There are some grounds for caution in making generalizations about the results presented here. First, the study was cross-sectional and hence did not provide the possibility to test causal hypotheses. It is possible that adolescents' achievement strategies influence their parents' child-rearing styles rather than vice versa. For example, the result that girls and their parents reported more authoritative parenting than boys and their parents may be due to boys' showing more maladaptive behaviour encouraging parents to apply an other than authoritative parenting style. Second, the parenting styles reported by parents were rated by either the mother or the father, or both. This is not an ideal choice, since the mother and the father in the same family may use different kinds of parenting. For example, earlier studies have shown that mothers are generally more authoritative than fathers (Litovsky and Dusek, 1985) and that authoritarian parenting is more typical of fathers than of mothers (Aunola *et al.*, 1999). Consequently, there is a need to replicate this study measuring parenting styles separately for mothers and fathers. Finally, this study represented only one culture, Sweden. It is possible, for example, that the possible tendency of parents to value self-enhancing attributions negatively is characteristic of Sweden and other Nordic countries, in general.

Overall, the results of our study suggest that parenting styles play an important role in the development of adolescents' achievement strategies. In particular, family relations emphasizing child disclosure, parental trust and engagement, on the one hand, and parental control and monitoring, on the other hand, seem to provide a basis for the development of adaptive achievement strategies. In contrast, family relations characterized by an overall uninvolvement, a lack of parental trust, engagement and control, seem to lead the use of maladaptive achievement strategies. Because school achievement provides a basis for adolescents' subsequent success in socialization into adulthood, these impacts of family parenting styles may have long-term consequences for adolescents' overall development.

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# III

## The role of parents´ self-esteem, mastery-orientation and social background in their parenting styles

by

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# The role of parents' self-esteem, mastery-orientation and social background in their parenting styles

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In order to examine the extent to which parents' levels of education, financial resources, self-esteem, and their mastery-orientation versus task-avoidance are associated with their parenting styles and parental stress, data from two studies were analyzed. In Study I, parents of 105 6 to 7-year old children were asked to fill in scales measuring their parenting styles and parental stress, mastery-orientation, financial resources, and their level of education. In Study II, 235 parents were asked to fill in the same scales. An identical pattern of results was found in the two studies. Parents' self-esteem and their use of mastery-oriented strategy were found to be associated with authoritative parenting and low parental stress, whereas parents' low level of education was related to an authoritarian parenting style. The results further showed that the impact of parents' self-esteem on authoritative parenting and parental stress was partly mediated by their use of a mastery-oriented strategy.

*Key words:* Parenting style, parental stress, self-esteem, mastery-orientation, task-avoidance.

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According to Baumrind (1989), the ways in which parents rear their children differ in respect of two main dimensions: demandingness and responsiveness. These differentiate three parenting styles. *Authoritative* parents are demanding and controlling but also warm and child-centered (Baumrind, 1989; Pulkkinen, 1982). They tend to direct their children's activities in a rational, issue-oriented manner. This parenting style has been associated with positive outcomes in child development, such as high self-esteem (Litovsky & Dusek, 1985; Maccoby & Martin, 1983) and school achievement (Grolnick & Ryan, 1989; Steinberg *et al.*, 1989). *Authoritarian* parents show less affiliative relationships with their children compared with authoritative parents. Moreover, the strict control typical of their parenting is more adult- than child-centered (Maccoby & Martin, 1983; Pulkkinen, 1982). Authoritarian parents have been found to have children who are dependent and who have an external locus of control (Grolnick & Ryan, 1989). *Permissive* parenting is characterized by a non-controlling, non-demanding and warm attitude toward the child. This style appears to lead to immaturity in children (Maccoby & Martin, 1983).

Besides parenting styles, it has been suggested that other kinds of parental factors are important for child development. For example, *parental stress*, which is characterized by feelings of powerlessness, stress and insufficiency in the face of parenting (Loyd & Abidin, 1985; Onatsu-Arvilommi *et al.*, 1998; Webster-Stratton, 1990), has been shown to lead to ineffective parenting (McBride, 1991; Snyder, 1991; Webster-Stratton & Hammond, 1988) and negative outcomes in children, such as a lack of persistence at school (Onatsu-Arvilommi *et al.*, 1998) or child conduct problems (Webster-Stratton & Hammond, 1988). While parenting styles refer to the ways in which parents deal with their children, parental stress emphasizes more how mothers and fathers think and feel about themselves in the context of parental roles and demands.

Although a considerable amount of research has been carried out on the relationship between parenting styles and child development, less is known about the antecedents of parenting (Abidin, 1985; Darling & Steinberg, 1993). Examples of factors that may influence child-rearing patterns include parents' psychological characteristics (Belsky, 1984; Dix, 1991; Maccoby & Martin, 1983), such as their well-being. Belsky (1984) suggested that only a mature adult who enjoys an adequate degree of well-being is able to adopt a nurturing orientation in parenting, and to provide growth-promoting care. For instance, depressed mothers have been shown to have negative, critical and nonconstructive communications with their children (Hammen *et al.*, 1990), to show low levels of supervision and authoritative parenting (Onatsu-Arvilommi *et al.*, 1998), and to report high parental stress (Webster-Stratton & Hammond, 1988). Similarly, MacPhee *et al.* (1996) have recently found that parents' self-esteem was associated with their child-rearing patterns: those with low self-esteem adopted a more authoritarian style in their parenting than did those with high self-esteem.

Another set of psychological characteristics that may be associated with parenting styles and parental stress are the control beliefs parents show, and the ways of coping they deploy, in their own lives and in achievement contexts, in particular. Such individual beliefs, expectations and behavioral patterns have recently been described in terms of achievement strategies (Cantor, 1990; Dweck & Leggett, 1988; Nurmi *et al.*, 1995). It is assumed in this framework

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that individuals' implicit theories orient them toward different goals which, in turn, set up and organize different patterns of adaptive or maladaptive behavior (Dweck, 1990). One such pattern frequently described is *mastery-orientation* versus *learned helplessness* (Diener & Dweck, 1978; Dweck, 1990). Because mastery-oriented individuals believe in their ability to manage the situation, they focus on the task by setting themselves clear goals and constructing task-related plans. Concentration on the task and high effort typically leads to success. Helpless individuals, on the other hand, lack a belief in personal control, which leads to passivity and task-avoidance. This, in turn, increases the likelihood of failure in future task. Besides helplessness, *self-handicapping* has been described as another type of maladaptive strategy (Jones & Berglas, 1978; Midgley *et al.*, 1996; Nurmi, 1993). Typical of a person using this strategy is that he or she does not trust his or her competence to handle the situation, and, consequently, anticipates a failure. In order to create an excuse for it, a self-handicapper concentrates on task-irrelevant behavior and task-avoidance instead of formulating task-relevant plans (Nurmi, 1993).

It might be assumed further that some of the strategic patterns individuals apply in various achievement contexts (e.g. at work) are also reflected on the ways they rear their children. If the achievement strategies are based on individual characteristics in general, control beliefs and ways of coping, some of them may also be reflected on other life-domains, such as parenting. It is possible, for example, that individuals' deployment of a mastery-oriented achievement strategy is associated with their optimism, internal control beliefs, and problem-focussed coping and high efforts in child-rearing situations, and their helpless or task-avoidant achievement strategy with external beliefs, passivity and emotion-focused coping in parenting, which have all been found to have consequences for their parenting styles and parental stress (Brody *et al.*, 1994; Bugental *et al.*, 1989; Coleman & Harraker, 1997; MacPhee *et al.*, 1996).

Consequently, the first aim of this study was to examine the extent to which parents' two psychological characteristics – self esteem, and the use of a mastery-oriented versus a task-avoidant strategy – might be associated with their parenting styles and parental stress. Moreover, because it has been shown that self-esteem is one of the key determinants of individuals' achievement strategies (Bandura, 1986; Nurmi *et al.*, 1995; Rhodewalt, 1990), we also investigated whether the impact of parents' self-esteem on parenting styles and parental stress is mediated by their mastery-orientation. We expected that low self-esteem, and the use of task-avoidant and helpless achievement strategies, would be positively associated with the insufficiency and powerlessness feelings in child-rearing situations typical of parental stress, whereas the use of mastery-oriented strategy would show an opposite pattern. The reason for this is that individuals' major control beliefs might be assumed to generalize across various life-domains (Bandura, 1986). It might also be assumed that individuals' high self-esteem and mastery-oriented strategies are associated with their parenting styles. For example, a mastery-oriented achievement strategy may lead to authoritative parenting, because parents who rely on their competence and apply task-focused strategies in achievement contexts are able to show positive emotions in child-rearing situations, and still be demanding at the same time. Another possibility is that they try to use a parenting style that would lead their children in future achievement situations to deploy a similar strategy to their own. It has been found previously that high self-esteem (MacPhee *et al.*, 1996), optimism (Brody *et al.*, 1994), and a functional task-oriented approach (Baumrind, 1989) are all related to parents' demanding but warm child-rearing patterns, typical of authoritative parenting.

It has also been suggested that family background variables, such as financial resources (Kinnunen & Pulkkinen, 1998), parents' level of education (Fox *et al.*, 1995; Zussman, 1978), socioeconomic factors (Maccoby & Martin, 1983; Melson *et al.*, 1993; Ogby, 1981) and parents' occupational status (Dodge *et al.*, 1994; Goodnow, 1988) provide a basis for various parenting styles. For example, mothers from lower socioeconomic backgrounds have been shown to be less warm (Solis-Camara-R & Fox, 1996), to employ harsher and more authoritarian discipline (Conger *et al.*, 1992; Dodge *et al.*, 1994; Lempers *et al.*, 1989; McLoyd, 1990), to have lower developmental expectancies concerning their children (Solis-Camara-R & Fox, 1996), and to provide less cognitive stimulation (Dodge *et al.*, 1994; Liang & Sugawara, 1996) than mothers from a higher socioeconomic background. In addition to parenting styles, social background has been found to be associated with how parents feel about parenting. For example, parents'

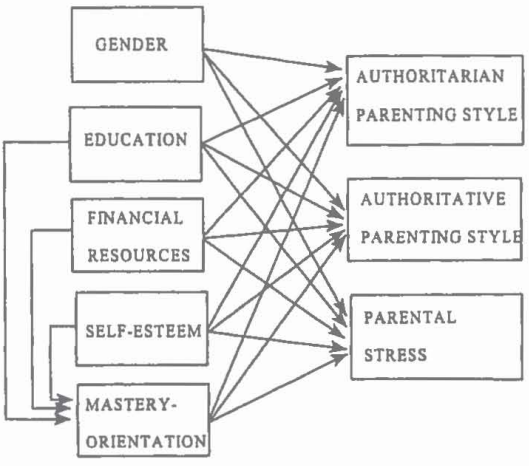


*Fig. 1.* Schematic path model.

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with fewer financial resources have been found to be more depressed in their parental roles (Webster-Stratton & Hammond, 1988), and to feel less competent as parents, than those with better resources (McBride, 1991). Consequently, a further aim of our study was to examine the extent to which parents' social background, measured in terms of their level of education and their financial resources, might be associated with their parenting styles and the parental stress they experienced.

It has also been found that parents' economic and educational backgrounds are associated with their degree of well-being and their control beliefs. For example, lack of family financial resources, high levels of socioeconomic disadvantage, and low level of education, have been shown to be associated with depression (Brody *et al.*, 1994), psychological distress (McLoyd, 1990) and a low state of well-being (Goodnow, 1988; MacPhee *et al.*, 1996) among parents. However, there are two limitations in the earlier research. First, most studies have been concerned with parental depression (Brody *et al.*, 1994). It is possible, however, that a high level of education and economic advantage may also be associated with parents' self-efficacy (Bandura, 1986), optimism and active problem-solving (Brody *et al.*, 1994; Schaier & Carver, 1992), which are typical characteristics of the use of a mastery-oriented strategy. The second limitation of earlier research is that only a few studies have been concerned with the processes by which social background influences parenting (Brody *et al.*, 1994; Zussman, 1980). Consequently, the final aim of our study was to investigate whether parents' financial resources and level of education influenced their parenting styles and parental stress directly, or whether these impacts were mediated by their use of mastery-oriented strategy.

In order to examine the extent to which parents' level of education and financial resources, on the one hand, and their self-esteem and mastery-orientation, on the other hand, contribute to their parenting styles and to parental stress, data from two studies were analyzed. In both studies, the research questions were tested by use of a path model. A schematic representation of the model is shown in Fig. 1. The model included the effects of parents' social background variables, self-esteem, and mastery-orientation on parenting styles and parental stress. Moreover, the indirect paths from background variables and self-esteem to parenting styles via mastery-orientation were also included. In order to control for the impact of respondents' gender, this variable was also entered in the model.

## STUDY 1

### *Method*

#### *Participants*

Participants were parents of 105 6 to 7-year-old children (61 boys, 44 girls). All these children attended the first grade of primary school[1]. Both parents of each child were mailed a set of questionnaires. They were further asked to fill them out independently. Seventy mothers (66.7%) and 54 fathers (51.4%) returned them. All parents lived in the Helsinki metropolitan area. Their ages ranged between 26 and 57 years (M = 39.55; SD = 5.46). The number of the children in the family ranged from one to six (M = 2.35; SD = 0.74).

#### *Measurements*

*Parents' level of education.* To measure their level of education, participants were asked about their vocational education on a 4-point scale (1 = *no vocational education*, 2 = *vocational school*, 3 = *a degree from an institution of professional education*, 4 = *a university degree*).

*Financial resources.* Parents' financial resources were measured by asking them about the total net family monthly income an 8-point scale (1 = *less than 3000 FM*, 2 = *3000–5999 FM*, 3 = *6000–8999 FM*, 4 = *9000–11999 FM*, 5 = *12000–14999 FM*, 6 = *15000–17999 FM*, 7 = *18000–20000 FM*, 8 = *more than 20000 FM*).

*Self-esteem.* Parents' self-esteem was measured using five positive items taken from Rosenbergs' Self-esteem Scale (Rosenberg, 1979). They were asked to rate the items on a 4-point scale (1 = "*not at all true of me*", 4 = "*very true of me*"). The Cronbach alpha reliability for this scale was 0.81.

*Mastery-oriented and avoidant-oriented strategies.* Parents' cognitive- and behavioral strategies in achievement contexts were assessed by a Strategy and Attribution Questionnaire (SAQ; Nurmi *et al.*, 1995). The subjects were asked to rate 15 items (see Appendix) on a 4-point scale (1 = "*Strongly disagree*", 4 = "*Strongly agree*"). The questionnaire was originally designed to measure the following three subscales: (1) *Success Expectations* measured the extent to which parents expected success and were not anxious about the possibility of failure (items 1, 4, 8, 12 and 13; e.g. "*I often have the feeling that I will not be able to cope with a new situation*", reversed); (2) *Task-Irrelevant Behavior* measured the extent to which parents tended to behave in a way that prevented them from, rather than helped them in, carrying out the task (items 2, 6, 9, 11 and 14; e.g. "*What often occurs is that I find something else to do when I have a difficult task in front of me*"); and (3) *Mastery Beliefs* measured the extent to which a parent believes that he or she has personal control over the situation, as opposed to the overriding influence of external factors, chance or other people (items 3, 5, 7, 10 and 15; e.g. "*I do not have the means to affect the way my life goes*", reversed). Retest correlations across a six-month period for these three scales have been shown to range from 0.48 to 0.74 (Nurmi *et al.*, 1995). They have also been shown to correlate in moderately and theoretically meaningful ways with the observational data of strategic behaviors, and other strategy measures (Nurmi *et al.*, 1995).

On the basis of these three scales, a new scale was calculated based on all the 15 items of the SAQ. The Cronbach alpha reliability for this scale was 0.78. There were several reasons for using this mastery-oriented vs. task-avoidant strategy scale rather than the three original subscales. First, we were interested in investigating the overall focus of participants' achievement strategies rather than their specific components, and consequently, decrease the number of variables in subsequent analysis. Second, the three subscales correlated highly (from 0.40 to 0.56). Third, when we carried out a factor analysis of one factor solution for the all

[1] Children in Finland start school (elementary school level) at the age of six or seven. After six years, at the age of 13, they move to the senior level (secondary school). Before going to primary school, most children have a year in pre-school.

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Table 1. *Factor Loading Scores for Items of Parent Rearing Style Questionnaire*

| Item | Study I | | | | Study II | | | |
|---|---|---|---|---|---|---|---|---|
| | Authoritative Parenting | Authoritarian Parenting | Parental Stress | $h^2$ | Authoritative Parenting | Authoritarian Parenting | Parental Stress | $h^2$ |
| 1. I often tell my child that I appreciate what she/he tries out or achieves. | 0.74 | 0.13 | 0.02 | 0.57 | 0.71 | 0.00 | −0.08 | 0.51 |
| 2. I encourage my child to be independent | 0.68 | −0.05 | 0.16 | 0.49 | 0.66 | −0.07 | −0.11 | 0.46 |
| 3. I believe praise is more effective than punishment | 0.47 | −0.02 | 0.00 | 0.22 | 0.64 | −0.30 | 0.02 | 0.50 |
| 6. I respect my child's opinions. | 0.72 | −0.07 | −0.11 | 0.53 | 0.63 | −0.18 | 0.00 | 0.43 |
| 11. I often joke with my child. | 0.47 | 0.11 | −0.02 | 0.24 | 0.56 | −0.07 | 0.01 | 0.32 |
| 13. I know my child's daily schedule. | 0.52 | −0.08 | −0.18 | 0.31 | 0.45 | 0.14 | −0.04 | 0.22 |
| 14. I talk it over and reason with my child when he/she misbehaves. | 0.64 | −0.12 | 0.12 | 0.44 | 0.65 | 0.10 | −0.09 | 0.44 |
| 19. I know where and with whom the child is when she/he is not at home | 0.67 | 0.24 | −0.21 | 0.55 | 0.36 | 0.30 | −0.06 | 0.23 |
| 21. I often show my child that I love him/her. | 0.62 | −0.06 | −0.05 | 0.39 | 0.70 | 0.06 | −0.10 | 0.50 |
| 23. I know what my child is interested in and where she/he spends her/his leisure time. | 0.60 | 0.21 | −0.26 | 0.47 | 0.53 | 0.10 | −0.08 | 0.30 |
| 24. I am easygoing and relaxed with my child | 0.70 | 0.03 | −0.10 | 0.50 | 0.62 | −0.02 | −0.26 | 0.46 |
| 26. My child and I have a good relationship | 0.65 | 0.17 | −0.22 | 0.50 | 0.60 | 0.13 | −0.34 | 0.50 |
| 27. I usually take my child's preferences into account in making plans for the family. | 0.60 | 0.16 | −0.10 | 0.40 | 0.59 | 0.00 | 0.08 | 0.36 |
| 7. I believe scolding and criticism are helpful. | 0.04 | 0.56 | 0.00 | 0.32 | −0.16 | 0.47 | −0.05 | 0.25 |
| 10. I teach my child that one always has to pay for one's misdeeds. | 0.12 | 0.61 | 0.05 | 0.39 | 0.08 | 0.66 | 0.16 | 0.47 |
| 12. I do not allow my child to question my decisions. | −0.20 | 0.45 | 0.04 | 0.24 | −0.09 | 0.39 | 0.07 | 0.16 |
| 17. My child should learn how to behave properly towards his/her parents. | 0.01 | 0.63 | 0.03 | 0.40 | 0.13 | 0.76 | 0.01 | 0.59 |
| 18. I control my child by warning him/her about the bad things that my happen to him/her. | 0.07 | 0.61 | 0.10 | 0.39 | 0.03 | 0.63 | 0.04 | 0.39 |
| 25. It is important that children obey their parents | 0.12 | 0.68 | −0.01 | 0.48 | 0.15 | 0.72 | −0.09 | 0.55 |
| 28. A child should not have secrets from his/her parents. | 0.04 | 0.55 | 0.04 | 0.31 | −0.02 | 0.56 | −0.02 | 0.31 |
| 4. I have many more problems raising my child than I expected. | −0.03 | 0.11 | 0.75 | 0.58 | −0.10 | 0.07 | 0.78 | 0.62 |
| 15. When I think about the kind of parent I am, I often feel guilty or bad about myself. | −0.01 | −0.05 | 0.83 | 0.69 | −0.02 | −0.03 | 0.71 | 0.51 |
| 20. I often feel that the task of upbringing is too much for me. | −0.07 | 0.16 | 0.70 | 0.52 | −0.12 | 0.15 | 0.72 | 0.56 |
| 22. I find myself less able to take care of my child than I thought I would have been. | −0.30 | 0.07 | 0.69 | 0.58 | −0.14 | −0.05 | 0.73 | 0.56 |

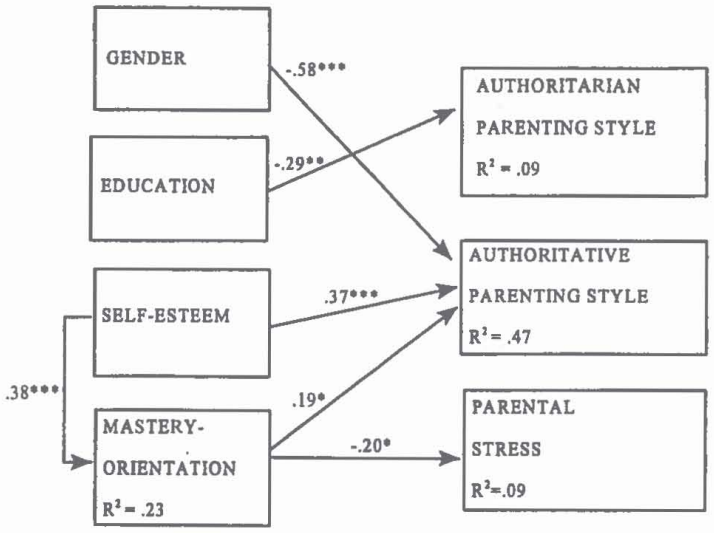


*Fig. 2.* Significant path coefficients for the model tested in Study 1. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

items in the scale, out of the 15 items 12 showed a factor loading above 0.30 and only two were lower than 0.20.

The SAQ has been planned to tap the strategies individuals use in achievement situations. Consequently, the vast majority of the items refer to such situations (achievement-related tasks and situations, work, etc.), and only a few more general statements are involved. None of the items refer to social or child-rearing situations.

*Parenting styles and parental stress*

Parenting was measured by a questionnaire that included two sets of items. The parenting style part included a Finnish version of the revised (Pulkkinen, 1996; Kochanska, 1990) Block's Child Rearing Practices Report (CRPR; Roberts *et al.*, 1984). The parental stress part consisted of a Gerris' Parental Stress Inventory (Gerris *et al.*, 1993; Pulkkinen, 1996). The parents were asked to rate 28 items on a 4-point scale (1 = "*not like me at all*", 4 = "*very much like me*"). The questionnaire included statements (see Table 1) taken from the following nine subscales: (1) *Encouragement of Independence* (items 2,6 and 27), (2) *Expression of Affection* (items 24 and 26), (3) *Rational Guidance* (items 1, 3 and 14), (4) *Affection and Attachment* (items 1, 11, 21 and 26), (5) *Supervision of the Child* (items 13, 19 and 23), (6) *Authoritarian Control* (items 7, 12 and 28), (7) *Control by Anxiety* (items 10 and 18), (8) *Punishment and Conformity* (items 17 and 25), and (9) *Parental stress* (items 4, 15, 20 and 22).

In this study, we were interested in investigating the two traditional child-rearing styles: authoritarian and authoritative parenting (Baumrind, 1989; Maccoby & Martin, 1983). Besides these, we decided to measure parental stress, i.e. how parents think and feel about themselves in parenting situations. To create such indices, we first carried out a principal-axis factor analysis with a varimax rotation for all the 28 items with the criterion of forming three factors. The three-factor solution fitted well with our conceptualization of child-rearing patterns: The factors were (1) Authoritative Parenting, (2) Authoritarian Parenting and (3) Parental Stress. The factor loadings for these factors are shown in Table 1.

The final child-rearing summary scores were calculated as the means of items that were loaded higher than 0.30 on a specific factor. These summary variables were: (1) *an authoritative parenting style* including items reflecting a positive relationship with the child (items 1, 2, 3, 6, 11, 13, 14, 19, 21, 23, 24, 26 and 27), (2) *an authoritarian parenting style*, including items which reflected strict parental control (items 7, 10, 12, 17, 18, 25 and 28), and (3) *parental stress*, including items that reflected powerlessness in parenting (items 4, 15, 20 and 22). The Cronbach alpha reliabilities for these were 0.87, 0.69, and 0.77, respectively. The Pearson product moment correlations between these scales ranged from +0.12 to −0.19, suggesting that they really measure three different constructs.

All these three scales, and the items they consisted of, focussed on child rearing situations. The authoritarian and authoritative parenting style included questions about how the parents deal with their children, and the parental stress scale on how they think about themselves and feel in child-rearing situations. Although both parental stress, and the previously described mastery-orientation vs. task-avoidance scale focussed on how people think about themselves, the parental stress scale focussed particularly on child-rearing situations, while the mastery-orientation scale included items concerning achievement situations.

*Results*

To investigate the extent to which parents' social background variables, and their self-esteem and mastery-orientation, might be associated with their parenting styles, a path analysis was carried out. Since the generalized least-square criterion (GLS) yields an approximate chi-square test under somewhat less restrictive assumptions of multivariate normality than some alternative procedures (Loehlin, 1987), the parameters of the model were estimated using this procedure. This model (Fig. 1) tested first, the direct pathways from parents' financial resources, level of education, self-esteem and mastery-orientation to their authoritative and authoritarian parenting style and parental stress, and second, the indirect pathways from parents' level of education, family financial resources and their self-

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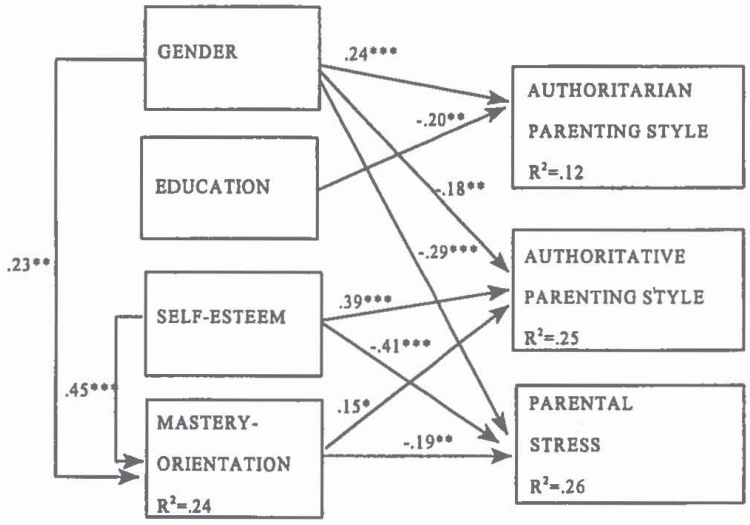


*Fig. 3.* Significant path coefficients for the model tested in Study 2. ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$.

esteem to parenting styles and parental stress through their mastery-orientation.

The chi-square test and fit indices suggested that the original model fitted the data well ($\chi^2(4) = 11.36$, $p = 0.02$; $GFI = 0.98$; $CFI = 0.99$). This model is shown in Fig. 2, including only statistically significant paths.

The results showed that parents' level of education was the only variable that predicted authoritarian parenting: the higher the level of education the parents had, the less authoritarian they were. On the other hand, the authoritative parenting style was directly predicted by gender[2], self-esteem and mastery-orientation: the higher the level of self-esteem the parents reported, and the more they used a mastery-oriented strategy, the more likely they were to practice authoritative parenting. Mothers also reported a higher level of authoritative style than fathers. Besides these direct effects, parents' self-esteem additionally predicted authoritative parenting indirectly through mastery-orientation: the higher the self-esteem the parents had, the more they showed mastery-orientation, which further contributed to authoritative parenting.

Parental stress was predicted only by parents' mastery-orientation: parents who employed a high level of mastery-oriented strategy reported less parental stress than parents who reported task-avoidance. Parents' self-esteem again had an indirect impact on parental stress via mastery-orientation: low self-esteem decreased parents' mastery-orientation, which further contributed to their parental stress.

In order to analyze whether the results would differ by gender, the path analyses described previously (dropping gender) were carried out separately for men and women using a multisample procedure as suggested by Jöreskog and Sörbom (1996). The results showed that the same model fitted the data for both men and women.

[2] Scoring for gender was 1 for mothers and 2 for fathers.

### *Discussion*

The results showed first, that parents who reported high self-esteem and frequent recourse to mastery-oriented strategy practised a higher level of authoritative parenting than other parents. These results accord well with earlier findings which showed that parents' self-efficacy is positively associated with the authoritative style of parenting (MacPhee *et al.*, 1996). Moreover, parents who used an avoidance-oriented, rather than a mastery-oriented strategy showed high levels of feelings of powerlessness, and stress in parenting. Moreover, parents' low self-esteem was also found to be associated with parental stress through the use of task-avoidant strategy. On the other hand, the results showed that parents' social background was associated with their authoritarian parenting style: parents with a lower educational level practiced more authoritarian, adult-centered parenting than parents with a higher educational level. This finding is similar to those of several earlier studies in showing that parents with a low socioeconomic status employ a more authoritarian rearing style than those with a higher status (Conger *et al.*, 1992; Dodge *et al.*, 1994; Lempers *et al.*, 1989; McLoyd, 1990).

However, Study 1 had certain limitations. First, all the parents had children who were 6–7 years old. Second, the sample was relatively homogenous in terms of educational level. Finally, although a model was tested, the testing procedure was exploratory. Consequently, another set of data was used to further examine our research questions and test the findings of Study 1. This time the sample was

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more representative of the Finnish adult population, for example in terms of social background variables than in Study 1. Moreover, the children of the participants represented a larger age-span than was the case in Study I.

## STUDY II

### *Methods*

#### *Participants*

The participants were 121 women and 114 men at the age of 35 to 36, who had at least one child. The number of the children in their families ranged from one to four (M = 2.14; SD = 0.93), and their age from 0 to 20 years (M = 6.33; SD = 3.87). All the participants had at least one school-aged child (6–15 years old). The participants came from the data of an ongoing Personality and Social Development longitudinal study (Pulkkinen, 1982). The sample originally consisted of 369 second-grade pupils (173 girls and 196 boys) in the town of Jyväskylä in 1966. For this particular study, 235 participants who had children during the fifth measurement point of the study, at the age of 35 to 36, were selected. The sample has been shown to be representative of the age cohort born in Finland in 1959 (Kinnunen & Pulkkinen, 1998). The participants were asked to fill in a set of mailed questionnaires.

#### *Measurements*

*Parents' level of education.* To measure participants' level of education, they were asked about their education, using a 5-point scale (0 = *no vocational education*, 1 = *employment- or occupational course (at least 4 months)*, 2 = *vocational school*, 3 = *a degree from an institute of professional education*, 4 = *a degree from an institute of university standing*).

*Financial resources.* Participants' financial resources were assessed by asking them to rate their economic situation on a 4-point scale (1 = *very tight*, 2 = *fairly tight*, 3 = *fairly good*, 4 = *very good*).

*Self-esteem.* Parents' self-esteem was measured on the same scale (Rosenbergs' Self-esteem Scale) as was used in Study I. The Cronbach alpha reliability for the scale was 0.72.

*Mastery-oriented and task-avoidant strategies.* In order to assess parents' cognitive and behavioral strategies, parents were asked to fill in a Strategy and Attribution questionnaire (SAQ). The scale and its scoring were identical to that used in Study I. The Cronbach alpha reliability for the mastery-orientation versus task-avoidance scale was 0.82.

*Parenting styles and parental stress.* The participants' child rearing patterns were measured using an identical questionnaire to that used in Study 1. Again, principal-axis factor analysis with varimax rotation of three factors (Table 1) accorded with the notion of three expected constructs: authoritative parenting style, authoritarian parenting style, and parental stress.

Using an identical procedure to that in Study I, three summary scores were calculated for (1) *authoritative parenting style*, (2) *authoritarian parenting style* and (3) *parental stress*. The Cronbach alpha reliabilities for these were 0.84, 0.75 and 0.74, respectively. The correlations between these varied between −0.22 to 0.06.

### *Results*

To investigate the extent to which parents' level of education, financial resources, self-esteem, and mastery-orientation might be associated with their parenting styles and parental stress, an identical path model to that tested in Study 1 (Fig. 1) was used. The results showed first, that the original model did not fit the data well ($\chi^2(4) = 27.10$, $p = 0.00$; $GFI = 0.97$, $CFI = 0.95$). Examination of the modification indices showed, however, that adding the path from parents' gender to their mastery-orientation would increase the fit of the model. Moreover, estimation of the covariance between the residuals of authoritative parenting style and parental stress (estimate −0.11; $r = -0.22$, $p < 0.01$) would also increase the fit of the model. This was due to fact that these two variables share some joint variance that was unique to these two scales. Consequently, these paths were added to the model. The results showed that this model fitted the data well ($\chi^2(2) = 8.13$, $p = 0.02$; $GFI = 0.99$; $CFI = 0.99$). The model is shown in Fig. 3 (only statistically significant paths are shown).

Overall, the results were nearly identical to those of Study I. First, the authoritarian parenting style was directly predicted by parents' level of education: the higher the level of parents' education, the less authoritarian the parenting style they showed. Second, both self-esteem and mastery-orientation predicted authoritative parenting: the higher the levels of self-esteem parents reported, and the more they had recourse to mastery-oriented strategies, the more authoritative the parenting they reported. The results further showed that parents' self-esteem also predicted authoritative parenting indirectly via mastery-orientation: the higher the self-esteem of the parents, the more mastery-oriented they were, which again contributed to an authoritative parenting style. Parental stress was directly predicted by self-esteem and mastery-orientation: parents who showed low self-esteem and a high-level of task-avoidance rather than mastery-orientation reported more parental stress. Moreover, parents' self-esteem also predicted parental stress indirectly via their mastery-orientation: parents with low self-esteem showed a higher level of avoidance-orientation, which, in turn, was associated with parental stress. Parents' gender (see Footnote 2) predicted both parenting styles and parental stress: mothers were more authoritative and also reported more parental stress than fathers. In turn, fathers were more authoritarian than mothers. Moreover, parents' gender was associated with their mastery-orientation: fathers reported more mastery-orientation than mothers.

In order to analyze whether the results would differ by gender, the path analyses described previously (dropping gender) were carried out separately for men and women using a multisample procedure as suggested by Jöreskog and Sörbom (1996). The results showed that the same model fitted the data of both men and women.

## GENERAL DISCUSSION

The two studies showed an identical pattern of findings: parents' high level of self-esteem, and their use of mastery-oriented strategy, were found to be associated with authoritative parenting and low parental stress, whereas a low

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socio-economic background was associated with authoritarian parenting. Overall, these results suggest that an authoritative parenting style may have its basis in the individual's personality characteristics and learning history, as evidenced in positive self-schemata and the use of adaptive strategies, whereas authoritarian parenting may be more related to a set of cultural beliefs and values typical of a specific social class and educational background.

The results showed first, that parents who had a high level of self-esteem typically practised an authoritative parenting style, characterized by positive attachment, the expression of affection, encouragement of the child's independence, rational guidance, and supervision of the child. These results are similar to those found by MacPhee *et al.* (1996). There are at least two alternative explanations for these findings. One is that parents' self-esteem reflected their own socialization history. It may be that parents with high self-esteem have been brought up according to an authoritative and supporting style, which is then reflected in their use of a similar type of parenting with their own children. The second possibility is that parents with high self-esteem may rely more on their own parenting skills. This may then lead to the expression of positive affects and encouragement towards a child, which is typical of authoritative parenting (Maccoby & Martin, 1983).

The results further showed that parents who reported the use of a mastery-oriented strategy rather than an avoidant strategy in achievement contexts showed a high level of authoritative parenting with their children. Although this is a new finding, it accords well with some earlier results. For example, parents' optimistic orientation and sense of personal control have been shown to be related to authoritative parenting, such as an awareness of developmental issues (see Schaeffer, 1991) and problem-focused coping in child-rearing (Brody *et al.*, 1994). There are again at least two possible explanations for these findings. First, parents who deploy mastery-oriented strategy in achievement contexts may have more positive attitudes towards their own skills overall, and parenting skills in particular, than parents who report task-avoidance. These mastery-oriented child-rearing beliefs may then help them to maintain positive affects and attachment toward their children even in cases of failure or in conflict situations. The second possibility is that mastery-oriented parents may try to teach similar kinds of strategic behavior to their children as they apply themselves. They may, for example, try to promote the child's self-reliance by encouraging his or her independence and use of initiative, and by creating the warm and success-facilitating environment typical of authoritative parenting (Baumrind, 1989; Maccoby & Martin, 1983).

The results further showed that parents with high self-esteem reported a higher level of the use of mastery-oriented strategy than those with low self-esteem. This result accords well with earlier notions, suggesting that how people think about themselves provides a basis for the types of strategies they use (Jones & Berglas, 1978; Cantor, 1990; Nurmi *et al.*, 1995; Rhodewalt, 1990). Moreover, the results showed that part of the impact of parents' self-esteem on authoritative parenting was mediated indirectly via their use of a mastery-oriented strategy. This is an important finding because it suggests that the achievement strategies that people most typically use also have consequences for their behaviors in a family context.

The results also revealed that parents who reported the use of a mastery-oriented strategy in achievement contexts were less stressed in their parental roles, and felt more competent than parents who deployed an avoidance-oriented strategy. Moreover, parents' low self-esteem was found to contribute to parental stress through their use of a task-avoidant strategy. One possible explanation for this result is that the adaptive achievement strategies that parents with a high self-esteem show are also associated with their overall optimism and beliefs in personal control, which are also evidenced in how they see themselves in parental roles and situations. On the other hand, parents' low self-esteem and related use of a task-avoidant achievement strategy (Dweck & Leggett, 1988) may be associated with their overall pessimism and helplessness, which may then be evidenced also in their negative attitudes towards parenting and the related stress. Another possibility is that parents who see their own behavior in terms of maladaptive strategies may also perceive their children's behavior in more negative terms, which in turn may lead to parental stress.

However, parents' self-esteem and strategy-use were not associated with an authoritarian parenting style. Instead, as has been shown in several previous studies in other societies, particular in the U.S., (Conger *et al.*, 1992; Dodge *et al.*, 1994; Lempers *et al.*, 1989; McLoyd, 1990), an authoritarian parenting style was also associated with parents' low level of education in Finland. This suggests that parents' authoritarian attitudes towards parenting may be more dependent on their socio-cultural values and beliefs than on their individual characteristics and related learning history. It is possible, for example, that involvement in higher education provides people with knowledge and attitudes, favorable to softer child-rearing patterns than in the authoritarian parenting style (Goodnow, 1988; Schaeffer, 1991). Parents' level of education may also evidence differences in the cultural values, beliefs, and socialization goals typical of a specific social class. For example, earlier studies have shown that obedience and conformity are more valued among parents with a low level of education (Goodnow, 1988). On the other hand, parents with a high level of education may put less emphasis on teaching their children to be obedient. Overall, these results may reflect the fact that, as Ogby (1981) has noted, parents in different subcultures attempt to socialize their children according to their own culture's unique needs. For example, Zussman (1978) has proposed that parents with a low socioeconomic status

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are more likely to perceive social relationships in terms of power and authority, and, consequently, use more power-oriented techniques when dealing with their children. One further explanation for the impact of parents' level of education on authoritarian parenting is that there has been a change from authoritarian parenting to more permissive child-rearing during recent decades, and that the well-educated middle class is in the forefront of these changing ideas, whereas the less educated people may be more reluctant to change their parenting patterns.

Although family financial resources have also been earlier found to be connected with parenting styles (Conger *et al.*, 1992; Dodge *et al.*, 1994; Lempers *et al.*, 1989; McLoyd, 1990) and parental stress (McBride, 1991; Webster-Stratton & Hammond, 1988), no such associations were found in this study. The result may be due to the fact that Finland is a typical Nordic welfare society in which the disparities in income are relatively small and the family economy is subsidized by the state. Furthermore, one aim of the two studies was to see whether parents' level of education and financial resources would predict parental styles through their mastery-oriented beliefs. No evidence of such mediating effects was found.

The results further showed that mothers and fathers used different child-rearing patterns. Both studies showed that an authoritative style was more typical of mothers than of fathers. This finding is similar to those of earlier studies (Litovsky & Dusek, 1985). One possible explanation for this is that mothers spend more time with their children than fathers, and are thus more care-oriented. In Study II mothers were also more stressed in parenting, and showed less mastery-orientation than fathers. These results agree with those of earlier studies, showing that mothers report higher levels of parental depression and stress than fathers (Loyd & Abidin, 1985; Webster-Stratton & Hammond, 1988). Loyd and Abidin (1985) suggested that this effect is due to the fact that mothers are more knowledgeable about and more sensitive to the pressures and stresses in the parent-child system than fathers. The authoritarian style, however, was more typical of fathers than of mothers.

There are several limitations to be considered in any attempt to generalize the findings of these two studies. First, both studies were correlational, and thus do not provide the possibility of testing causal hypotheses. It is possible, for example, that parental stress due to a difficult child leads to reporting lower self-esteem rather than vice versa. Thus, there is a clear need for a cross-lagged longitudinal study to investigate some of these prospective relationships. Second, social desirability was not controlled. However, because the results were analyzed by path models with the SEM procedure, the results are based on unique associations between the variables, which should decrease the role of unspecific common method variance due to the self-report measures, for instance. Future research with other kinds of measures of parenting styles, such as observational data, should be applied to verify some of the findings of our two studies. Third, although two studies were carried out, both samples represented one culture, Finland. As there may be cross-cultural differences, not only in child-rearing practices, but in their impact as well, there is a clear need to cross-validate the findings in other cultural environments.

Moreover, this study was carried out during one particular historical period, the 1990s. Because the parenting styles are socially constructed and also influenced by the general child-rearing-related beliefs and values typical of a certain historical period (Bronfenbrenner, 1979), some of the findings may generalize only to this particular historical period. For example, in the last two decades there have been a rapid change from authoritarian parenting to more permissive parenting and, subsequently, to authoritative parenting styles (Bronfenbrenner, 1979), which have been evident also in Finland. Finally, our measurements did not include a scale for the permissive parenting style, although, from the socio-historical point of view, this parenting style in particular could be of general interest. However, because we used continuous variables to measure the parenting styles, rather than grouping of the parents to different parenting style groups, it might be assumed that the opposite end of the authoritarian scale represents a permissive type of parenting.

Overall, the results of the two studies suggested that parents' self-esteem, and their use of an adaptive achievement strategy, were associated with authoritative parenting and low parental stress, whereas parents' level of education was associated with authoritarian parenting. Besides showing that authoritative parenting is based on personality characteristics and authoritarian child-rearing on social background, these findings may also be useful in identifying the key components of effective and competent child-rearing. For example, a lack of authoritative parenting, which may lead to problems in a child's healthy development, might be successfully prevented by focusing on the parents' well-being, belief-systems, and the strategies they use. Similarly, interfering with parents' self-related beliefs and their strategies may help to prevent parental stress and its negative consequences for child development. Instead, the negative effects of authoritarian parenting might best be prevented by investing effort in changing the parents' cultural beliefs and values, for example, by providing them with guidance about alternative child rearing practices and their positive impacts.

## APPENDIX A: Items and Instructions for the Attribution and Strategy Questionnaire—short form

Presented below are different statements. Rate how well they correspond to you and circle the appropriate alternative. For each question choose from the following alterna-

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tives: (1) Strongly disagree, (2) Disagree, (3) Agree, (4) Strongly agree.

1. When I get ready to start a task, I am usually certain that I will succeed in it.
2. What often occurs is that I find something else to do when I have a difficult task in front of me.
3. How I succeed in different tasks depends on chance.*
4. When I go into new situations, I usually expect I will manage.
5. Progress in your work depends completely on circumstances.*
6. If something begins to go wrong, I quickly disappear to the cafeteria or to some other place.
7. I do not have the means to affect the way my life goes.*
8. I often have the feeling that I will not be able to cope with a new situation.*
9. If I am expecting some difficulties, I usually find something else to do.
10. In the long run, success in different situations depends little on one's knowledge and abilities.*
11. If I have a difficult task before me, I notice that often I do not really try.
12. I have done well even in more demanding situations.
13. I usually do well, even on more difficult tasks.
14. I often get sick when I know that there will be something difficult on the following day.
15. Success in one's work depends on oneself.

*Scored in reversed directions

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# IV

## Developmental dynamics of reading skills, achievement strategies, and parental beliefs

by

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# Developmental dynamics of reading skills, achievement strategies, and parental beliefs

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*This study investigates the developmental dynamics between parental beliefs, and children's achievement strategies and reading performance by using cross-lagged longitudinal data. The reading skills of 111 six-to-seven-year-old children were tested four times during their first year of primary school. In the same time periods, the children's use of a task-avoidant versus a task-focused achievement strategy in the classroom context was rated by their teachers. Parents filled in questionnaires measuring their general beliefs about their children's school performance and their reading-specific beliefs at the beginning and at the end of the school year. The results showed that parents' beliefs in their children's general school competence predicted their children's use of a task-focused strategy and a lack of task-avoidance, which further predicted the children's high level of reading performance. Moreover, children's use of a task-focused achievement strategy increased parents' high beliefs in their children's general competence, whereas the children's reading performance was reflected in their parents' skill-specific beliefs.*

*Keywords: Learned helplessness, Self-handicapping, Mastery-orientation, Family, Learning difficulties.*

The achievement strategies children deploy at school play an important role in their academic performance. Children who seek challenges (Dweck, 1986), and are active and persistent, even in the face of obstacles (Dweck & Leggett, 1988), tend to do well at school. In turn, those who are afraid of demanding tasks, and, consequently, resort to task-avoidant (Nurmi, Onatsu, & Haavisto, 1995) and passive (Diener & Dweck, 1978) behaviors, are likely to underachieve, and even to show learning difficulties (Butkowsky & Willows, 1980; Chapman, 1988). Although a substantial amount of research has been carried out on such strategies in the school context (Butkowsky & Willows, 1980; Carr, Borkowski, & Maxwell, 1991; Jacobsen, Lowery, & DuCette, 1986; Wagner, Spratt, Gal, & Paris, 1989), only a few have thus far investigated the developmental dynamics of achievement strategies and specific academic skills using cross-lagged longitudinal data (Onatsu-Arvilommi & Nurmi, 2000). There has also been an increasing interest in the role of family, such as parents' expectations and beliefs, in children's academic socialization (Miller, 1988; Murphey, 1992; Sigel, Stinson, & Flaugher, 1991). However, none of these studies have focused on the role that parental beliefs may play in the developmental dynamics between children's achievement strategies and their academic skills. Consequently, the aim of this study was to investigate the prospective relationships between children's achievement strategies, their acquisition of literacy, and parental beliefs about children's school performance, during the first year of primary school.

## Task-focused and task-avoidant strategies

Achievement strategies have been described in terms of several successive psychological processes (Cantor & Kihlstrom, 1987; Nurmi, Salmela-Aro, & Ruotsalainen, 1994; Pintrich & DeGroot, 1990). First, the cognitive schemata which individuals have constructed in previous situations provide a basis for their anticipation of what will happen in a similar kind of future learning context (Cantor, 1990; Dweck, 1986; Elliot & Dweck, 1988; Pintrich & Garcia, 1991). These anticipations, and related emotions, then direct the ways in which individuals try to handle the task in terms of setting goals (Pintrich, Marx, & Boyle, 1993; Winne, 1997), constructing related plans, and investing effort (Cantor, 1990; Dweck, 1986; Norem, 1989; Pea & Hawkins, 1987; Pintrich & DeGroot, 1990). Finally, individuals interpret the outcomes of their behavior in terms of making causal attributions, such as those related to situation, skills and effort (Butkowsky & Willows, 1980; Jacobsen et al., 1986; Taylor & Brown, 1988; Weiner, 1985).

Earlier research has identified two major kinds of motivational and behavioral patterns that individuals deploy in academic settings. The task-focused strategies, such as mastery-orientation (Diener & Dweck, 1978; Dweck, 1986), 'illusory glow optimism' (Cantor, 1990) or task-orientation (Salonen, Lepola, & Niemi, 1998; Skaalvik, 1997), are characterized by mastery beliefs, a high degree of task involvement (Cantor, 1990; Diener & Dweck, 1978; Skaalvik, 1997), persistence (Dweck & Leggett, 1988; Onatsu-Arvilommi & Nurmi, 2000), active problem-focused coping efforts in the face of obstacles (Dweck, 1990), and a self-enhancing attributional style (Cantor, 1990; Diener & Dweck, 1978).

Task-avoidant strategies have been described either as a passive avoidance (Diener & Dweck, 1978; Dweck, 1990) or active avoidance pattern (Jones & Berglas, 1978; Nicholls, Cheung, Lauer, & Patashnick, 1989). Learned helplessness, for example, is characterized by a lack of belief in personal control, which leads to passivity (Diener & Dweck, 1978) and skill-related causal attributions after failure and external attributions after success (Dweck, 1990). On the other hand, typical of self-handicapping is that a person does not trust in his or her ability to handle the situation, but rather expects failure, and therefore concentrates on creating excuses instead of formulating task-relevant plans (Jones & Berglas, 1978; Midgley, Arunkumar, & Urdan, 1996). This is typically evidenced in a low level of effort and active task-avoidance.

Most research on achievement strategies in academic settings has used self-report instruments (e.g. Butkowsky & Willows, 1980; Cain & Dweck, 1995; Carr et al., 1991; Galloway, Leo, Rogers, & Armstrong, 1995; Jacobsen et al., 1986; Pintrich, Alderman, & Klobucar, 1994), which provide information about how individuals perceive their ways of dealing with the situation (e.g. Hill & Hill, 1982; Pintrich, Roeser, & DeGroot, 1994; Wigfield & Guthrie, 1997). These instruments do not, however, provide information about how the achievement strategies are reflected in individuals´ behavior. Consequently, in this study, we focused on the behavioral aspects of children´s achievement strategies by using teacher observations. One additional reason for using behavioral rather than self-report instruments was that teacher-ratings were assumed to provide more valid and reliable information of young children´s achievement strategies than self-reports.

## Learning to read at school

Learning to read is a basic academic skill, particularly in early elementary school years, which provides one of the foundations for success at school thereafter (Boland, 1993; Juel, 1988). Reading ability has been typically assumed to be composed of two basic elements, decoding and comprehension (Bast & Reitsma, 1997; Juel, 1988). Decoding skills refer to the ability to read out written words and sentences (Bast & Reitsma, 1997; Boland, 1993). Comprehension is the process by which the meanings of words are integrated into sentences and text structures (Juel, 1988; Snowling, 1998), which requires both decoding ability (Perfetti, 1985) and linguistic comprehension (Gough & Tunmer, 1986; Nation & Snowling, 1997). Skillful reading often also requires other more specific abilities, such as inference making (Nation & Snowling, 1998; Snowling, 1998).

The nature of reading skill changes rapidly during the first school years. For example, decoding gets automatized and the importance of comprehension skills increases (Nation & Snowling, 1998; Salonen et al., 1998). A variety of factors contributing to early reading development, such as knowing the names or sounds of letters, and phoneme awareness, have been studied (Goswami & Bryant, 1990; Salonen et al., 1998; Stanovich, 1986). For example, letter recognition at kindergarten has been shown to be a strong predictor of reading one year later (Ellis & Large, 1988). Also several environmental factors, such as reading experiences at home (Lyytinen, Rasku-Puttonen, Poikkeus, Laakso, & Ahonen, 1994; Stanovich, 1986), have been found to be associated with early reading development.

The Finnish language has some unique features from the point of view of learning to read: it has an unusually regular orthography and a consistent letter-sound correspondence (Lyytinen, 1994; Vauras, Dufva, Hämäläinen, & Mäki, 1994). This means that each sound is represented by a single symbol, and each symbol stands for only one sound. This feature has been assumed to help Finnish children to learn to read within a relatively short time period (Lerkkanen, 1994; Linnakylä, 1993). They learn decoding and word recognition skills usually by the spring term of the first grade, and are then able to concentrate at an early stage on text comprehension, thus in this way increasing reading fluency.

## Achievement strategies and school performance

A substantial amount of research has been carried out on children´s achievement strategies at school. Mastery beliefs (Diener & Dweck, 1978; Elliot & Dweck, 1988), task-focused behaviors (Skaalvik, 1997) and active coping efforts (Dweck, 1986; Mantzicopoulos, 1990; Rijavec & Brdar, 1997) have been shown to be related to a high level of school achievement. In turn, helplessness beliefs and related passivity (Diener & Dweck, 1978), being afraid of failure, and task-irrelevant behaviors (Nurmi et al., 1995), have been related to low achievement (Carr et al., 1991; Diener & Dweck, 1978; Midgley & Urdan, 1995; Nolen-Hoeksema, Seligman, & Girgus, 1986; Nurmi et al., 1995; Zuckerman, Kieffer, & Knee, 1998), and learning disabilities (Butkowsky & Willows, 1980; Chapman, 1988).

However, this research has at least two limitations. First, most of the studies

have been cross-sectional (Butkowsky & Willows, 1980; Galloway et al., 1995; Jacobsen et al., 1986; Cain & Dweck, 1995). Second, the vast majority of earlier studies have focused on pupils´ overall achievement (Chapman, 1988; Jacobsen et al., 1986; Mantzicopoulos, 1990; Midgley et al., 1996) instead of specific academic skills, such as reading (e.g. Carr et al., 1991; Onatsu-Arvilommi & Nurmi, 2000). In one of the few cross-lagged longitudinal studies Onatsu-Arvilommi and Nurmi (2000) showed not only that children´s task-avoidant behaviors decreased their subsequent improvement in reading skills, but also that a low level of reading skills increased their subsequent use of task-avoidant behaviors. However, because these results were based on a relatively small sample and three measurements points only, the first aim of our study was to replicate the findings of Onatsu-Arvilommi and Nurmi´s study using another sample, and four measurements across a half-year period.

**The role of parental beliefs**

It has been suggested that parental beliefs play an important role in children´s school performance and academic socialization (Goodnow, 1988; Musun-Miller & Blevins-Knabe, 1998; Sigel, 1985). For example, parents´ positive beliefs and high expectations about their offsprings´ competencies and school abilities have been shown to be associated with the children´s high achievement at school (Galper, Wigfield, & Seefeldt, 1997; Gottfried, Flemming, & Gottfried, 1994; Hess, Holloway, Dickson, & Price, 1984; Murphey, 1992; Phillips, 1987; Seginer, 1983). The impact of parental beliefs on children´s school achievement may, however, be indirect and mediated by other factors. According to Eccles (1983, 1984, 1993), for example, parents´ beliefs in their offsprings´ abilities are a major determinant of children´s self- and task-related beliefs, which then influence their academic performance. There is some indirect support for this notion. First, parental beliefs have been found to be associated with children´s intrinsic motivation to learn (Gottfried, 1985, 1990; Wigfield & Asher, 1984), self-perceptions of ability (Frome & Eccles, 1998; Phillips, 1987; Stevenson & Newman, 1986), and expectations of success (Entwisle & Baker, 1983; Galper et al., 1997; Parsons, Adler, & Kaczala, 1982; Stevenson & Newman, 1986). Second, such achievement-related beliefs have then been shown to predict children´s school performance (Chapman & Tunmer, 1997; Mujis, 1997).

These studies, however, have one major limitation. Because the majority of them have been cross-sectional (Entwisle & Hayduk, 1978; Miller, 1988; Murphey, 1992), they had not provided a basis for examining whether it is the parental beliefs that influence children´s achievement-related beliefs and strategies, and their academic achievement, or vice versa. Consequently, in the present study, we used cross-lagged longitudinal data to examine, first, the extent to which the impact of parental beliefs on children´s academic performance would be mediated by children´s achievement strategies, and second, the extent to which the strategies children deploy and their academic performance would contribute to their parents´ subsequent beliefs.

Previous research on the role of parental beliefs has other limitations, too. First, there is a substantial amount of variation in the kinds of parental beliefs that

have been investigated. Some studies have focused on parental beliefs concerning a particular skill, such as math or reading (Frome & Eccles, 1998; Galper et al., 1997; Parsons et al., 1982; Phillips, 1987), whereas others have investigated more general beliefs concerning children´s overall achievement (Alexander & Entwisle, 1988; Peet, Powell, & O´Donnel, 1997). Only a few studies have investigated both general and skill-specific beliefs (Baker & Entwisle, 1987). In the present study, both parents´ general beliefs about their children´s abilities at school, and their skill-specific beliefs concerning their offsprings´ reading skills in particular, were investigated.

Second, most research on parental beliefs and children´s school performance has dealt with older school-age children or adolescents (Frome & Eccles, 1998; Ladd & Price, 1986; Parsons et al., 1982; Phillips, 1987; Stevenson & Newman, 1986). However, the role of parental beliefs for the children´s school performance might be assumed to be particularly important during the first school years (Murphey, 1992). Third, in most previous studies only maternal beliefs have been under focus (Baker & Entwisle, 1987; Mantzicopoulos, 1997; Miller, 1986; Peet et al., 1997; Phillips & Zimmerman, 1990; Stevenson & Lee, 1990; Stevenson & Newman, 1986), and only a handful of studies have concerned themselves with the fathers´ beliefs (Frome & Eccles, 1998; Galper et al., 1997). Consequently, the present study focused on both the mothers´ and fathers´ parental beliefs, and their children´s achievement strategies and reading skills during the first grade.

**Aims of the study**

This study aimed at investigating the developmental dynamics between mothers´ and fathers´ beliefs about their children´s school performance, and the children´s achievement strategies and reading skills. The following research questions were examined (Figure 1):

(1) To what extent does children´s use of a task-avoidant versus a task-focused achievement strategy predict the development of their reading skills?

(2) To what extent do children´s reading skills predict their subsequent use of a task-avoidant versus a task-focused achievement strategy?

(3) To what extent do parents´ general beliefs about their children´s school performance and skill-specific beliefs concerning reading predict the children´s subsequent use of a task-avoidant versus a task-focused achievement strategy and their reading skills?

(4) To what extent is the impact of parental beliefs in their children´s reading skills mediated by the children´s achievement strategies?

(5) To what extent do the achievement strategies children deploy, and their reading skills predict their parents´ subsequent general beliefs about their children´s school performance and skill-specific beliefs concerning reading?

These research questions were investigated by the use of a structural equation model which included all the paths of theoretical interests (see Figure 1). The model was tested separately for mothers´ and fathers´ data.

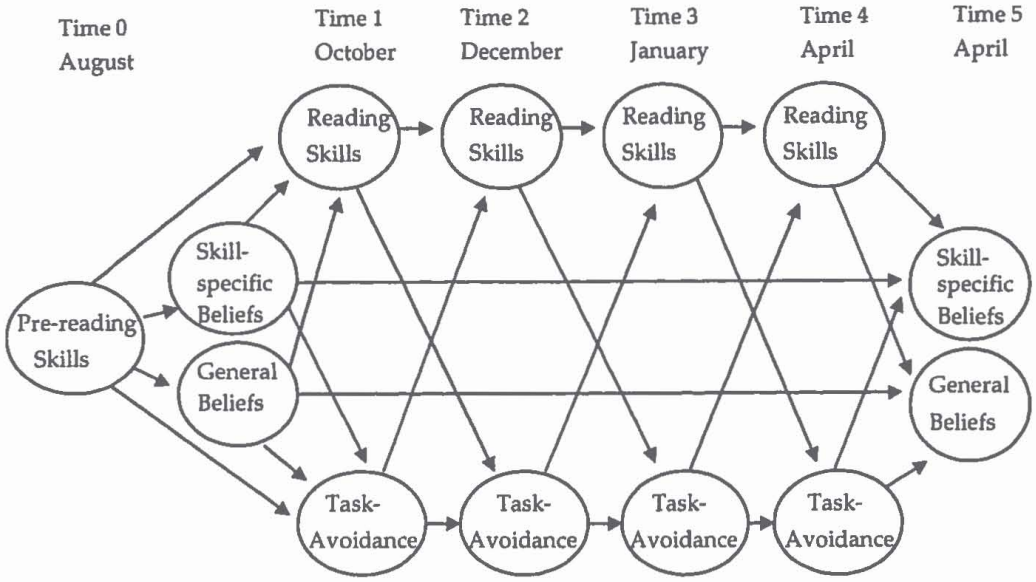


FIGURE 1 Schematic representation of the structural model.

## METHOD

### Participants and procedure

#### Children

One-hundred and eleven (59 boys, 52 girls) 6- to 7-year old children ($M$ = 7.30, $SD$ = 0.32) participated in the study. They came from six first-grade classes in four primary schools situated in a medium-sized town in Central Finland.[1]

The children were examined five times during their first school year (number of the participants in each measurement). First, their pre-reading skills were tested in August, just at the beginning of their first school year (N=111). Then, they were tested using the Reading Skill Test (Lerkkanen, 1998) and also rated by their teachers using the Behavioral Strategy Rating Scale (Onatsu & Nurmi, 1995) in October (N=109), December (N=109), January (N=109) and April (N=108).

A total of 77 % of the participants were from families with two parents, 9 % of the families consisted of the mother or the father living with her/his new spouse and their children and 13 % of children were living with their single mother or father. The number of the children in the families ranged from one to seven ($M$ = 2.46 , $SD$ = 1.05).

#### Parents

A questionnaire was mailed twice to both the parents of the children: in October and April. In October, a total of 96 mothers (86.5 %) returned the questionnaire;

[1] Children in Finland start school (elementary school level) in August of the year they reach the age of seven. Before going to primary school, most children have a year in pre-school.

and in April, 92 (82.9%) of them returned it. In October, 82 (73.9%) of the fathers returned the questionnaire; and in April, 65 (58.6%) of them returned it. Parents were asked to fill in the questionnaires independently of each other.

A total of 30% of the mothers and 35% of the fathers had a degree from an institution of university standing, 63.5% of the mothers and 58.5% of the fathers had a degree from an institution of professional or vocational education, and 6.5% of the mothers and fathers had no occupational education.

To investigate the possible selection effect, children whose mother or father participated in the study were compared with children whose mother or father did not participate, according to the reading skill and achievement strategy variables. No selection effect was found in the case of mothers. However, the children whose father participated in the study showed a lower level of task-avoidant behaviors than children whose father did not participate ($F$ (1, 106) = 5.74, $p < .05$).

## Measurements

### Children´s measures

*Pre-reading skills.* The children´s reading skills at the beginning of the primary school were tested using the Beginner´s Reading Test (Normaalikoulu [Jyväskylä University Teacher Training School], 1985). This test consists of two parts:

(1) In the letter identification part, the participants were asked to name 21 upper case letters. Scoring was based on the number of correctly identified letters.

(2) In the reading words and sentences part, the participants were presented first, one by one, with 20 written words of increasing difficulty, and then with two sentences. Their task was to read aloud each word or sentence. Testing continued until four successive words/sentences were read incorrectly or were not attempted. Scoring was based on the number of words/sentences read correctly, with a maximum value of 22.

*Reading skills.* Children´s reading skills were assessed in the four measurement by the use of the Reading Skill Test (Lerkkanen, 1998). The test was administered by the primary school teacher during regular school hours. The structure of the test was similar at all measurement points. However, the tasks included in the test became progressively more difficult across the measurement points as the children became more skilled readers. The test consisted of three parts:

(1) In the word-recognition and reading task, the children were shown eight words (first measurement point) or sentences (second, third and fourth measurement points) and eight pictures. Their task was then to relate the words/sentences to appropriate pictures.

(2) In the literal text comprehension task, the children read a short text and then completed a picture on the basis of the text.

(3) In the inferential text comprehension task, the children were first asked to read a short story. They were then asked to write down the answers to questions which required text evaluation and making inferences about the text content.

The scoring for the Reading Skill Test was based on the number of correct

answers or the number of correctly completed items.

The word-recognition and reading task is similar to the letter-word recognition subtest of the Woodcock-Johnson Tests of Achievement-Revised (Woodcock, 1980-91) used previously, for example, by Seefeldt, Denton, Galper and Younoszai (1999). The literal text comprehension task is similar to those used earlier by Touchstone Applied Science Associates (TASA)(DRP; 1979-91), and Reid and Elley (Progressive Achievement Tests of Reading; 1969-91). The inferential text comprehension task is similar to those used earlier, for example, by Cain and Oakhill (1998).

Cronbach alpha for the Reading Skill Test was .76, .73, .71, and .55, at four measurement points, respectively. The test-retest correlation between measurements 1 and 2 was .88, between measurements 2 and 3 .70, and between measurements 3 and 4 .75.

Because each of the Reading Skill scores in four measurements, and also the score for Beginner's Reading Test, showed either high skewness or kurtosis values ($p < .05$), new scores were computed by combining the original values to make the distribution resemble the normal. For example, the kurtosis for Reading Skill at measurement 1 was: $z = 35.99$, $p<.01$. New scores were computed as follows: value 1 = 1, values 2 - 3 = 2, values 4 -5 = 3, values 6 - 7 = 4, value 8 = 5, values 9 - 27 = 6, value 28 = 7, value 29 = 8, and value 30 = 9.

*Achievement strategies.* The classroom teachers of each of the four first-grade classes were asked to evaluate the behavior of each pupil in their class using the Behavioral Strategy Rating Scale (BSR; Onatsu & Nurmi, 1995; Onatsu-Arvilommi & Nurmi, 2000). They were first asked to consider and remind themselves how a certain pupil typically behaved in classroom situations, and then rate his or her behavior using five statements (e.g. *"Does the pupil have a tendency to find something else to do instead of focusing on the task at hand?"*; *"Does it seem that the pupil easily give up the task at hand?"*) assessed with a 5-point rating scale (0 = *"Not at all*, 4 = *"To a great extent"*). A summary score was formed for each pupil's use of a task-avoidant versus a task-focused achievement strategy. The Cronbach Alpha reliability for this scale was .95, .94, .95, and .96, for the four measurement points, respectively. The test-retest correlation between measurements 1 and 2 was .86, between measurements 2 and 3 .87, and between measurements 3 and 4 .89.

The Task-avoidance Scale of BSR have been shown to correlate moderately with children's self-reported task-avoidance (.30) (Nurmi & Aunola, 2000; Onatsu & Nurmi, 1997) and also with observers' rating of it (.42) (Nurmi & Aunola, 2000).

**Parents' measurement**

The parents' beliefs about their children's school performance were assessed with four 4-point Likert items modified from the questionnaires used by Parsons et al. (1982) and Frome and Eccles (1998). Two of these items measured parents' *skill-specific beliefs* (*"How well do you think your child is doing in reading?"*; *"How well do you think your child will do in reading later in school?"*). Two of the items measured parents' *general beliefs* (*"In general, how well is your child doing at school?"*; *"In general, how well do you think your child will do at school later on?"*). The Cronbach alpha reliabilities for the mothers' skill-specific and general beliefs ranged from .62 to .75, and those for the fathers' ranged from .66 to .81.

TABLE 1 The Pearson Product-Moment Correlations Between Manifest Variables and their Means and Standard Deviations.

| Variables | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Beginners´ Reading Test (0) | --- | -.32[c] | .60[a] | -.28[c] | .64[a] | -.17 | .49[a] | -.27[c] | .54[a] | .61[a] | .29[c] | .34[c] | .08 | 4.09[1] | 1.85[1] |
| 2. Task-avoidance (1) | -.62[a] | --- | -.32[c] | .85[a] | -.39[b] | .83[a] | -.28[c] | .79[a] | -.27[c] | -.18 | -.13 | -.43[b] | -.22 | 2.10 | 1.18 |
| 3. Reading Skill (1) | .71[a] | -.47[a] | --- | -.17 | .72[a] | -.20 | .64[a] | -.34[c] | .73[a] | .56[a] | .35[c] | .34[c] | .10 | 2.53[1] | 2.01[1] |
| 4. Task-avoidance (2) | -.67[a] | .87[a] | -.53[a] | --- | -.30[c] | .86[a] | -.19 | .53[a] | -.18 | -.12 | .05 | -.33[c] | -.13 | 2.18 | 1.15 |
| 5. Reading Skill (2) | .83[a] | -.68[a] | .70[a] | -.72[a] | --- | -.28[c] | .70[a] | -.41[c] | .65[a] | .64[a] | .32[c] | .41[c] | .16 | 3.98[1] | 1.63[1] |
| 6. Task-avoidance (3) | -.53[a] | .85[a] | -.48[a] | .89[a] | -.61[a] | — | -.21 | .90[a] | -.21 | -.06 | .04 | -.25 | -.06 | 2.26 | 1.14 |
| 7. Reading Skill (3) | .56[a] | -.47[a] | .50[a] | -.58[a] | .63[a] | -.54[a] | --- | -.31[c] | .67[a] | .66[a] | .31[c] | .48[a] | .14 | 2.93[1] | 1.14[1] |
| 8. Task-avoidance (4) | -.60[a] | .84[a] | -.45[a] | .88[a] | -.61[a] | .87[a] | -.57[a] | --- | -.31[c] | -.21 | -.09 | -.34[c] | -.11 | 2.31 | 1.20 |
| 9. Reading Skill (4) | .42[b] | -.48[a] | .51[a] | -.53[a] | .47[a] | -.60[a] | .65[a] | -.61[a] | --- | .56[a] | .34[c] | .39[c] | .08 | 2.51[1] | 1.09[1] |
| 10. Mothers´ Skill-specific belief I (0) | .70[a] | -.54[a] | .57[a] | -.54[a] | .65[a] | -.45[b] | .49[a] | -.44[b] | .41[b] | --- | .45[a] | .52[a] | .21 | 2.88 | 0.93 |
| 11. Mothers´ Skill-specific belief II (0) | .31 | -.26 | .19 | -.21 | .19 | -.14 | .13 | -.11 | .15 | .57[a] | --- | .42[b] | .50[a] | 3.24 | 0.55 |
| 12. Mothers´ General belief I (0) | .38[c] | -.48[b] | .30 | -.42[b] | .37[c] | -.42[b] | .40[c] | -.41[b] | .54[a] | .47[b] | .43[b] | --- | .55[a] | 3.12 | 0.65 |
| 13. Mothers´ General belief II (0) | .28 | -.24 | .39[c] | -.15 | .24 | -.19 | .18 | -.21 | .41[b] | .36[c] | 59[a] | .66[a] | — | 3.22 | 0.54 |
| 14. Fathers´ Skill-specific belief I (0) | .57[a] | -.31 | .43[b] | -.22 | .59[a] | -.16 | .34[c] | -.16 | .14 | .68[a] | .48[c] | .24 | .30 | 2.79 | 0.75 |
| 15. Fathers´ Skill-specific belief II (0) | .22 | -.42[c] | .20 | -.26 | .25 | -.23 | .04 | -.18 | .00 | .44[b] | .39[c] | .19 | .15 | 3.17 | 0.58 |
| 16. Fathers´ General belief I (0) | .37[c] | -.32 | .22 | -.17 | .35[c] | -.12 | .08 | -.11 | .05 | .29 | .30 | .32 | .38[c] | 3.07 | 0.60 |
| 17. Fathers´ General belief II (0) | .05 | -.31 | -.14 | -.15 | .02 | -.09 | -.13 | -.09 | -.18 | -.05 | .13 | .07 | .03 | 3.10 | 0.48 |
| 18. Mothers´ Skill-specific belief I (5) | .66[a] | -.36[c] | .54[a] | -.37[c] | .54[a] | -.40[b] | .66[a] | -.40[b] | .59[a] | .66[a] | .43[b] | .45[b] | .33[c] | 3.19 | 0.80 |
| 19. Mothers´ Skill-specific belief II (5) | .43[b] | -.09 | .20 | -.08 | .09 | -.04 | .32[c] | -.08 | .26 | .36[c] | .46[b] | .26 | .26 | 3.26 | 0.50 |
| 20. Mothers´ General belief I (5) | .60[a] | -.46[b] | .27 | -.50[a] | .50[a] | -.41[b] | .49[a] | -.43[b] | .42[b] | .54[a] | .61[a] | .60[a] | .51[a] | 3.02 | 0.64 |
| 21. Mothers´ General belief II (5) | .33[c] | -.08 | .02 | -.05 | .09 | -.03 | .29 | -.19 | .17 | .08 | .42[b] | .23 | .52[a] | 3.17 | 0.49 |
| 22. Fathers´ Skill-specific belief I (5) | .52[b] | -.44[c] | .38[c] | -.40[c] | .54[b] | -.40[c] | .53[b] | -.39[c] | .48[b] | .52[b] | .34 | .16 | .14 | 3.00 | 0.81 |
| 23. Fathers´ Skill-specific belief II (5) | .30 | -.34 | .10 | -.25 | .22 | -.29 | .24 | -.29 | .29 | .38[c] | .30 | .05 | .01 | 3.18 | 0.64 |
| 24. Fathers´ General belief I (5) | .57[a] | -.49[b] | .31 | -.40[c] | .52[b] | -.42[c] | .35[c] | -.49[b] | .41[c] | .28 | .21 | .27 | .33 | 3.00 | 0.56 |
| 25. Fathers´ General belief II (5) | .31 | -.37[c] | -.03 | -.23 | .26 | -.24 | .14 | -.30 | .16 | .26 | .26 | .15 | .12 | 3.06 | 0.50 |
| *M* | 4.52[1] | 2.43 | 2.58[1] | 2.49 | 4.44[1] | 2.47 | 3.38[1] | 2.68 | 2.94[1] | 3.02 | 3.37 | 3.27 | 3.29 | | |
| *SD* | 1.82[1] | 1.08 | .85[1] | 1.07 | 1.30[1] | 1.13 | .95[1] | 1.11 | 1.00[1] | 0.96 | 0.58 | 0.59 | 0.56 | | |

*Note1.* The correlations for boys are above the diagonal and for girls below the diagonal.
[a] $p < .05$; [b] $p < .01$; [c] $p < .001$. 0 = Premeasurement; 1 = Measurement 1; 2 = Measurement 2; 3 = Measurement 3; 4 = Measurement 4; 5 = Measurement 5.
*Note2.* [1]Revised scores.

(continues)

TABLE 1 (continues)

| Variables | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Beginning Reading Test (0) | .64[a] | .24 | .12 | -.12 | .43[a] | .22 | .22 | .24 | .44[a] | .25 | .18 | -.04 |
| 2. Task-avoidance (1) | -.36[c] | -.18 | -.41[b] | -.21 | -.17 | -.15 | -.48[a] | -.22 | -.33 | .02 | -.49[b] | -.37 |
| 3. Reading Skills (1) | .61[a] | .27 | .21 | .01 | .52[a] | .11 | .39[c] | .12 | .40[c] | .03 | .18 | -.05 |
| 4. Task-avoidance (2) | -.22 | -.18 | -.24 | -.05 | -.10 | -.10 | -.39[b] | -.18 | -.28 | .13 | -.38[c] | -.07 |
| 5. Reading Skills (2) | .74[a] | .41[c] | .20 | .18 | .57[a] | .43[c] | .38[c] | .32[c] | .47[c] | .27 | .23 | .01 |
| 6. Task-avoidance (3) | -.11 | -.17 | -.27 | -.23 | -.11 | -.08 | -.47[b] | -.15 | -.17 | .04 | -.44[b] | -.21 |
| 7. Reading Skills (3) | .51[a] | .31 | .17 | .09 | .56[a] | .29 | .47[c] | .26 | .58[a] | .49[c] | .38[c] | .13 |
| 8. Task-avoidance (4) | -.22 | -.21 | -.21 | -.15 | -.14 | -.01 | -.54[a] | -.13 | -.18 | .12 | -.34 | -.11 |
| 9. Reading Skills (4) | .55[a] | .19 | .20 | .06 | .51[a] | .24 | .44[c] | .17 | .36[c] | .12 | .16 | .05 |
| 10. Mothers´ Skill-specific belief I (0) | .68[a] | .28 | .15 | -.05 | .51[a] | .23 | .26 | .31[c] | .34 | .35[c] | .14 | -.12 |
| 11. Mothers´ Skill-specific belief II (0) | .38[c] | -.02 | .19 | .06 | .31[c] | .35[c] | .26 | .51[a] | -.02 | .19 | .09 | .19 |
| 12. Mothers´ General belief I (0) | .51[a] | .02 | .45[b] | .00 | .33[c] | .23 | .56[a] | .35[c] | .33 | .11 | .22 | -.04 |
| 13. Mothers´ General belief II (0) | .27 | .16 | .31 | .18 | .29 | .40[b] | .46[b] | .48[a] | .06 | .26 | .21 | .31 |
| 14. Fathers´ Skill-specific belief I (0) | --- | .48[a] | .41[b] | .19 | .54[a] | .25 | .28 | .19 | .62[a] | .30 | .27 | .05 |
| 15. Fathers´ Skill-specific belief II (0) | .51[a] | --- | .25 | .55[a] | .22 | .12 | .18 | .07 | .29 | .36[c] | .09 | .30 |
| 16. Fathers´ General belief I (0) | .59[a] | .23 | --- | .56[a] | .15 | .01 | .48[b] | .14 | .24 | .08 | .44[c] | .23 |
| 17. Fathers´ General belief II (0) | .15 | .50[b] | .46[b] | --- | .08 | .12 | .44[b] | .15 | -.01 | .27 | .35[c] | .49[b] |
| 18. Mothers´ Skill-specific belief I (5) | .53[a] | .36[c] | .14 | .04 | --- | .67[a] | .46[b] | .29 | .66[a] | .41[c] | .47[b] | .19 |
| 19. Mothers´ Skill-specific belief II (5) | .11 | .15 | -.10 | .00 | .66[a] | --- | .36 | .62[a] | .40[c] | .45[c] | .33 | .42[c] |
| 20. Mothers´ General belief I (5) | .47[b] | .34 | .50[b] | .32 | .58[a] | .48[b] | --- | .45[b] | .33 | .25 | .57[a] | .42[c] |
| 21. Mothers´ General belief II (5) | .22 | .24 | .18 | .20 | .36[c] | .63[a] | .56[a] | --- | .17 | .35[c] | .23 | .36[c] |
| 22. Fathers´ Skill-specific belief I (5) | .65[a] | .59[a] | .19 | .25 | .77[a] | .36[c] | .43[c] | .38[c] | --- | .56[a] | .62[a] | .24 |
| 23. Fathers´ Skill-specific belief II (5) | .48[b] | .68[a] | .20 | .33 | .64[a] | .44[c] | .32[c] | .38[c] | .81[a] | --- | .44[b] | .56[a] |
| 24. Fathers´ General belief I (5) | .44[c] | .56[a] | .37[c] | .47[b] | .41[c] | .15 | .56[a] | .51[b] | .72[a] | .63[a] | --- | .56[a] |
| 25. Fathers´ General belief II (5) | .34 | .60[a] | .30 | .49[b] | .41[c] | .34 | .48[b] | .54[b] | .57[a] | .70[a] | .78[a] | --- |
| *M* | 3.08 | 3.41 | 3.27 | 3.32 | 3.36 | 3.45 | 3.24 | 3.21 | 3.25 | 3.41 | 3.19 | 3.28 |
| *SD* | 0.80 | 0.60 | 0.61 | 0.47 | 0.76 | 0.59 | 0.58 | 0.52 | 0.76 | 0.67 | 0.74 | 0.58 |

## RESULTS

The statistical analyses were carried out by the use of structural equation modelling (SEM) with the LISREL8 statistical package (Jöreskog & Sörbom, 1993). The parameters of the model were estimated using the Maximum Likelihood (ML) procedure. The goodness-of-fit was evaluated using three indicators, $\chi^2$/df, Bentler's (1990) Comparative Fit Index (*CFI*), and Bentler and Bonnet's (Bentler, 1990) Non-normed Fit Index (*NNFI*), as suggested by Gerbing and Anderson (1993). In order to investigate whether an identical model would fit for boys and girls, a multisample procedure suggested by Jöreskog and Sörbom (1993) was used. The sample correlation matrix, and means and standard deviations for the measured variables are presented in Table 1, separately for boys and girls.

In all the tested models, the constructs for reading skills and the use of a task-avoidant versus a task-focused strategy (time 1, 2, 3 and 4), and pre-reading skills (time 0) each consisted of one indicator. Consequently, their loadings were set as equal to 1 with an error term 0. The constructs for the parents' skill-specific and general beliefs at time 0 and time 5 consisted of two indicators. For each of these constructs, one of the loadings was constrained to be equal to 1 (Table 2).

TABLE 2 Standardized Parameter Estimates for Parents' Skill-specific and General Beliefs at Time 0 and Time 5 (the Final Model).

| Variable | Time 0 | Time 5 |
|---|---|---|
| **Mothers** | | |
| Skill-specific belief I | 0.87 | 0.97 |
| Skill-specific belief II | 0.59 | 0.61 |
| General belief I | 0.87 | 0.88 |
| General belief II | 0.70 | 0.48 |
| **Fathers** | | |
| Skill-specific belief I | 0.80 | 0.89 |
| Skill-specific belief II | 0.59 | 0.66 |
| General belief I | 0.67 | 1.00 |
| General belief II | 0.62 | 0.60 |

### A model for mothers

We started by testing the model that included the mothers' and the children's data. The basic model is presented in Figure 1. In this model, the constructs for the mothers' skill-specific and general beliefs at the same measurement point were let to correlate. The model fitted the data well ($\chi^2$ = 315.55, df = 253; *CFI* = 0.93; *NNFI* = 0.92). However, inspection of the modification indices suggested that estimating the error covariances between one of the skill-specific belief variables at time 5 and one of the general belief variables at time 5 for the whole sample would increase the fit of the model. After this specification, none of the indices exceeded the value 8, suggesting that the same model had a good fit for both girls and boys data ($\chi^2$ = 281.76, df = 252; *CFI* = 0.97; *NNFI* = 0.96). The final model included only

those paths which were statistically significant ($\chi^2$ = 287.50, df = 260; *CFI* = 0.97; *NNFI* = 0.97; the percentage contribution to $\chi^2$ was 56.28% for girls and 43.72% for boys.). The standardized beta coefficients for this model are presented in Figure 2.

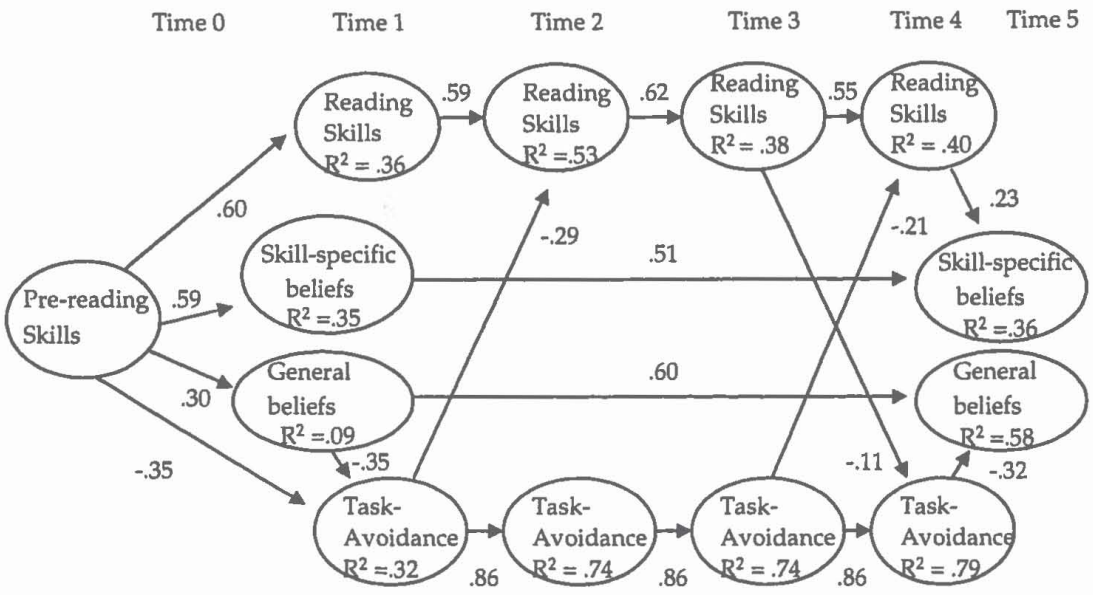


FIGURE 2 Results of the SEM for Mothers´ General and Skill-specific Beliefs, and Children´s Strategies and Reading Skills.

**Achievement strategies and reading skills**

The results showed, first, that the level of children´s pre-reading skills at the beginning of the school year (time 0) was positively associated with their reading skills and negatively with their use of task-avoidant strategy at measurement 1. Moreover, both task-avoidance and reading skills were substantially stable across the four measurements.

Second, examination of the prospective relationships between reading skills and the deployment of a task-avoidant achievement strategy revealed that high levels of task-avoidance prospectively predicted low levels of reading skills both from time 1 to time 2 and from time 3 to time 4. In turn, a low level of reading skills at time 3 predicted a high level of task-avoidance at time 4.

**Achievement strategies, reading skills and mothers´ parental beliefs**

The results showed further that, first, the pre-reading skills of the children were positively associated with the mothers´ skill-specific and general beliefs: the higher the level the children´s reading skills was at the beginning of the school year, the more their mothers believed in their child´s ability to do well at school in

general, and in reading, in particular. Moreover, both mothers´ skill-specific and general beliefs showed substantial stability across the two measurements.

Second, mothers´ general beliefs at the beginning of the first school year predicted the level of their children´s use of a task-avoidant strategy at time 1: the less well the mothers expected their child to do at school in general, the higher the level of task-avoidance children showed later on. Moreover, mothers´ general beliefs at time 0 had an indirect impact on children´s reading skills at time2 (*Indirect effect* $_{standardized}$ = .10, $t$ = 2.30) through children´s achievement strategies: high beliefs in children´s general school competence increased children´s use of a task-focused rather than a task-avoidant achievement strategy, which further increased the child´s subsequent reading skill development.

Third, children´s use of a task-avoidant strategy predicted mothers´ general beliefs at the end of the school year: the more task-avoidant behaviors children showed at time 4, the lower confidence mothers had in their children´s school performance at the end of the school year. In turn, the level of children´s reading skills at the end of the school year predicted mothers´ subsequent skill-specific beliefs: the higher the level of reading skills the children showed at time 4, the more the mothers believed in their children´s ability to do well in reading, in particular.

**A model for fathers**

Next, an analogous model for the fathers´ and children´s data was tested (Figure 1). The model fitted the data well ($\chi^2$ = 308.71, df = 253; *CFI* = 0.93; *NNFI* = 0.93). However, the modification indices suggested, that the fit of the model would be increased by estimating: (1) the error covariances between one of the skill-specific belief variables at time 0 and one of the general belief variables at time 0 for the whole sample; and (2) the error covariances between one of the skill-specific belief variables at time 5 and one of the general beliefs variables at time 5 among boys; and (3) one of the skill-specific belief variables at time 0 and one of the general belief variables at time 0 among girls. After these specifications, none of the indices exceeded the value 9, suggesting that the same model fitted for both girls and boys data well ($\chi^2$ = 242.06, df = 249; *CFI* = 1.01; *NNFI* = 1.00). The final model included only those paths which were statistically significant ($\chi^2$ = 256.48, df = 259; *CFI* = 1.00; *NNFI* = 1.00; the percentage contribution to $\chi^2$ was 51.60% for girls and 48.40% for boys.). The standardized beta coefficients for this model are presented in Figure 3.

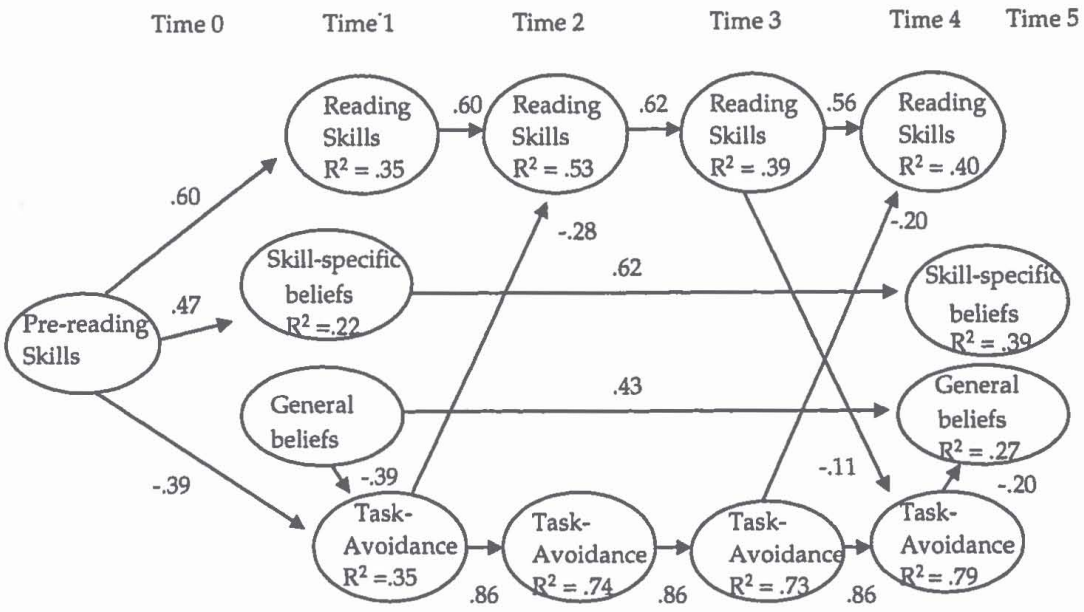


FIGURE 3 Results of the SEM for Fathers´ General and Skill-specific beliefs, and Children´s Strategies and Reading Skills.

## Achievement strategies and reading skills

The results for the relationships between children´s achievement strategies and reading skills in the model which included the fathers´ parental beliefs (Figure 3) were identical to the previous model which included the mothers´ beliefs (Figure 2). We also tested a model from which mothers´ and fathers´ parental beliefs were excluded. Also in this case, the relationships between children´s achievement strategies and their reading skills were identical to those reported in the models including parental beliefs.

## Achievement strategies, reading skills, and fathers´ parental beliefs

The results further showed that children´s pre-reading skills were positively associated with fathers´ skill-specific beliefs: the higher the level of children´s pre-reading skills was at the beginning of the school year, the more their fathers believed in their children´s ability to do well in reading. Contrary to the result found with the mothers, the level of the children´s pre-reading skills was not found to predict the fathers´ general beliefs. As was the case with mothers, fathers´ skill-specific and general beliefs showed substantial stability across the two measurements.

Moreover, fathers´ general beliefs predicted their children´s use of a task-avoidant strategy at time 1: the higher the fathers expectations about their children´s achievement at school were, the lower level of task-avoidance their children showed later on. As was the case with mothers, the children´s achievement strategies mediated the impact of fathers´ general beliefs in

children´s reading skills at time 2 (*Indirect effect* $_{standardized}$ = .11, $t$ = 2.20): high perceptions of children´s overall school achievement contributed to children´s use of a task-focused strategy, which further increased their subsequent reading skills.

Finally, children´s deployment of a task-avoidant strategy predicted fathers´ general beliefs at the end of the school year: the lower the level of children´s task-avoidance was at time 4, the better their fathers believed that their children would do at school later on.

### Changes in the levels of the children´s use of task-avoidant strategy and parental beliefs

In order to examine whether there are any changes in the level of the children´s use of a task-avoidant strategy, a two-way multivariate analysis of variance with one within-subject factor (Time: Measurement 1 vs. Measurement 2 vs. Measurement 3 vs. Measurement 4) and one between-subject factor (Gender of the Child) were carried out for Task-avoidance.

The results revealed that there was a statistically significant main effect for Time in the use of a task-avoidant strategy ($F$ (3, 104) = 4.43, $p < .01$): the level of task-avoidance was shown to decrease across the school year. However, neither the main effect for gender ($F$ (1, 106) = 2.20, $p$ = .14), nor Time X Gender interaction ($F$ (3, 104) = 0.50, $p$ = .68), was statistically significant.

Next, to investigate the mean differences in the parental beliefs, two-way multivariate analyses of variance with one within-subject factor (Time: Measurement 0 vs. Measurement 5) and one between-subject factor (Gender of the Child) were carried out separately for general beliefs and skill-specific beliefs. These analyses were carried out separately for mothers and fathers. The sum scores were created for each construct by multiplying each individual variable by its factor loading in the (final) measurement models presented in Table 2, and calculating the means across these variables. The means and standard deviations for the variables at the three measurement points are presented in Table 3 separately for girls and boys.

TABLE 3 Means (M) and Standard Deviations (SD) of Parents´ Beliefs for Girls and Boys, Separately.

| Variable | Gender | Measurement 0 | | Measurement 5 | |
|---|---|---|---|---|---|
| | | *M* | *SD* | *M* | *SD* |
| **Mothers´** | | | | | |
| Skill-specific beliefs | Girls | 4.59 | 1.06 | 5.47 | 1.02 |
| | Boys | 4.39 | 0.99 | 5.18 | 1.01 |
| General beliefs | Girls | 5.15 | 0.83 | 4.69 | 0.73 |
| | Boys | 4.96 | 0.84 | 4.46 | 0.75 |
| **Fathers´** | | | | | |
| Skill-specific beliefs | Girls | 4.69 | 0.99 | 5.50 | 1.14 |
| | Boys | 4.29 | 0.88 | 5.07 | 1.09 |
| General beliefs | Girls | 4.81 | 0.70 | 5.48 | 1.09 |
| | Boys | 4.50 | 0.72 | 5.14 | 0.81 |

The main effects for gender or Time x Gender interaction were not statistically significant in any of these analyses. However, the main effect for time was statistically significant for mothers´ general ($F$ (1, 76) = 29.65, $p < .001$) and skill-specific ($F$ (1, 77) = 69.29, $p < .001$) beliefs: mothers reported a lower level of general beliefs and a higher level of skill-specific beliefs at the end of the school year than at the beginning. Similarly, a statistically significant main effect for time was found for fathers´ general ($F$ (1, 60) = 41.77, $p < .001$) and skill-specific ($F$ (1, 60) = 88.53, $p < .001$) beliefs: the levels of fathers´ general and skill-specific beliefs increased across the two measurements.

Because the measurement for reading skills was different at different measurement points, changes in the levels of reading skills were not investigated.

## DISCUSSION

The aim of this study was to extend our understanding of the developmental dynamics between mothers´ and fathers´ beliefs about their children´s school performance, and the children´s achievement strategies and their reading skills at the beginning of primary school. The results showed that the kinds of beliefs mothers and fathers had about their children´s general school competence seemed to play an important role in the kinds of achievement strategy their children deployed at school, which then contributed to the development of children´s reading performance. Moreover, the kinds of achievement strategy the children deployed during the first school year were reflected in their parents´ later beliefs about their offsprings´ overall school performance.

### Achievement strategies and reading performance

The results revealed, first, that children who deployed a task-avoidant rather than a task-focused achievement strategy at school performed less well in reading later on. This was the case even after controlling the previous levels of reading skills, and that at the beginning of the first school year. These results were similar to those found previously by Onatsu-Arvilommi and Nurmi (2000), and support their notion that the achievement strategies evidenced in children´s behaviors in a classroom play an important role in the development of basic reading skills, and, conversely, reading difficulties. The results also showed that a low level of children´s reading competence increased their subsequent task-avoidance, but only during the second half of the school year. Overall, these results suggest that the achievement strategies children deploy at school and their reading skills seem to form a cumulative developmental cycle during the first year of primary school (Onatsu-Arvilommi & Nurmi, 2000). Moreover, the results suggest that the achievement strategies children deploy seem to have greater influence on their subsequent reading skills than their reading skills have on their strategies. Thus, besides previous reading-related cognitive skills, such as phoneme awareness (Blachman, Tangel, Ball, Black, & McGraw , 1999; Goswami & Bryant, 1990; Salonen et al., 1998; Stanovich, 1986) and knowing the alphabet (Badian, 1998; Ellis

& Large, 1988), the ways in which children deal with the demanding tasks in the classroom seem to provide a basis for how they progress in learning to read, and also the extent to which they show reading difficulties. Consequently, interventions aimed at helping pupils with their reading difficulties, which typically consist of training of their reading-related cognitive skills (Blachman et al., 1999; Good, Simmons, & Smith, 1998; Layton, Deeny, Upton, & Tall, 1998; Nicolson, Fawcett, Moss, Nicolson, & Reason, 1999; Poskiparta, Niemi, & Vauras, 1999), may benefit from efforts to change children´s achievement-related beliefs in order to motivate them to deploy a task-focused rather than a task-avoidant strategy in the classroom.

**Parents´ general beliefs, and their children´s achievement strategies and reading performance**

The results revealed further that the beliefs parents had about their children´s overall school performance predicted the kinds of achievement strategy the children deployed at school: parents´ high beliefs in their children´s school competence increased their children´s use of a task-focused strategy and, conversely, decreased task-avoidance. These results support earlier findings suggesting that the achievement strategies have their developmental basis in the family environment (Aunola, Stattin, & Nurmi, 2000; Hokoda & Fincham, 1995; Nolen-Hoeksema, Wolfsom, Mumme, & Guskin, 1995; Onatsu-Arvilommi, Nurmi, & Aunola, 1998). It has been shown previously that parental beliefs concerning the children´s abilities and school achievement are related with the children´s intrinsic motivation to learn (Gottfried, 1985, 1990; Wigfield & Asher, 1984), self-perceptions of ability (Frome & Eccles, 1998; Phillips, 1987; Stevenson & Newman, 1986), perception of task difficulty (Frome & Eccles, 1998), and effort expended on the task at hand (Entwisle & Baker, 1983; Parsons et al., 1982; Stevenson & Newman, 1986). Thus, it seems that parents may foster the development of task-focused behaviors and self-efficacy beliefs among their children by having high expectations and perceptions of their competencies at school. In turn, parents´ lack of confidence in their children´s abilities to perform well at school seems to contribute to the use of a task-avoidant achievement strategy.

There are many alternative ways in which the parents´ general beliefs may provide a basis for their children´s achievement strategies. First, parental beliefs may influence how parents´ motivate their children (Sigel, Stinson, & Flaugher, 1991). For example, parents who think that their children are highly competent may invest more effort in encouraging their children to deal with demanding learning tasks. This may then lead the children to deploy a more rational and task-focused achievement strategy. In turn, parent´s negative expectations of their children´s competence may lead to providing them with fewer opportunities for independent problem solving, thus fostering a use of a strategy that is characterized by a lack of effort and a high level of dependence (Lyytinen et al., 1994; Maccoby & Martin, 1983). Secondly, parents´ general beliefs about their children´s competencies may influence the kind of feedback they provide for their children. For example, parents who have high confidence in their children´s abilities may provide more positive feedback whereby the child´s sense of

competence is enhanced (Entwisle & Hayduk, 1978; Phillips, 1987). Third, parents´ beliefs in their children´s competence may be influential because children internalize the expectations of their parents (Parsons et al., 1982; Phillips, 1987). These children´s self-perceptions may then influence the achievement strategies they adopt (Bandura, 1993).

One major finding of the study was that the impact of parents´ general beliefs on children´s subsequent reading skills was mediated via the achievement strategies the children deployed in a classroom: parents´ beliefs in their children´s competence increased the children´s use of a task-focused strategy, which then increased their reading performance. This supports the earlier notion that children´s self-perceptions and task-orientations mediate the impact of parental beliefs on their academic achievement (Murphey, 1992; Parsons et al., 1982; Phillips, 1987).

The results revealed, overall, that it was parents´ general beliefs about their children´s school performance, rather than their skill-specific beliefs concerning their offsprings´ reading skill, that contributed to the children´s strategy use. One explanation for this is that parents´ general beliefs about their children´s school performance reflect to a larger extent their 'core beliefs' concerning their children than the skill-specific beliefs do. Consequently, they may be more comprehensively reflected in the ways they treat their children. By contrast, reading-specific parental beliefs might be assumed to have a narrower impact on the parents´ behavior. Parents who consider their children´s reading skills to be relatively low may still believe in their children´s competencies in other areas, such as math.

Our findings also revealed that the achievement strategies children deployed at school predicted their mothers´ and fathers´ general beliefs about the children´s school performance: children´s use of a task-avoidant strategy decreased parents´ subsequent beliefs in their children´s overall school competence, whereas children´s deployment of a task-focused strategy increased them. This was true even after controlling the level of parents´ earlier general beliefs and the level of children´s reading skills. These results suggest that parents adjust their expectations about their children´s competence according to their children´s behavior at school.

**Parents´ skill-specific beliefs and their children´s reading skills**

The results of this study showed that, although parents´ skill-specific beliefs were associated with children´s reading skills at the correlational level, they did not predict children´s reading skills after the level of pre-reading skills was controlled. This result differs from those found earlier by Entwisle and Baker (1983), Galper et al. (1997) and Hess et al. (1984). This result, in fact, is in accordance with the accuracy hypothesis which suggests that parents´ beliefs correlate with children´s future skills because they are based on valid predictors of children´s skills (Jussim & Eccles, 1992; Miller, 1995; Miller, Manhal, & Mee, 1991; Smith, Jussim, Eccles, VanNoy, Madon, & Palumbo, 1998). Thus, parents´ skill-specific beliefs are associated with children´s reading skills because they accurately reflect children´s previous level of reading.

The results further showed that the children´s reading skills were reflected in the mothers´ skill-specific beliefs at the end of the first school year: the higher the level of reading skills children showed, the more confident their mothers were later on about their children´s performance in reading. Again, this was true even after controlling the level of mothers´ earlier skill-specific beliefs and children´s achievement strategies. These results are similar to those found earlier by Entwisle and Hayduk (1978) suggesting that parents adjust their expectations about their children´s competence according to their children´s school achievement.

Although a number of studies have shown that parents´ educational expectations, and their beliefs in their children´s competence are associated with the children´s school achievement, most of the studies have been cross-sectional and, consequently, have not provided information about the prospective relationships between parental beliefs and children´s achievement (for reviews, see Murphey, 1992; Seginer, 1983). The results of this study may contribute to our understanding of this process in two ways. The results showed, first, that parents´ general beliefs about their children´s school competence predicted the kinds of achievement strategy the child deployed later on in the classroom and, via this, indirectly, the development of his or her reading skills. Second, the kind of achievement strategy children deployed also contributed to their parents´ later beliefs about their children´s general school competence, whereas the level of children´s reading skill predicted subsequent reading-related skill-specific beliefs.

### Gender differences

The results found in this study were similar for boys and girls. For example, the prospective relationships between parental beliefs and children´s achievement strategies and reading skills, across the first school year did not differ. Similarly, no differences between boys and girls were found in the levels of the parental beliefs. These results differ from some earlier results (Entwisle & Baker, 1983; Frome & Eccles, 1998; Parsons et al., 1982), which have suggested that parents perceive and expect higher performance from boys than from girls. The differences between the results of this study and some previous ones may be due to the cultural differences. In Finland, there is a long history of active female participation in higher education. For example, the proportion of girls in higher education exceeds that of boys (Nurmi & Siurula, 1994). This situation may be reflected also in the ways in which parents perceive their sons´ and daughters´ academic performance.

The results were also similar for mothers and fathers, and only a few gender differences were found. Children´s pre-reading skills predicted mothers´ but not fathers´ general beliefs at the beginning of the school year. Moreover, mothers´ but not fathers´ skill-specific beliefs at the end of the school year were predicted by their children´s reading skills. One explanation for this is that mothers spend more time with their children and are thus more sensitive to or aware of the developmental changes in their children´s reading skills. Another explanation is that because the sample size of fathers was smaller than that of mothers, this resulted in the testing of the model being less powerful statistically.

## Limitations

There are at least four limitations which should be taken into account in any attempt to generalize the findings of this study. First, the study was carried out in one particular society, Finland. It is possible that due to specific features of the schooling and educational system, and the Finnish language, the associations between parental beliefs, children´s achievement strategies, and reading skills may show up differently than in other cultural environments. For example, various studies have indicated that there are cultural differences in the expectations concerning children´s academic achievement (Murphey, 1992; Stevenson, Chen, & Uttal, 1990). Second, the sample size of this study was relatively small. This was the case particularly with the fathers´ data. Thus, the results of structural equation modelling must be interpreted with caution. Third, because the reading skill variables showed substantial skewness and kurtosis, these variables were recoded to make the distribution resemble the normal. This, of course, may have influenced the results. However, analyses using dichotomic reading competence variables provided closely analogous results to those reported here. Fourth, although a cross-lagged longitudinal study was carried out, it is possible that there are some other variables behind the obtained path coefficients. It is possible, for example, that there is shared genetic background, e.g. parents´ intelligence, behind the associations between parents´ beliefs and children´s behavior in academic settings (Miller, 1988).

## Conclusion

It has been suggested previously that children´s achievement beliefs and strategies, and their school performance and academic skills, form cumulative (Onatsu-Arvilommi & Nurmi, 2000) or self-perpetuating cycles (Groteluschen, Borkowski, & Hale, 1990; Salonen et al., 1998; Weiner, 1994). The results of this study add to the earlier literature in showing that this cumulative developmental cycle seems to extent to family influences as well. On the one hand, parents´ overall high confidence in their children´s academic competencies seem to foster their children´s use of a task-focused rather than a task-avoidant achievement strategy, which is then reflected in their learning results. On the other hand, children´s use of a task-focused strategy and subsequent high school performance seem to increase the parents´ beliefs in their children´s academic competencies. These results also suggest that, in addition to efforts to enhance children´s cognitive skills, family-oriented interventions fostering parents´ positive beliefs about their children´s school performance may strengthen children´s task-focused efforts and decrease their task-avoidance and, in this way, improve their reading skill development at school.

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# The role of achievement-related behaviors and parental beliefs in children´s mathematical performance

by

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# The Role of Achievement-Related Behaviors and Parental Beliefs in Children´s Mathematical Performance

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*This study aimed at investigating the developmental dynamics between children´s mathematical performance, the task-focused versus task-avoidant behaviors they show in the classroom, and their parents' beliefs concerning their offsprings´ school competence. To investigate this, the mathematical performance of 111 six-to-seven-year-old children was tested, and their task-focused versus task-avoidant behaviors were rated by their teachers four times during their first school year. Parents filled in questionnaires measuring their skill-specific and general beliefs about their children´s school competencies at the beginning and at the end of the school year. The results showed that parents´ beliefs in their children´s general school competence increased their children´s task-focused behaviors at school, which further predicted the child´s high level of math performance. Parents´ beliefs in their children´s competence in mathematics, in turn, contributed directly to the children´s high mathematical performance. Moreover, children´s high performance increased parents´ subsequent beliefs in their children´s mathematical competence, whereas children´s task-focused behaviors predicted parents´ beliefs in their children´s overall school performance.*

Children´s mathematical performance has been shown to be sensitive to various motivational, cognitive, and affective influences (Pajares & Miller, 1994; Wigfield & Meece, 1988), and the ways in which such factors are reflected in the behavior they show in the classroom (Onatsu-Arvilommi & Nurmi, 2000). Further, parental beliefs have been found to be associated with both children´s mathematical performance (Entwisle & Alexander, 1990; Entwisle & Baker, 1983; Galper, Wigfield, & Seefeldt, 1997; Hess, Holloway, Dickson, & Price, 1984; Huntsinger, Jose, Liaw, & Ching, 1997; Jacobs, 1991), and also their achievement-related beliefs and motivation (Frome & Eccles, 1998; Parsons, Adler, & Kaczala, 1982; Stevenson & Newman, 1986). This study focused on examining the developmental dynamics between children´s achievement-related behaviors, their mathematical performance, and their mothers´ and fathers´ parental beliefs during the first year of primary school.

Children´s achievement-related beliefs and behaviors have been shown to play an important role in their academic performance. Children who show a positive self-concept of ability (Chapman & Tunmer, 1997; Mujis, 1997), expect success (Chapman, 1988), seek challenges (Dweck, 1990; Dweck & Leggett, 1988), deploy task-focused behaviors (Onatsu-Arvilommi & Nurmi, 2000; Skaalvik, 1997), and are persistent in the face of obstacles (Dweck, 1986; Mantzicopoulos, 1990; Rijavec & Brdar, 1997) do well at school. By contrast, those who are afraid of failure, avoid challenges and are not persistent in learning situations show low-

achievement (Butkowsky & Willows, 1980; Carr, Borkowski, & Maxwell, 1991; Diener & Dweck, 1978; Nolen-Hoeksema, Girgus, & Seligman, 1992; Nurmi, Onatsu, & Haavisto, 1995; Midgley & Urdan, 1995; Zuckerman, Kieffer, & Knee, 1998) and even learning disabilities (Butkowsky & Willows, 1980; Chapman, 1988). Although a variety of motivational styles and achievement strategies have been described previously (Diener & Dweck, 1978; Dweck, 1986; Jones & Berglas, 1978; Nicholls, Cheung, Lauer, & Patashnick, 1989; Onatsu-Arvilommi & Nurmi, 2000; Skaalvik, 1997), they seem to fall into two major categories. Task-focused strategies, such as mastery-orientation (Diener & Dweck, 1978), task-involved goal orientation (Nicholls et al., 1989) and action-oriented coping strategies (Mantzicopoulos, 1990), are typically characterized by success expectations, high effort and persistence. Task-avoidant strategies, like learned helplessness (Diener & Dweck, 1978), self-handicapping (Jones & Berglas, 1978) and ego-oriented coping (Salonen, Lepola, & Niemi, 1998) are typified by failure expectations, and low levels of effort and persistence in academic tasks. In the present study, such achievement-related patterns were operationalized in terms of task-focused versus task-avoidant behaviors.

A substantial amount of research has been carried out on the motivational and affective basis of children´s mathematical performance: their performance has been associated with self-concept of math ability (Campbell & Beaudry, 1998; Jacobs, 1991; Marsh, Walker, & Debus, 1991; Pajares & Miller, 1994), math self-efficacy (Pajares & Graham, 1999; Pajares & Kranzler, 1995), expectancies for future success (Alexander & Entwisle, 1988; Jacobs, 1991), math anxiety (Pajares, & Miller, 1994; Wigfield & Meece, 1988), perceived difficulty (Frome & Eccles, 1998), perceptions of math usefulness (Armstrong, 1985), and the motivation to avoid failure (Cock & Halvari, 1999). However, this research has at least three major limitations. First, most of the studies have been cross-sectional (Ashcraft, Kirk, & Hopko, 1998; Pajares & Miller, 1994, for a review). Consequently, little is known about the developmental dynamics between children´s achievement beliefs and behaviors, and their mathematical performance. Second, previous research has focused on children´s achievement beliefs (Jacobs, 1991; Marsh et al., 1991; Pajares & Kranzler, 1995; Pajares & Miller, 1994) rather than achievement-related behaviors (Onatsu-Arvilommi & Nurmi, 2000). It is possible, however, that it is the ways in which children try to handle the school tasks rather than their math-related beliefs that play an important role in their mathematical performance. Third, previous studies have concerned older school-age children or adolescents (Campbell & Beaudry, 1998; Galloway, Leo, Rogers, & Armstrong, 1995; Jacobs, 1991; Pajares & Graham, 1999; Pajares & Kranzler, 1995; Pajares & Miller, 1994) and only a few have dealt with children entering the primary school (Alexander & Entwisle, 1988; Onatsu-Arvilommi & Nurmi, 2000; Onatsu-Arvilommi, Nurmi, & Aunola, 2000). The entrance into primary school might be assumed to be a particularly important developmental period, because during it children are for the first time faced with a challenge to master the basic academic skills (Alexander & Entwisle, 1990) and also receive systematic feedback on their performance (Onatsu-Arvilommi & Nurmi, 2000). Consequently, the present study focused on investigating the developmental dynamics between children´s task-focused versus task-avoidant behaviors and their mathematical performance during the first

school year.

Parental beliefs have been found to provide a basis for children´s math-related attitudes and beliefs: children who show a high level of self-concept of math ability, who expect success, and who have positive math attitudes, come from families where parents believe in their offsprings´ abilities to do well in mathematics (Frome & Eccles, 1998; Huntsinger et al., 1997; Jacobs, 1991; Murphey, 1992; Parsons et al., 1982; Phillips, 1987; Stevenson & Nyman, 1986; Wagner & Phillips, 1992). In turn, children who see math as difficult and have low expectations for their future math performance come from families were parents believe that their children are not very good at math (Entwisle & Baker, 1983; Phillips, 1987; Phillips & Zimmerman, 1990; Stevenson & Nyman, 1986).

Parental beliefs have also been shown to be associated with children´s mathematical performance: parents who believe in their children´s math competencies have children who do well in mathematics (Entwisle & Alexander, 1990; Entwisle & Baker, 1983; Galper et al., 1997; Hess et al., 1984; Huntsinger et al., 1997; Jacobs, 1991). It has also been suggested that the impact of parental beliefs on children´s math performance may be mediated by the children´s own achievement-related beliefs and behaviors (Eccles, 1993; Jacobs, 1991; Murphey, 1992).

However, previous research on the relationships between parental beliefs, children´s achievement beliefs and behaviors, and their mathematical performance has one major limitation. The prospective relationships between parents´ beliefs, and their children´s achievement-related beliefs and behaviors, and their mathematical performance have not been investigated by using cross-lagged longitudinal data. It might be assumed that it is parents´ beliefs that influence children´s achievement-beliefs and behaviors (Frome & Eccles, 1998; Jacobs, 1991; Louis & Lewis, 1992; Miller, 1986; Parsons et al., 1982; Phillips, 1987), and subsequently their mathematical performance. Another alternative, however, is that children´s performance is reflected in their parents´ beliefs (Frome & Eccles, 1998; Miller, 1988). Consequently, this study focused on investigating the prospective relationships between parents´ beliefs, children´s achievement-related behaviors and their mathematical performance.

Most earlier studies of parental beliefs and children´s performance have focused on one particular set of beliefs (Miller, 1988). Some studies have focused on parental beliefs concerning a particular skill, such as math or reading (Frome & Eccles, 1998; Galper et al., 1997; Parsons et al., 1982; Phillips, 1987), whereas others have investigated more general beliefs concerning children´s overall achievement (Alexander & Entwisle, 1988; Hess et al., 1984; Peet, Powell, & O´Donnel, 1997). Only a few studies have investigated both general and skill-specific beliefs (Baker & Entwisle, 1987). In the present study, both parents´ general beliefs in their children´s competence at school, and their skill-specific beliefs concerning their offsprings´ mathematical competence in particular, were investigated.

## Aims of the study

This study focused on investigating the developmental dynamics between children's achievement-related behaviors and their mathematical performance, and their mothers' and fathers' beliefs about their offsprings' competencies at school. The following research questions were examined:

(1) To what extent do the task-focused versus task-avoidant behaviors children deploy at school predict their subsequent mathematical performance, or is it rather the children's mathematical performance that predict their behaviors?

(2) To what extent do parents' general beliefs about their offsprings' school competence, and their skill-specific beliefs concerning mathematics, predict their children's mathematical performance later on?

(3) To what extent do parents' general beliefs and math-related beliefs predict their children's use of task-focused versus task-avoidant behaviors? And, in particular, to what extent is the impact of parental beliefs on children's mathematical performance mediated by the behaviors children show at school?

(4) To what extent do the task-focused versus task-avoidant behaviors children show at school and their mathematical performance contribute to their parents' subsequent general and math-related beliefs?

# METHOD

## Participants and procedure

### Children

A total of 111 (59 boys, 52 girls) 6- to 7-year old children ($M$ = 7.30, $SD$ = 0.32) participated in the study. They came from six first-grade classes in four primary schools situated in a medium-size town in Central Finland.[1] A total of 77% of the participants were from families with two parents, 9% of the families consisted of the mother or the father living with her/his new spouse and their children, and 13% of children were living with their single mother or father. The number of the children in the families range from 1 to 7 ($M$ = 2.46 , $SD$ = 1.05).

The children were examined five times during their first school year. First, their pre-mathematical skills were tested in August, at the beginning of the school year. Then, they were subsequently tested four times during their first school year - in October, December, January and April - using the Mathematical Skill Test (Lerkkanen, 1998). In the same time periods, participants' behavior in the classroom context was rated by their teacher using the Behavioral Strategy Rating Scale (BSR; Onatsu & Nurmi, 1995).

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[1] Children in Finland start school (elementary school level) in August of the year they reach the age of seven. Before going to primary school, most children have a year in pre-school.

**Parents**

A questionnaire was mailed twice to the both parents of the children: in October and April. Parents were asked to fill in the questionnaires independently of each other. In October, a total of 96 mothers (86.5%) returned the questionnaire; and in April, 92 (82.9%) of them returned it. In October, 82 (73.9%) of the fathers returned the questionnaire; and in April, 65 (58.6%) of them returned it. A total of 30% of mothers and 35% of fathers had a degree from an institution of university standing, 63.5% of mothers and 58.5% of fathers had a degree from an institution of professional or vocational education, and 6.5% of mothers and fathers had no occupational education.

To investigate the possible selection effect, children whose mother or father filled in the questionnaire at time 1 and time 2 were compared with children whose mother or father did not return the questionnaires according to the mathematical performance and task-focused versus task-avoidant behaviors variables. No selection effect was found in the case of mothers. However, the children whose father participated the study at time 1 showed a higher level of task-focused behavior than children whose father did not participate at time 1 ($F(1, 106) = 5.74, p < .05$).

**Measurements**

**Children´s measures**

*Premeasurement.* Children´s pre-mathematical skills at the beginning of the primary school were measured with the Number Concept Test (Liikanen, 1984). In this test, children were read aloud 24 questions, consecutively, and asked to mark down the answers on the separate answer sheet. The questions assessed three kinds of mathematical knowledge or skills: (1) mathematical concepts, such as 'last', 'middle', 'nearest', 'between', and 'before' (e.g. "*Draw a line over the shovel in the middle.*"); (2) ordinal- and cardinal numbers (e.g. "*Draw a line over nine leaves.*"); (3) addition, subtraction, division and multiplication skills (e.g." *You have four pears. You get an equal amount more. Draw a line over the number of pears you now have.*"; "*Eeva has two balls. Kirsti has twice as many balls as Eeva has. Draw a line over the number of balls Kirsti has.*").

The maximum score for the test was 24. Because the score for the Number Concept Test was not normally distributed ($z = 1.80$, $p<.01$), a new score was computed by combining the original values to make the distribution resemble the normal. The new score was computed as follows: values 6 - 12 = 1, values 13 - 15 = 2, value 16 = 3, value 17 = 4, value 18 = 5, value 19 = 6, value 20 = 7, value 21 = 8, value 22 = 9, value 23 = 10, value 24 = 11. The Cronbach alpha reliability for this test has been shown to be .82 (Ljungblad, 1971).

*Mathematical performance.* Children´s mathematical performance was assessed by the use of the Mathematical Skill Test (Lerkkanen, 1998). The tasks were modified from the Diagnostic Tests 3: Motivation, metacognition and mathematics (Salonen, Lepola, Vauras, Rauhannummi, Lehtinen, & Kinnunen, 1994). The structure of the test was similar at all measurement points. However, the tasks included in the test became progressively more difficult across the measurement points as the children became more skilled in mathematics. The test consisted of

three parts:

(1) The mathematical-logical reasoning part consisted of four verbal mathematical problems, which each assessed different aspects of reasoning (transitive reasoning, number conservation, class inclusion, logical reasoning). The problems were read aloud to the participants twice. After each problem, the participants were asked to choose and mark down the right solution on the paper.

(2) The number sequence part consisted of four questions or tasks assessing children´s knowledge of ordinal aspects of numbers (forward and backward). In the first and second measurements, children were read aloud four questions (e.g. *"What number is after number five?"*; *"What is the number you get when you count five numbers backward from nine?"*) and asked to write the answers down. In the third and fourth measurements, the children´s task was to complete four rows of numbers (e.g. "2, 4, 6, _, 10, 12"; "18, 17, _, 15, 14, 13").

(3) The basic arithmetic skill part consisted of a set of addition (e.g. "9 + 5 = _"; "7 + _ = 14") and subtraction (e.g. "17-9 = _"; "15 - _ = 9") tasks (12 tasks in the first measurement; 16 tasks in the second, third, and fourth measurements). Children were asked to do as many of them as they could.

In the Mathematical Skill Test, one point was given for each correct answer. The total maximum score for the test was 20 in the first measurement and 24 in the second, third and fourth measurements. The Cronbach alpha reliabilities for the Mathematical Skill Test were .61, .72, .80, and .75, respectively at four measurement points.

The mathematical-logical reasoning tasks are similar to those used earlier by Pajares and Miller (1994). The tasks in the number sequence- and basic arithmetic skill -parts are similar to those used earlier, for example, by Newcomer and Curtis (DAP-2; 1984-90), and McCarney and Bauer (LDES; 1983-91).

*Task-focused versus task-avoidant behaviors.* The classroom teachers of each of the four first-grade classes involved in the study were asked to evaluate the behavior of each pupil in their class using the Behavioral Strategy Rating Scale (BSR; Onatsu & Nurmi, 1995; Onatsu-Arvilommi & Nurmi, 2000). They were first asked to consider and remind themselves how a certain pupil typically behaved in classroom situations, and then rate his or her behavior using 5 statements (e.g. *"Does the pupil have a tendency to find something else to do instead of focusing on the task at hand?"*, reversed; *"Does the pupil show persistence even in the more difficult tasks?"*) assessed on a 5-point rating scale (0 = *"Not at all"*, 4 = *"To a great extent"*). A summary score was formed for each pupil´s task-focused versus task-avoidant behavior. Later on, the term task-focused behavior is used to refer this. The Cronbach Alpha reliabilities for the summary-score were .95, .94, .95, and .96, respectively at the four measurement points. The task-focused versus task-avoidant behavior scale of BSR has been shown to correlate moderately with children´s self-reported task-focused behavior (.30) (Nurmi & Aunola, 2000; Onatsu & Nurmi, 1997) and also with observers´ rating of it (.42) (Nurmi & Aunola, 2000).

**Parents´ measurement**

The parents´ beliefs about their children´s school competence were assessed with four 4-point Likert items modeled from the questionnaires of Parsons [Eccles] et

TABLE 1 Pearson Product-Moment Correlations Between Manifest Variables and their Means and Standard Deviations.

| Variables | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | *M* | *SD* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Premathematical Skills (0)[1] | — | .29* | .49** | .17 | .54** | .30* | .57** | .32* | .58** | .43** | .21 | .22 | .02 | 7.25 | 3.05 |
| 2. Task-focused Behavior (1) | .57** | — | .22 | .85** | .16 | .83** | .08 | .78** | .29* | -.12 | -.07 | .43** | .22 | 2.09 | 1.18 |
| 3. Mathematical Performance (1) | .51** | .33* | — | .16 | .52** | .27* | .56** | .29* | .53** | .44** | .27 | .33* | .18 | 16.07 | 2.65 |
| 4. Task-focused Behavior (2) | .57** | .87** | .38** | — | .07 | .86** | .04 | .85** | .27* | -.11 | -.13 | -.33* | .13 | 2.18 | 1.15 |
| 5. Mathematical Performance (2) | .63** | .56** | .59** | .55** | — | .03 | .76** | .11 | .56** | .38** | .33* | .38** | .16 | 15.41 | 4.54 |
| 6. Task-focused Behavior (3) | .59** | .85** | .33* | .89** | .52** | — | .03 | .90** | .35** | -.12 | -.19 | .25 | .06 | 2.26 | 1.14 |
| 7. Mathematical Performance (3) | .54** | .59** | .53** | .54** | .75** | .61** | — | .11 | .70** | .56** | .27 | .37* | .10 | 15.14 | 4.85 |
| 8. Task-focused Behavior (4) | .61** | .84** | .28* | .88** | .61** | .87** | .61** | — | .41** | .02 | -.07 | .34* | .11 | 2.31 | 1.20 |
| 9. Mathematical Performance (4) | .56** | .53** | .47** | .51** | .73** | .55** | .79** | .56** | — | .45** | .28* | .24 | .10 | 16.81 | 4.68 |
| 10. Mothers´ Skill-specific belief I (0) | .47** | .57** | .48** | .41** | .50** | .49** | .63** | .46** | .49** | — | .51** | .31* | .22 | 3.37 | 0.66 |
| 11. Mothers´ Skill-specific belief II (0) | .22 | .28 | .46** | .13 | .38* | .18 | .37* | .20 | .31* | .76** | — | .36* | .60** | 3.33 | 0.52 |
| 12. Mothers´ General belief I (0) | .35* | .48* | .43** | .42** | .49** | .42** | .44** | .41** | .39** | .46** | .36* | — | .55** | 3.12 | 0.65 |
| 13. Mothers´ General belief II (0) | .16 | .24 | .45** | .15 | .30 | .19 | .26 | .21 | .25 | .42** | .57** | .66** | — | 3.22 | 0.54 |
| 14. Fathers´ Skill-specific belief I (0) | .28 | .18 | .39* | -.03 | .36* | .07 | .46** | .21 | .36* | .51** | .55** | .14 | .27 | 3.21 | 0.65 |
| 15. Fathers´ Skill-specific belief II (0) | .10 | .35* | .27 | .16 | .36* | .24 | .31 | .20 | .33* | .54** | .48** | .30 | .27 | 3.24 | 0.62 |
| 16. Fathers´ General belief I (0) | .12 | .32 | .25 | .17 | .31 | .12 | .40** | .11 | .29 | .30 | .29 | .32 | .38* | 3.07 | 0.60 |
| 17. Fathers´ General belief II (0) | -.03 | .31 | .05 | .15 | .17 | .09 | .13 | .09 | .12 | .17 | .21 | .07 | .03 | 3.10 | 0.48 |
| 18. Mothers´ Skill-specific belief I (5) | .43** | .38* | .65** | .35* | .52** | .37* | .62** | .42** | .61** | .50** | .51** | .37* | .48** | 3.43 | 0.77 |
| 19. Mothers´ Skill-specific belief II (5) | .29 | .28 | .55** | .17 | .52** | .15 | .40* | .29 | .44** | .55** | .62** | .24 | .37* | 3.29 | 0.55 |
| 20. Mothers´ General belief I (5) | .40* | .46* | .63** | .50** | .53** | .41** | .32 | .43** | .31 | .44** | .35* | .60** | .51** | 3.02 | 0.64 |
| 21. Mothers´ General belief II (5) | .14 | .08 | .41** | .05 | .32* | .03 | .10 | .19 | .25 | .31 | .51* | .23 | .52** | 3.17 | 0.49 |
| 22. Fathers´ Skill-specific belief I (5) | .39* | .36* | .32 | .18 | .46** | .31 | .63** | .35* | .55** | .40* | .33 | .03 | .17 | 3.30 | 0.81 |
| 23. Fathers´ Skill-specific belief II (5) | .37* | .48** | .48** | .27 | .39* | .39* | .47** | .43* | .42* | .37* | .30 | .05 | .04 | 3.30 | 0.59 |
| 24. Fathers´ General belief I (5) | .45** | .49** | .49** | .40* | .55** | .42* | .49** | .49** | .41* | .31 | .24 | .27 | .33 | 3.00 | 0.56 |
| 25. Fathers´ General belief II (5) | .31 | .37* | .37* | .23 | .33 | .24 | .28 | .30 | .17 | .42* | .34 | .15 | .12 | 3.06 | 0.50 |
| *M* | 7.02 | 2.42 | 15.25 | 2.49 | 14.02 | 2.47 | 13.89 | 2.68 | 15.82 | 3.20 | 3.22 | 3.27 | 3.29 | | |
| *SD* | 3.06 | 1.08 | 3.25 | 1.07 | 4.65 | 1.13 | 4.85 | 1.11 | 4.75 | 0.72 | 0.65 | 0.59 | 0.56 | | |

*Note 1.* The correlations for boys are above the diagonal and for girls below the diagonal.

*Note 2.* * $p < .05$; ** $p < .01$. 0 = Premeasurement; 1 = Measurement 1; 2 = Measurement 2; 3 = Measurement 3; 4 = Measurement 4; 5 = Measurement 5.

*Note 3.* [1]Revised score.

(continues)

TABLE 1 (continues)

| Variables | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Premathematical Skills (0)[1] | .35* | .31* | .12 | -.03 | .26 | .18 | .31* | .11 | .47** | .33 | .17 | -.03 |
| 2. Task-focused Behavior (1) | .21 | -.03 | .41** | .20 | .03 | .10 | .48** | .22 | .05 | .09 | .49** | .16 |
| 3. Mathematical Performance (1) | .51** | .29 | .22 | .08 | .32* | .45** | .37* | .39* | .35* | .38* | .19 | .13 |
| 4. Task-focused Behavior (2) | .19 | .01 | .24 | .05 | -.05 | .05 | .39* | .18 | -.02 | .05 | .38* | .07 |
| 5. Mathematical Performance (2) | .45** | .16 | .32* | .01 | .47** | .38* | .27 | .12 | .56** | .07 | .21 | -.08 |
| 6. Task-focused Behavior (3) | .29 | .08 | .27 | .23 | -.10 | .00 | .47** | .15 | .01 | .24 | .44** | .21 |
| 7. Mathematical Performance (3) | .48** | .16 | .24 | -.09 | .51** | .21 | .21 | -.04 | .60** | .07 | .10 | -.20 |
| 8. Task-focused Behavior (4) | .32* | .05 | .21 | .15 | -.06 | .01 | .54** | .13 | -.07 | .12 | .34* | .11 |
| 9. Mathematical Performance (4) | .54** | .18 | .35* | .18 | .41** | .21 | .29 | .17 | .53** | .29 | .21 | -.08 |
| 10. Mothers´ Skill-specific belief I (0) | .47** | .14 | .05 | -.07 | .62** | .31* | .14 | .19 | .48** | .17 | -.04 | -.19 |
| 11. Mothers´ Skill-specific belief II (0) | .34* | .08 | .20 | .05 | .50** | .58** | .25 | .34* | .50** | .31 | .09 | .19 |
| 12. Mothers´ General belief I (0) | .31 | -.06 | .46** | .00 | .23 | .27 | .56** | .35* | .36* | .03 | .22 | -.04 |
| 13. Mothers´ General belief II (0) | .14 | .14 | .31 | .18 | .36* | .42** | .46** | .48** | .54** | .25 | .21 | .31 |
| 14. Fathers´ Skill-specific belief I (0) | ---- | .48** | .54** | .32* | .49** | .14 | .48** | .12 | .57** | .43* | .17 | -.04 |
| 15. Fathers´ Skill-specific belief II (0) | .53** | ---- | .28 | .41** | .24 | .26 | .31 | .18 | .44* | .67** | .18 | .38* |
| 16. Fathers´ General belief I (0) | .49** | .18 | ---- | .56** | .25 | .10 | .48** | .14 | .50** | .48** | .44* | .23 |
| 17. Fathers´ General belief II (0) | .29 | .28 | .46** | ---- | .13 | .11 | .44* | .15 | .11 | .47** | .35 | .49** |
| 18. Mothers´ Skill-specific belief I (5) | .57** | .18 | .38* | .37* | ---- | .45** | .23 | .26 | .58** | .19 | .07 | -.07 |
| 19. Mothers´ Skill-specific belief II (5) | .53** | .19 | .21 | .22 | .77** | ---- | .32* | .63** | .48** | .34 | .30 | .39* |
| 20. Mothers´ General belief I (5) | .27 | .16 | .50** | .32 | .57** | .47** | ---- | .45** | .36* | .36* | .57** | .42* |
| 21. Mothers´ General belief II (5) | .53** | .27 | .18 | .20 | .58** | .72** | .56** | ---- | .42* | .32 | .23 | .36* |
| 22. Fathers´ Skill-specific belief I (5) | .75** | .41* | .45* | .42* | .67** | .48** | .35 | .50** | ---- | .59** | .35* | .19 |
| 23. Fathers´ Skill-specific belief II (5) | .56** | .45* | .27 | .48** | .54** | .46** | .37* | .52** | .83** | ---- | .38* | .58** |
| 24. Fathers´ General belief I (5) | .47** | .43* | .37* | .47** | .58** | .39** | .56** | .51** | .66** | .70** | ---- | .56** |
| 25. Fathers´ General belief II (5) | .44* | .39* | .30 | .49** | .49** | .46** | .48** | .54** | .57** | .76** | .78** | ---- |
| *M* | 3.10 | 3.24 | 3.27 | 3.32 | 3.02 | 3.10 | 3.24 | 3.21 | 2.84 | 3.16 | 3.19 | 3.28 |
| *SD* | 0.74 | 0.64 | 0.61 | 0.47 | 0.88 | 0.73 | 0.58 | 0.52 | 0.92 | 0.63 | 0.74 | 0.58 |

al. (1982) and Frome and Eccles (1998). Two of these items measured parents´ (1) *Skill-specific beliefs* (*"How well do you think your child is doing in mathematics?"*; *"How well do you think your child will do in mathematics later in school?"*) and two of them measured their (2) *General beliefs* (*"In general, how well is your child doing at school?"*; *"In general, how well do you think your child will do at school later on?"*).

## RESULTS

The statistical analyses were carried out by the use of structural equation modelling (SEM) with the LISREL8 statistical package (Jöreskog & Sörbom, 1993). The parameters of the model were estimated using the Maximum Likelihood (ML) procedure. The goodness-of-fit was evaluated using three indicators, $\chi^2/df$, Bentler´s (1990) Comparative Fit Index (*CFI*), and Bentler and Bonnet´s (Bentler, 1990) Non-Normed Fit Index (*NNFI*), as suggested by Gerbing and Anderson (1993). In order to investigate whether an identical model would fit for boys and girls, a multisample procedure suggested by Jöreskog and Sörbom (1993) was used. The sample correlation matrix, and means and standard deviations for the measured variables are presented in Table 1, separately for boys and girls.

In all the tested models, the constructs for mathematical performance and task-focused behavior (time 1, 2, 3 and 4), and pre-mathematical skills (time 0) consisted of one indicator. Consequently, their loadings were set as equal to 1 with an error term 0. The constructs for parents´ skill-specific and general beliefs at time 0 and time 5 consisted of two indicators. For each of these constructs, one of the loadings were set equal to 1 (Table 2).

TABLE 2 Standardized Parameter Estimates for Parents´ Skill-Specific and General Beliefs at Time 0 and Time 5 (the Final Model).

| Variable | Time 0 | Time 5 |
|---|---|---|
| **Mothers** | | |
| Skill-specific belief I | 0.82 | 0.77 |
| Skill-specific belief II | 0.74 | 0.64 |
| General belief I | 0.86 | 0.89 |
| General belief II | 0.71 | 0.53 |
| **Fathers** | | |
| Skill-specific belief I | 0.93 | 0.90 |
| Skill-specific belief II | 0.56 | 0.74 |
| General belief I | 0.84 | 1.00 |
| General belief II | 0.61 | 0.67 |

### Task-focused behavior and mathematical performance

First, a structural model using a multisample procedure was constructed to examine the extent to which task-focused behavior prospectively predicted mathematical performance, and the extent to which mathematical performance prospectively predicted task-focused behavior. Besides stability coefficients, this model included paths from task-focused behaviors to subsequent mathematical performance measurement, and from mathematical performance to subsequent

task-focused behavior. In order to control the preliminary level of mathematical skills at the beginning of the school year, the pre-mathematical skill variable was included in the model at measurement 0.

The model fitted the data well ($\chi^2 = 110.17$, df = 67; *CFI* = 0.94; *NNFI* = 0.94). However, after omitting the nonsignificant paths ($\chi^2 = 113.09$, df = 71; *CFI* = 0.94; *NNFI* = 0.94), the modification indices suggested that the fit of the model would be increased by estimating the error covariances between (1) the task-focused behavior variable at time 2 and that of time 3 for the whole sample; and (2) the task-focused behavior construct at time 1 and the mathematical performance construct at time 2 among boys. After these specifications, none of the indices exceeded the value 8, suggesting that the model fitted both girls and boys data well ($\chi^2 = 86.18$, df = 69; *CFI* = 0.98; *NNFI* = 0.98; the percentage contribution to $\chi^2$ was 44.03% for girls and 56.97% for boys). The standardized beta coefficients for this model are presented in Figure 1.

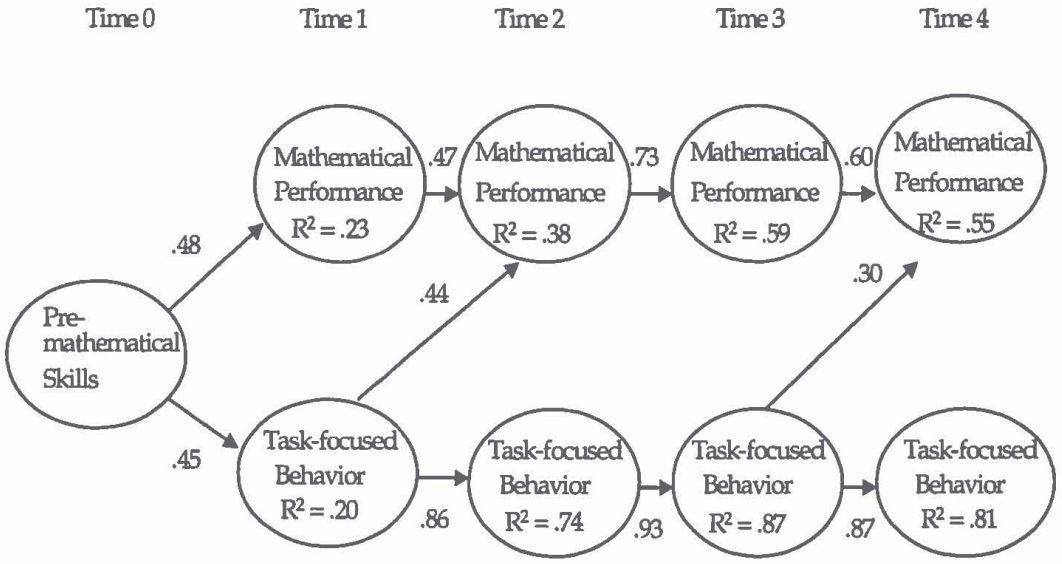


FIGURE 1 Results of SEM for Children's Task-Focused Behavior and Mathematical Performance.

The results showed, first, that the level of children's pre-mathematical skills at the beginning of the school year (time 0) was positively associated with their mathematical performance and task-focused behavior at measurement 1. Moreover, both mathematical performance and task-focused behavior were substantially stable across the four measurements.

Second, examination of the prospective relationships between mathematical performance and achievement-related behaviors revealed that a high level of task-focused behavior prospectively predicted high levels of mathematical performance both from time 1 to time 2 and from time 3 to time 4.

**The role of mothers' beliefs in children's task-focused behavior and mathematical performance**

Next, in order to examine the prospective relationships between mothers' beliefs, and their children's task-focused behavior and mathematical performance, maternal general and skill-specific beliefs at time 0 and time 5 were added to the previously-mentioned model. In this model, the constructs for mothers' general and skill-specific beliefs at the same measurement point were let to correlate. Moreover, the stability coefficients for maternal general and skill-specific beliefs were included in the model, as well as the paths from maternal beliefs to subsequent mathematical performance and task-focused behavior, and from these to subsequent maternal beliefs.

The model did not fit the data very well: $\chi^2 = 332.17$, df = 255; *CFI* = 0.92; *NNFI* = 0.91. After omitting the nonsignificant paths ($\chi^2 = 337.67$, df = 259; *CFI* = 0.92; *NNFI* = 0.91), the modification indices suggested that the fit of the model would be increased by estimating the error covariances between: (1) one of the general belief variables at time 0 and one of the skill-specific belief variables at time 0; (2) one of the general belief variables at time 5 and one of the skill-specific belief variables at time 5; and (3) one of the skill-specific belief variables at time 0 and one of the skill-specific belief variables at time 5 among boys. After these specifications, the model fitted both girls' and boys' data well ($\chi^2 = 285.27$, df = 253; *CFI* = 0.97; *NNFI* = 0.96; the percentage contribution to $\chi^2$ was 53.44% for girls and 47.56% for boys.). The standardized beta coefficients for this final model are presented in Figure 2.

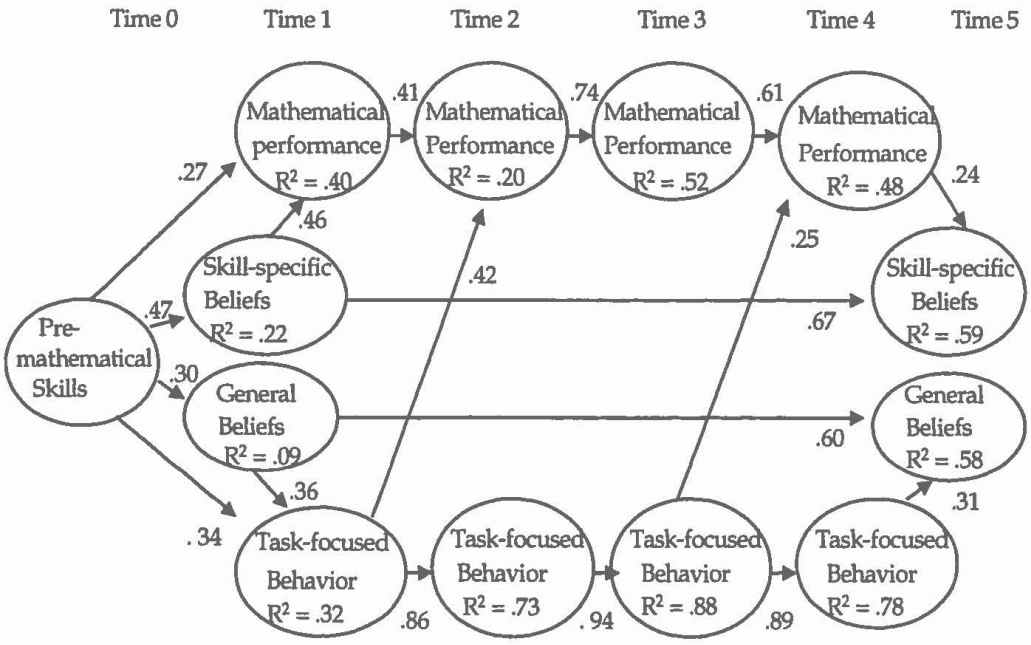


FIGURE 2 Results of SEM for Mothers' General and Skill-Specific Beliefs, and Children's Task-Focused Behavior and Mathematical Performance.

The results showed that the pre-mathematical skills of the children were positively associated with the mothers´ skill-specific and general beliefs: the higher the level of the children´s pre-mathematical skills was at the beginning of the school year, the more their mothers believed in their children´s abilities to do well at school in general, and in mathematics, in particular. Moreover, both the mothers´ skill-specific and general beliefs showed substantial stability across the two measurements.

Second, the mothers´ skill-specific beliefs at the beginning of the first school year predicted their children´s level of mathematical performance at time 1: the higher confidence the mothers had in their children´s math competence, the higher the level of mathematical performance the children showed later on. The results also showed that the children´s mathematical performance predicted the mothers´ subsequent skill-specific beliefs: the higher the level of mathematical performance the children showed at time 4, the more the mothers believed in their children´s abilities to do well in mathematics, in particular.

Third, the mothers´ general beliefs at the beginning of the first school year predicted their children´s subsequent task-focused behavior at time 1: the better the mothers expected their children to do at school in general, the higher the level of task-focused behavior the children showed later on. Moreover, there was also an indirect impact from the mothers´ general beliefs to the children´s mathematical performance at time 2 through the children´s task-focused behavior (*Indirect effect* $_{\text{standardized}} = 0.16$, $t = 2.56$): in other words, the mothers´ high beliefs in their children´s general school competence increased the children´s task-focused rather than task-avoidant behaviors, which further increased their subsequent performance in mathematics. Finally, the level of task-focused behavior the children showed in the classroom predicted the mothers´ general beliefs at the end of the school year: the more task-focused behaviors the children showed at time 4, the higher confidence the mothers had on their offsprings´ school performance at the end of the school year.

### The role of fathers´ beliefs in children´s task-focused behavior and mathematical performance

Next, an analogous model was tested for the fathers´ data. The model fitted the data well ($\chi^2 = 284.17$, df = 255; *CFI* = 0.96; *NNFI* = 0.96). However, after omitting the nonsignificant paths ($\chi^2 = 286.43$, df = 258; *CFI* = 0.96; *NNFI* = 0.96), the modification indices suggested that the fit of the model would be increased by estimating the error covariance between one of the skill-specific belief variables at time 5 and one of the general belief variables at time 5 among boys. After this specification the fit of the model was good ($\chi^2 = 260.32$, df = 256; *CFI* = 0.99; *NNFI* = 0.99; the percentage contribution to $\chi^2$ was 45.59% for girls and 54.41% for boys). Standardized beta coefficients for this final model are presented in Figure 3.

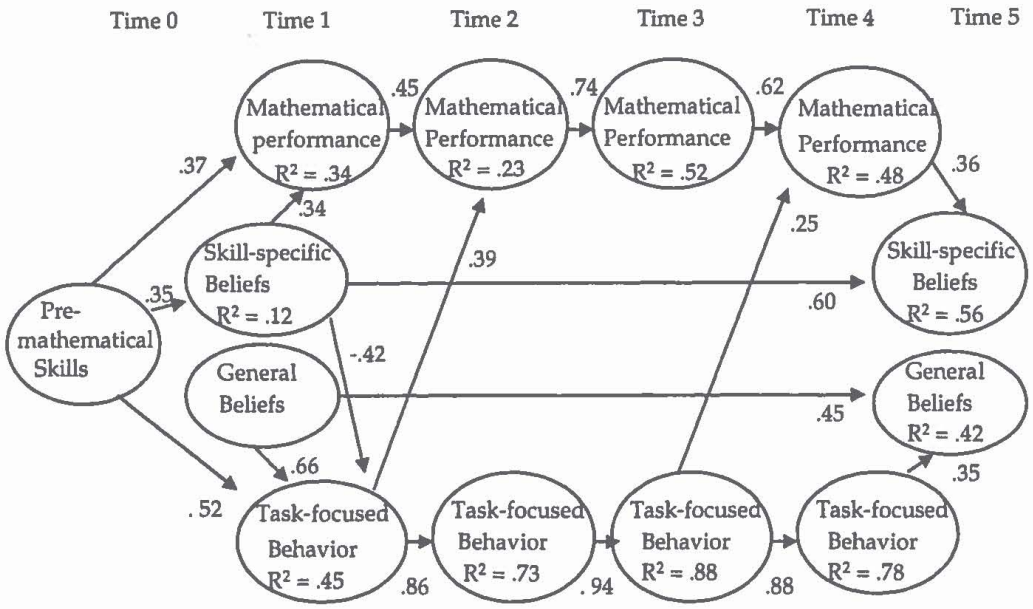


FIGURE 3 Results of SEM for Fathers´ General and Skill-Specific Beliefs, and Children´s Task-Focused Behavior and Mathematical Performance.

The results showed, first, that the pre-mathematical skills of the children were positively associated with the fathers´ skill-specific beliefs: the higher the level of children´s pre-mathematical skills was at the beginning of the school year, the more their fathers believed in their children´s abilities to do well in mathematics, in particular. However, the premathematical skills did not predict the fathers´ general beliefs. The fathers´ skill-specific and general beliefs showed both substantial stability across the two measurements.

Second, the fathers´ skill-specific beliefs at the beginning of the first school year predicted their children´s mathematical performance at time 1: the higher confidence fathers had in their children´s math competence, the higher level of mathematical performance the children showed later on. The results also showed that the children´s mathematical performance predicted the fathers´ subsequent skill-specific beliefs: the higher the level of mathematical performance the children showed at time 4, the more the fathers believed in their children´s ability to do well in mathematics.

Third, the fathers´ general beliefs at the beginning of the first school year predicted their children´s subsequent task-focused behavior at time 1: the better the fathers expected their children to do at school in general, the higher the level of task-focused behavior the children showed later on. Moreover, there was an indirect impact from the fathers´ general beliefs to the children´s mathematical performance at time 2 through the children´s task-focused behavior (*Indirect effect* $_{standardized}$ = 0.24, $t$ = 2.43): the fathers´ high beliefs in their children´s general school competence increased the children´s task-focused rather than task-avoidant behaviors, which further increased their subsequent performance in mathematics. Although there was a negative path from the fathers´ skill-specific beliefs to the

children's task-focused behavior, the correlation coefficient was positive ($r = .18$). Finally, the level of task-focused behavior the children showed in the classroom predicted the fathers' general beliefs at the end of the school year: the more task-focused behaviors the children showed at time 4, the higher confidence the fathers had in their offsprings' school performance at the end of the school year.

The results for both fathers and mothers were closely analogous. Only one of the tested paths were different for mothers and fathers: the children's pre-mathematical skills did not predict the fathers' general beliefs as they did among the mothers.

## Mean and gender differences in the levels of parental beliefs

In order to investigate the mean differences in the parental beliefs, two-way multivariate analyses of variance with one within-subject factor (Time: Measurement 0 vs. Measurement 5) and one between-subject factor (Gender of the Child) were carried out separately for general beliefs and skill-specific beliefs. These analyses were carried out separately for mothers and fathers. The sum scores were created for each construct by multiplying each individual variable by its factor loading in the (final) measurement model presented in Table 2, and calculating the means across these variables. The means and standard deviations for the variables at the three measurement points are presented in Table 3, separately for girls and boys.

TABLE 3 Means (M) and Standard Deviations (SD) of Parents' Beliefs for Girls and Boys, Separately.

| Variable | Gender | Measurement 0 | | Measurement 5 | |
|---|---|---|---|---|---|
| | | *M* | *SD* | *M* | *SD* |
| **Mothers'** | | | | | |
| Skill-specific beliefs | Girls | 5.00 | 1.00 | 4.31 | 1.08 |
| | Boys | 5.23 | 0.81 | 4.74 | 0.82 |
| General beliefs | Girls | 5.15 | 0.83 | 4.59 | 0.71 |
| | Boys | 4.96 | 0.84 | 4.37 | 0.73 |
| **Fathers'** | | | | | |
| Skill-specific beliefs | Girls | 4.71 | 0.93 | 4.90 | 1.24 |
| | Boys | 4.80 | 0.82 | 5.42 | 1.04 |
| General beliefs | Girls | 4.77 | 0.69 | 5.39 | 1.07 |
| | Boys | 4.47 | 0.71 | 5.05 | 0.80 |

Among mothers, the main effects for gender or Time x Gender interaction were not statistically significant in either of the analyses. However, the main effect for time was statistically significant for the mothers' general ($F$ (1, 76) = 45.29, $p <$ .001) and skill-specific ($F$ (1, 76) = 37.40, $p < .001$) beliefs: the mothers reported a lower level of general and math-specific beliefs at the end of the school year than at the beginning.

Among the fathers, a statistically significant main effect for Time x Gender interaction was found for the skill-specific beliefs: the fathers' reported a higher

beliefs in their son´s and a lower beliefs in their daughter´s mathematical performance at the end of the school year than at the beginning ($F$ (1, 60) = 3.99, $p$ < .05). The analyses for the fathers´ general beliefs revealed no significant main effects for Time x Gender interaction or gender. However, the main effect for time was significant: the fathers´ general beliefs increased across the two measurements ($F$ (1, 60) = 36.26, $p$ < .001).

## DISCUSSION

This study focused on investigating the developmental dynamics between parental beliefs, children´s achievement-related behaviors and their mathematical performance. Overall, the results revealed that the impact of parents´ beliefs concerning their offsprings´ general school competence on children´s math performance was mediated via the child´s task-focused versus task-avoidant behavior at school (Eccles, 1993). By contrast, parents´ beliefs in their children´s competence in mathematics contributed directly to their children´s high performance. Moreover, children´s high mathematical performance was reflected in parents´ subsequent beliefs in their children´s mathematical competence, whereas children´s task-focused behaviors increased parents´ beliefs in their children´s overall school competence.

The first aim of this study was to investigate the prospective relationships between children´s task-focused versus task-avoidant behaviors, and their performance in mathematics, during their first school year. The results revealed that the achievement-related behaviors children displayed in the classroom contributed to their math-skill development: children´s high level of task-focused behaviors increased their subsequent improvement in mathematics, whereas their high-level of task-avoidance decreased it. This result accords well with previous cross-sectional findings on the role of children´s and adolescents´ achievement-related beliefs, such as self-concept of ability (Campbell & Beaudry, 1998; Jacobs, 1991; Marsh et al., 1991; Pajares & Miller, 1994), self-efficacy (Pajares & Graham, 1999; Pajares & Kranzler, 1995), and success expectations (Alexander & Entwisle, 1988; Jacobs, 1991), in their mathematical performance. The results of the present study suggest that, in addition to achievement beliefs, the related behaviors at school also play an important role in children´s math performance. Moreover, the present study adds to the previous literature by showing that it is the achievement-related behaviors that contribute to the math performance rather than vice versa. Overall, the results suggest that school pupils with learning difficulties in mathematics may benefit from efforts to change their achievement-related beliefs in order to motivate them to deploy a task-focused rather than a task-avoidant behavior in the classroom (Onatsu-Arvilommi & Nurmi, 2000).

The second aim of this study was to investigate the extent to which parents´ beliefs in their offsprings´ competence would predict their children´s mathematical performance and whether this impact is mediated by the achievement-related behaviors children deploy at school. The results showed that the impact of parents´ general beliefs on their offsprings´ mathematical

performance was mediated by the children´s achievement-related behavior: parents´ high beliefs in their offsprings´ academic competence increased their children´s task-focused behavior, which, in turn, improved their subsequent performance in mathematics. These results accord well with previous cross-sectional findings. It has been found that parental beliefs are associated with children´s own achievement related beliefs (Frome & Eccles, 1998; Jacobs, 1991; Murphey, 1992; Parsons et al., 1982; Phillips, 1987; Stevenson & Nyman, 1986; Wagner & Phillips, 1992), which, in turn, have been found to be related to children´s mathematical performance (Pajares & Graham, 1999; Pajares & Kranzler, 1995). The results of the present study add to this literature by providing direct support for the notion that children´s self-perceptions and task-orientations mediate the impact of parental beliefs on their academic achievement (Murphey, 1992; Parsons et al., 1982; Phillips, 1987). There are, however, many possible reasons for this particular result. For example, parents´ general beliefs and related child-rearing practices may provide a basis for their children´s own self-perceptions (Frome & Eccles, 1998; Parsons et al., 1982; Stevenson & Newman, 1986) and, consequently, their task-focused or task-avoidant behavior, which is then reflected in their mathematical performance. Another possibility is that parents´ general beliefs about their children´s academic competencies are associated with authoritative parenting styles (Murphey, 1992), the effective scaffolding (Pratt, Green, MacVicar, & Bountrogianni, 1992), and rational guidance (Maccoby & Martin, 1983), which have been shown to motivate children´s active problem solving attempts and task-focused behavior (Ginsburg & Bronstein, 1993; Onatsu-Arvilommi, Nurmi, & Aunola, 1998), and high subsequent performance.

The results further showed that children´s achievement-related behavior was reflected in their parents´ general beliefs: the more task-focused behaviors children deployed at school the more their parents´ believed in their children´s overall competence at school, whereas the more task-avoidance they showed the less the parents believed in their competence. These results suggest that besides school performance children´s school-related behaviors also provide information for parents about how the child will do at school in the future.

The results revealed, however, that parents´ skill-specific beliefs predicted their offsprings´ mathematical performance directly: children whose parents believed in their offsprings´ abilities in mathematics performed well in mathematics later on. This was true even after controlling for the level of children´s mathematical skills at the beginning of the school year. This result is consistent with many previous cross-sectional findings (Entwisle & Alexander, 1990; Galper et al., 1997; Hess et al., 1984; Stevenson & Newman, 1986). One explanation for the results of the present study is that parents who believe in their children´s abilities in mathematics provide more challenging tasks and opportunities for their children to practice math-related problem solving skills (Musun-Miller & Blevins-Knabe, 1998). It is also possible that parents who believe in their children´s abilities in mathematics themselves perform well in math and have positive attitudes toward mathematics (Huntsinger et al., 1997), and, consequently, also encourage their children in math-related activities. The results also showed that children´s performance in mathematics was reflected in their

parents´ math-related beliefs: high performance in mathematics enhanced parents´ positive beliefs about their offsprings´ mathematical competence. This result supports earlier cross-sectional findings (Parsons et al., 1982; Phillips, 1987), suggesting that parental beliefs reflect children´s actual skill level. This result also fit well with the notion that school feedback has a 'corrective' effect on parents´ beliefs (Entwisle & Hayduk, 1978).

The relationships between children´s achievement-related behaviors and mathematical performance, and their parents´ beliefs, were highly similar for boys and girls. Similarly, the results for both fathers and mothers were closely analogous. However, the results showed gender differences in how fathers perceived their son´s and daughters´ skills: fathers´ beliefs in their sons´ mathematical performance increased across the school year, whereas the opposite was true for girls. This result support the earlier notions that parents tend to socialize their sons and daughters in a stereotypical ways, expecting girls to be less competent in mathematics (Jacobs, 1991; Lummis & Stevenson, 1990). However, the results of the present study did not support this notion among mothers.

There are some grounds for caution in making generalizations on the basis of the results presented here. First, although a cross-lagged longitudinal study was carried out, it is possible that there were some other variables behind the obtained path coefficients. For example, it is likely that there is a shared genetic background behind the parents´ and children´s math performance (Miller, 1988), which may be reflected in their attitudes. Second, because the sample size of this study was relatively small, particularly concerning the fathers´ data, the results of structural equation modelling must be interpreted with caution. Third, the present study focused on children´s teacher-rated behaviors at school and no information was gathered from children´s achievement beliefs. In future research, there is a need to use a multiple-informant approach to gather data on both children´s beliefs and their behaviors. In such research, it is also possible to examine the extent to which the impacts of children´s beliefs on their performance is mediated by the behaviors they show. Finally, this study included self-report data on parents´ expectations. In future studies, it would also be important to have information about how parents´ expectations are reflected in their parenting behaviors.

Overall, the results of the present study add to previous research on the role of achievement-related motivation, beliefs and behaviors in children´s math skill development in at least three ways. First, the present study showed that besides children´s math-related beliefs (Jacobs, 1991; Marsh et al., 1991; Pajares & Kranzler, 1995; Pajares & Miller, 1994) their achievement-related behaviors, such as focusing on task or task-avoidance, also play an important role in their mathematical performance. Second, the present study showed that parents´ beliefs did not only provide a basis for their children´s mathematical performance both directly, and indirectly via children´s behaviors, but that children´s performance and behavior also had an impact on their parents´ beliefs. Third, the results suggested that not only children´s achievement-related beliefs and strategies, and their mathematical competence, form positive or negative developmental cycles, but also that parental beliefs are part of such a self-perpetuating, cumulative cycle.

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