Author(s): Enlund, Emmi; Aunola, Kaisa; Nurmi, Jari-Erik

Title: Stability in Parents' Causal Attributions for Their Children's Academic Performance: A Nine-Year Follow-up

Year: 2015

Version:

Please cite the original version:

Enlund, E., Aunola, K., & Nurmi, J.-E. (2015). Stability in Parents' Causal Attributions for Their Children's Academic Performance: A Nine-Year Follow-up. Merrill-Palmer Quarterly, 61(4), 509-536. https://doi.org/10.13110/merrpalmquar1982.61.4.0509

Stability in Parents' Causal Attributions for Their Children's Academic Performance: A Nine-Year Follow-up

Emmi Enlund, Kaisa Aunola, and Jari-Erik Nurmi *University of Jyväskylä*

This study investigated the interindividual stability and mean-level changes in parents' causal attributions for their children's academic performance across a 9-year period from the first year in primary school (Grade 1, age 7) to the end of lower secondary school (Grade 9, age 16). In all, 212 children participated in the study. The results showed that, after we controlled for the children's level of academic performance, the parents made fairly similar causal attributions when their children were in the ninth grade as they did in the first grade. Changes in the mean-level happened in only external attributions. Further, the differences between mothers and fathers in the stability of their causal attributions, and with regard to girls vs. boys, were minor. The results support the notion that parents' attributional styles may play an important role in their causal attributions for their children's academic performance.

Although a substantial amount of research has already been conducted on the kinds of causal attributions that parents form regarding their children's school performance (Ames & Archer, 1987; Dunton, McDevitt, & Hess, 1988; Phillipson, 2006; Rytkönen, Aunola, & Nurmi, 2005; Yee & Eccles, 1988), and on how parental causal attributions are linked to children's academic achievement (for a review, see S. Miller, 1995; see also Georgiou,

Emmi Enlund, Kaisa Aunola, and Jari-Erik Nurmi, Department of Psychology.

This study is part of the Jyväskylä Entrance into Primary School (JEPS) study and was funded by a grant (no. 201822) from the Academy of Finland. We would like to express our gratitude to all the children participating in this study, as well as to their parents and the local school authorities.

Address correspondence to the Emmi Enlund, Department of Psychology, University of Jyväskylä, PO Box 35, 40014 Jyväskylä, Finland. Phone: +358408054709. E-mail: emmi.k.enlund@jyu.fi.

Merrill-Palmer Quarterly, October 2015, Vol. 61, No. 4, pp. 509–536.

1999; Khodayarifard, Brinthaupt, & Anshel, 2010; Räty & Kärkkäinen, 2011; Rytkönen, Aunola, & Nurmi, 2007), still little is known about how stable parents' causal attributions are over time. There are two possibilities: Parents' causal attributions for their offspring's academic performance may change over time due to feedback they receive (S. Miller, 1995), or their causal attributions may reflect more general attributional styles that will be relatively stable over time (Peterson & Steen, 2009). It has previously been found that, although parental causal attributions change to some extent, at the mean level, during children's transition from preschool to primary school (Rytkönen et al., 2005), interindividual differences in these attributions are relatively stable across this period (Natale, Aunola, & Nurmi, 2009). However, as far as we know, no previous studies have examined the interindividual stability of parents' causal attributions for their children's academic successes and failures over longer periods. The stability of parents' causal attributions over a longer period can be assumed to be important for children's academic achievement and adjustment, because such attributions form a stable developmental environment for children that does not only include parents' thinking but also their parenting practices (Murphey, 1992). Consequently, the present study examined the interindividual stability of parents' causal attributions for their children's academic successes and failures from children's first to ninth years of compulsory education. The changes in the mean levels of causal attributions over this period were also investigated.

The attributional theory of achievement motivation (Weiner, 1985, 1986) has been extended to encompass the ways in which parents explain and evaluate their children's academic performance. The four most common causes that parents attribute to their children's success or failure at school are ability, effort, teaching, and task difficulty (Cashmore & Goodnow, 1986; Dunton et al., 1988; Holloway, 1986; Räty, Vänskä, Kasanen, & Kärkkäinen, 2002; Rytkönen et al., 2005; Yee & Eccles, 1988). These causal attributions vary along three dimensions: (a) the locus of control (internal vs. external); (b) the amount of stability; and (c) the amount of controllability. In this way, these causal attributions can be roughly compared in the same terms. Ability, for example, is an internal, stable, and uncontrollable factor, whereas effort is an internal, unstable, and controllable factor. Meanwhile, teaching and task difficulty are both external, stable, and uncontrollable factors (Weiner, 1986).

Parents' causal attributions for their offspring's academic performance may affect their behavior toward their children and hence the ways in which their children develop (S. Miller, 1995). It has been suggested, for example, that parents' causal attributions not only influence the expectations and aspirations they have regarding their children's performance but also the support, advice, and guidance they give to their children (Murphey, 1992). Previous studies have also shown that, in addition to parenting practices, parents' perception of their children's academic achievement is associated with their children's self-concept of ability, even more strongly than the children's grades (Frome & Eccles, 1998; Rytkönen et al., 2007). Moreover, if parents praise their children for intelligence, this increases their performance orientation in learning situations, whereas praising them for effort promotes their mastery-orientated strategies (Kamins & Dweck, 1999). Given these connections between parents' causal attributions regarding their offspring's academic outcomes, parenting practices, and child outcomes, the stability of parents' causal attributions may also play a crucial role in child development, because the stability of such attributions provides a basis for the lasting developmental environment for the child. For example, if parents' causal attributions are stable, they are likely to direct a child's development in a certain way over a long period, whereas unstable causal attributions create a more diverse environment for the child.

Two theoretical frameworks have been used in the study of parents' causal attributions. The first emphasizes that parents adapt their causal attributions regarding their children on the basis of the feedback they receive from their children's performance in different situations (S. Miller, 1995; Natale et al., 2009; Rytkönen et al., 2005). The second theoretical framework describes people thinking in terms of an attributional or explanatory style (Abramson, Seligman, & Teasdale, 1978; Peterson & Steen, 2009), and these styles may also be used to understand the kinds of causal attributions that parents' use regarding their children's academic performance. It has been suggested that individuals will tend to use a self-serving bias in their causal attributions (Chan & Wong, 2013; D. T. Miller & Ross, 1975)—in other words, success is typically attributed to one's own characteristic (especially to ability), whereas failure is attributed to external causes or a lack of effort. Thus, this kind of positive bias might be also evident in parents' causal attributions regarding their own children.

Only two previous studies have examined the interindividual stability of parents' causal attributions over time (Natale et al., 2009; Rytkönen et al., 2005), but none has as yet examined this phenomenon over longer periods, and so this was the first aim of the present study. In previous literature, children's past performance at school has also been shown to be related to parents' causal attributions (Holloway & Hess, 1985; Natale et al., 2009), so the present study also controlled for children's performance at school when examining the stability of parents' causal attributions.

Previous research suggests that, in the long run, parents' causal attributions change as their children age. For example, parents seem usually to offer different causal attributions for young children than they do for adolescents, mainly because of perceived developmental processes the child is going through (Dix & Grusec, 1985). Moreover, as the children age, parents have been shown increasingly to attribute the children's social behavior to personality dispositions, misconduct, and intentions (Dix, Ruble, Grusec, & Nixon, 1986; Dix, Ruble, & Zambarano, 1989; Gretarsson & Gelfand, 1988). Rytkönen et al. (2005) also found that, during the transition from kindergarten to primary school, mothers and fathers increasingly attributed their children's academic success to *ability,* with a corresponding decrease in attributing it to *teaching* over the same period. These results suggest that, as children develop with age, parents perceive their offspring as being more directly responsible for their own behavior and academic achievement. However, these previous studies focused only on the early years of school, and little research has been conducted on these kinds of mean-level change in parental attributions over longer periods. Our second aim was therefore to study parental attributions not only over longer periods but during the later school years.

Apart from children's past academic performance, it has been shown that parents' success attributions differ depending on their child's gender. For example, mothers are typically more likely to attribute their sons' success to ability, and their daughters' success to effort, particularly in mathematics (Dunton et al., 1988; Eccles, Jacobs, & Harold, 1990; Holloway & Hess, 1985; Parsons, Adler, & Kaczala, 1982; Räty et al., 2002; Yee & Eccles, 1988). Some other studies have shown that mothers of boys attribute success in math to more unstable causes (such as task difficulty or effort) than do mothers of girls (Holloway, 1986). It has been suggested that such differences are due to the parents' gender stereotypes (Dunton et al., 1988; Eccles et al., 1990). Some scholars have even gone further to propose that the gender stereotypes in causal attribution may also explain the gender differences not only in children's motivation toward mathematics (Mueller & Dweck, 1998) but also their self-concept of ability in the subject (Frome & Eccles, 1998). Not all studies, however, find gender a significant factor (e.g., Cashmore & Goodnow, 1986; Cote & Azar, 1997; Natale et al., 2009; Rytkönen et al., 2005), and thus, with the exception of math, gender has been only a peripheral variable in studies on parents' causal attributions (for a review, see S. Miller, 1995).

Surprisingly, only a few studies have explored how the *parent's* gender may affect the causes that are attributed to their children's school performance. In addition, the few studies on this subject show quite contradictory findings. Some studies have shown that a mother's thinking depends more on gender stereotypes, whereas a father's might rely more on a child's school achievement (Frome & Eccles, 1998). Other researchers have suggested that mothers may be more aware of their child's academic progress than are fathers (Bird & Berman, 1985). Other studies have found that mothers and fathers share causal attributions regarding their child's success, but not regarding their child's failure (Rytkönen et al., 2005). Yet, some studies have found there is little if any difference between mothers and fathers (Cashmore & Goodnow, 1986; Parsons et al., 1982; Yee & Eccles, 1988). These contradictory findings suggest that it is important to continue research in this field. In addition, besides investigating the differences between mothers' and fathers' causal attributions for their child's academic performance, it is also important to examine gender differences in the interindividual stability of parents' causal attributions. Such research can be assumed to have important implications for the interventions that are developed to support parents in thinking positively about their child's performance in a school context. Consequently, the final aim of this study was to investigate the role of parents' gender in the interindividual stability and mean-level changeability of parents' causal attributions.

This study therefore examines the following research questions:

1. Do mothers' and fathers' causal attributions for their offspring's successes and failures in school during first grade predict their causal attributions during ninth grade (interindividual stability)? In addition to stability estimates, we conducted analyses in which children's academic performance (in both first grade and ninth grade) were controlled for. On the basis of the notion of attributional styles, we assumed that parents' causal attribution would be stable over a long period such as this.
2. Do these associations vary between mothers and fathers, as well as with regard to the child's gender?
3. Do parents use different kinds of causal attributions regarding a change in their child's academic performance from Grade 1 through Grade 9 (mean-level changes)?
4. Do these changes vary between mothers and fathers and with regard to the child's gender?

The Finnish Education System

Finnish children start their education with kindergarten, typically in the year of their sixth birthday. One year later, at age 7, they progress to compulsory school, where they continue for the next 9 years. Compulsory education is divided into primary school (Grades 1–6) and lower secondary school (Grades 7–9). Up to age 16, all Finnish adolescents have a similar basic education, except for a small minority (on average, 0.27%) who leave school without a certificate (Official Statistics of Finland, 2010a).

Method

Participants and Procedure

This study is part of the Jyväskylä Entrance into Primary School (JEPS) study (Nurmi & Aunola, 1999–2009). The aim of the JEPS study is to investigate the development of a broad range of cognitive, social, and motivational factors among children who are facing the transition from preschool to primary school and, thereafter, throughout secondary school. The original sample consisted of all children (n = 210) residing in two medium-sized districts (including both suburban and rural areas) of Central Finland, who were born in 1993 and started kindergarten in 1999. Parental permission to participate in the study was granted by the parents of 207 children. In the present study, we used the data pertaining to the children and their parents when the children were in first grade and ninth grade. Parental permission to gather data on the children was obtained at the beginning of the fall semester of kindergarten and again in the fall semester of seventh grade.

The children participating in the present study were 212 first graders (102 girls and 110 boys) who were 6–7 years old (M = 87 months, SD = 3.3 months). Of these children, 196 were from the original sample, whereas the 16 additional children did not live in the districts under study when the study began but had moved to these districts afterward. Information about the children's performance in reading and mathematics was gathered during the fall semester of first grade (Time 1), in October 2000 (N = 212). During ninth grade (Time 2), 8½ years later, in April 2009, the children were asked to report their latest grades for Finnish, English, one other foreign language, and mathematics. In ninth grade, 177 children (86 girls and 91 boys) from the original sample participated.

Mothers and fathers were sent a questionnaire and asked to fill it in independently and without conferring. The parents returned the questionnaires by mail directly to the researchers. The questionnaire included items on background information and on parents' causal attributions for their child's academic achievements. Of the parents of the 212 children, 178 mothers and 145 fathers completed the questionnaire in the first assessment (first grade), and 150 mothers and 114 fathers do so in the second assessment (ninth grade).

To investigate the possible selection effect, we compared all the independent variables and the level of all parental causal attributions at Time 1 of those parents who returned the questionnaire at Time 2 and the parents who did not return the questionnaire at Time 2. No selection effect was found among mothers. However, children whose fathers did not return the questionnaire at Time 2 showed a lower level of grade point average (GPA) (M = 7.38, SD = 0.90) than did children whose fathers returned the questionnaire at Time 2 (M = 7.79, SD = 1.05; $t[176] = -2.56$, $p < .05$).

The families in the study were somewhat more educated than the Finnish population overall (Official Statistics of Finland, 2010b): 13.6% of the mothers and 10.9% of the fathers had no vocational education, 24.4% of the mothers and 41.7% of the fathers had a vocational education, 44.9% of the mothers and 34.0% of the fathers had a qualification from a college of professional education, and 17.0% of the mothers and 13.5% of the fathers had a degree from an institution of higher education (e.g., university or polytechnic institute). In all, 83.7% of the mothers and 90.4% of the fathers were living in a nuclear family, 9.8% of the mothers and 9.6% of the fathers were living in a blended family, and 6.5% of the mothers were single parents. The number of children per family ranged from 1 to 11 (M = 2.80, SD = 1.50).

Measurements

Parents' causal attributions. At Time 1, parents' causal attributions for their children's successes and failures in school were measured by a four-item questionnaire (Rytkönen et al., 2005) that was based on items used in previous studies, using open-ended statements to be completed by the participants (Ames & Archer, 1987; Parsons, 1980). Two of the four statements assessed parent's causal attributions for their children's successes in school (e.g., If my child does well on some school assignment, it is probably because . . . ; If my child does well in school, it is probably because . . .), and two assessed parents' causal attributions for their children's failures in school (e.g., If my child does not do well on his/her school assignment, it is probably because . . . ; If my child does not know how to do some school assignments, it is probably because . . .).

At Time 2, parents' causal attributions for success and failure at school were measured with an expanded version of the questionnaire used at Time 1 (Rytkönen, Aunola, & Nurmi, 2006). The expanded version included 12 statements of which six assessed parents' causal attributions for their children's success. Two of the questions concerned success in school in general (similar to Time 1), two addressed success in reading, and a further two success in mathematics (e.g., If my child does well on some reading-related school assignment, it is probably because . . . ; If my child does well on reading, it is probably because . . .). The other six questions assessed parents' causal attributions for their children's failures in school in general (similar to Time 1), failure in reading, and failure in mathematics (e.g., If my child does not do well on his/her mathematics assignment, it is probably because . . . ; If my child does not know how to do some mathematics assignment, it is probably because . . .).

After each statement, the parents were asked to rank four alternatives according to their importance: a = *My child receives good teaching / My child does not receive good teaching,* b = *My child makes an effort / My child does not make an effort,* c = *My child has abilities / My child lacks abilities,* and d = *The tasks are too easy for my child / The tasks are too difficult for my child.* On the basis of the parents' ranked answers, a mean score was calculated for each type of attribution (i.e., *teaching, effort, ability,* and *task difficulty*), separately for success vs. failure situations, and separately for mothers vs. fathers. The scores were reversed so that larger values indicated a higher importance regarding the causal attribution in question. The internal consistency (the Cronbach's alphas) of the causal attributions for success, across the two measurement points, ranged from .68 to .82 at Time 1 and from .92 to .94 at Time 2 for mothers, and from .77 to .89 at Time 1 and from .93 to .94 at Time 2 for fathers. For causal attributions for failure, the internal consistency coefficients across the two measurement points ranged from .77 to .90 at Time 1 and from .93 to .94 at Time 2 for mothers, and from .81 to .82 at Time 1 and from .90 to .92 at Time 2 for fathers.

Children's measures. Children's math and reading performance were assessed at Time 1 and GPA at Time 2. The children's math performance was assessed in a classroom group situation by the use of the Diagnostic Test for Basic Mathematical Concepts (Ikäheimo, 1996). The test consisted of five subtests assessing the children's knowledge of basic mathematical concepts. In the first subtest, (1) the children's *knowledge of ordinal numbers* was assessed by two tasks. The children were first shown a picture of a sequence of boy figures and then asked to circle a particular one. (For example, "The boys are in a line. Circle the third boy from the beginning.") (2) The children's *knowledge of cardinal numbers and basic mathematical concepts* (such as *equal, more,* and *less*) were measured with 12 tasks that became progressively more difficult. In each task, the children were shown a picture of a set of balls and asked to draw a specific number of balls in the space given. (For example, "Draw five balls fewer than are shown in the model.") (3) *Number identification,* measured as the child's ability to perceive the correspondence between a particular written number (numeral) and the number of objects in a figure, was assessed by six tasks. In three, the children were shown a picture that included a set of balls and four different numerals written below the set. They were then asked to circle the numeral corresponding to the number of balls in the figure. (For example, "How many balls are there in the picture? Circle the correct numeral.") In the other three tasks, the children were shown a picture that featured a specific numeral and were asked to draw as many balls as the numeral shown in the picture represented. (For example, "Draw as many balls as the numeral shown in the picture represents.") (4) In the *word problems* test, the children were read aloud simple verbal mathematical problems. (For example, "You have 7 sweets and then you get 3 more. How many do you have now?") There were six problems; after each problem, the children were asked to write down the correct solution on their answer sheet. (5) The children's *basic arithmetical skills* were assessed by using a set of visual addition (e.g., 9 + 3 = ?; 7 + ? = 14), subtraction (e.g., 11 – 2 = ?; 15 – ? = 9), multiplication (e.g., 8 × 7 = ?; 4 × 700 = ?), and division tasks (e.g., 48/6 = ?; 240/80 = ?), as well as combinations of these (e.g., 16/4 + 7 = ?). Overall, there were 18 tasks. The children were asked to do as many of these as they could.

In the diagnostic test, one point was given for each correct answer. Consequently, the highest total score possible on the test was 44. The test–retest reliability of the test was .94 (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004). The correlation of the diagnostic test score with the teacher rating of the children's math performance (5-point scale) was .66 in the present sample.

Children's reading performance was assessed by three subtests: (1) In the *letter knowledge* test, the children were asked to read all 21 letters (uppercase) of the Finnish alphabet aloud from a piece of paper. The order of presentation was random across the letters but fixed across the participants in order to avoid systematic effects due to alphabetic order and enhanced knowledge of letters occurring in the child's own name. Fatigue did not affect responding, since the test takes only 2–3 minutes to complete. The score is the number of correctly named letters. (2) In the *reading words and sentences* test, the children were asked to read a set of words and sentences aloud (Normaalikoulu, 1985). The first 20 items were words of progressive difficulty. The difficulty was increased mainly by the fact that the words became longer—for example, *ja* (and), *isä* (dad), *ikkuna* (window), and *tulitikku* (match). The final two items were sentences. The first sentence consisted of three and the second sentence of six words. The test was discontinued if the child could not read three successive items correctly.

One point was given for each correctly read word or sentence, yielding a maximum possible score of 22. The Reading Words and Sentences test has been shown to correlate positively with teachers' assessment of children's reading performance, between 0.47 and 0.85 (Aunola & Nurmi, 2002). (3) The *sentence comprehension* test is a subtest of the Reading test for Primary School (*ALLU—Ala-asteen Lukutesti;* Lindeman, 1998). The test included 20 items, with each item consisting of four sentences and one picture. Out of the four possibilities, the children were asked to choose the sentence that best matched the meaning of the picture by drawing a line from the correctly corresponding sentence to the picture. The child's score indicates the number of correct answers he or she provided during the 2-minute test period. The maximum possible score was 20. The Sentence Comprehension test has been shown to correlate positively with teachers' assessment of children's reading performance, between 0.72 and 0.74 (Aunola & Nurmi, 2002).

To create an overall index for reading performance, a sum score of these three tests was calculated—with the maximum total score possible being 63. Although the tests focus on different stages of learning to read, the sum score was assumed to give an overall estimate of each child's current skill level.

The children's grades for Finnish, English, one other foreign language, and mathematics at Time 2 were summed up to yield their GPA for Grade 9. The internal consistency (the Cronbach's alphas) of the GPAs was .85. In the Finnish school system, the GPA ranges from 4 (fail) to 10 (excellent). Self-reported GPAs, on average, have been shown to have a correlation of .96 with the actual GPA of Finnish ninth graders (Holopainen & Savolainen, 2005).

Analysis Strategy

The research questions were analyzed through the following steps. To analyze the research questions concerning the interindividual stability of parental causal attributions, we first examined the correlations between study variables and, second, conducted path models in which the parents' causal attributions for their children's academic success and failure in ninth grade (at Time 2) were predicted by parents' corresponding causal attributions in first grade (at Time 1). As predictors of parents' causal attributions in Grade 9, children's reading and math performance at Time 1 and their GPA at Time 2 were also included in these models. The analyses were conducted separately for mothers and fathers. To investigate whether identical models would fit with regard to both girls and boys, a multisample procedure was used for all of the analyses. In this procedure, the model of interest is postulated with regard to the groups of interest, in this case for both girls and boys, and then simultaneously estimated (Raykov & Marcoulides, 2006). By constraining all model parameters to be equal across the groups, it is possible to investigate whether the identical model fits both groups. If the fit of the model tested is acceptable, it can be interpreted that the same model fits both groups. If the fit of the model is unacceptable, there are differences between the groups that should be considered in order to end up with an acceptable model. In cases where the fit of the model using the multisample procedure was acceptable—that is, if no gender differences were suggested by any of the estimates—the analyses were conducted for the entire sample without using the multisample procedure. However, even if the fit of the constrained model is acceptable, a comparison between a constrained model and a free model may result in an advantage for the free model. This option was tested with Satorra–Bentler's scaled chi-square difference test (Satorra & Bentler, 2001). The results showed no advantage for the free model compared to the constrained models in any tested models described in the result section ($p > .05$).

Third, to analyze the research questions concerning the mean-level changes in parental causal attributions from Time 1 (Grade 1) to Time 2 (Grade 9), the mean structures of parental attributions were investigated across the two measurement points and between girls and boys. Separate models were tested for each attribution variable and for mothers and fathers. In these models, the main effects of time and the child's gender, as well as the interaction effect of time and the child's gender, were tested by using model constraints.

All models were estimated by using the M*plus* statistical software program (Version 6.12; Muthén & Muthén, 2011). Because some of the variables were initially skewed, the parameters of the models were estimated by using the MLR[1] estimator in M*plus*. The fit of each model was evaluated by using the χ^2 goodness-of-fit statistic, which assesses the magnitude of discrepancy between the sample and fitted covariance matrices. A good fit is obtained when the χ^2 statistic is nonsignificant, which by convention is taken to happen for *p*s ≥ .05 (Bagozzi & Yi, 2012). In addition to the chi-square tests, root mean-square error of approximation (RMSEA) was used to evaluate the fit of the models. For the RMSEA, values of <.05 are indicative of a good-fitting model and values of .06–.08 indicative of

1. Maximum likelihood estimation with robust standard errors and scale corrected chi square test value.

adequate model fit (e.g., see Schermelleh-Engel, Moosbrugger, & Müller, 2003). The correlations, means, and standard deviations pertaining to the children's skills and GPA are listed in Table 1. Means and standard deviations for parents' causal attributions at Time 1 and Time 2 are listed in Table 2 (mothers) and Table 3 (fathers).

Results

Interindividual Stability of Mothers' Causal Attributions

The Pearson product–moment correlations showed, first, that mothers' causal attributions regarding their children's success in Grade 1 had moderate correlations with their causal attribution in Grade 9 (see Table 2). However, mothers' causal attributions regarding their children's failure in Grade 1 showed smaller, although statistically significant, correlations with their corresponding causal attributions in Grade 9. The only exception was their causal attribution to effort regarding failure, which was not statistically significant.

Children's math and reading performance in Grade 1 and their GPA in Grade 9 showed moderate positive associations with mothers' ability attributions and moderate negative association with effort attributions after success. In failure situations, children's math performance in Grade 1 and their GPA in Grade 9 showed moderate negative associations with mothers' ability attributions but not with other causal attributions.

Next, several multisample path analyses were conducted in which mothers' particular causal attribution when their child was in Grade 9 (Time 2) was predicted by the corresponding causal attribution when their child was in Grade 1 (Time 1), as well as by their child's math and reading performance in Grade 1 (Time 1) and their child's GPA in Grade 9

Table 1. Summary of the intercorrelations, means (*M*s), and standard deviations (*SD*s) of the independent variables

Variable	1	2	3
1. Math performance			
2. Reading performance	$.62^{***}$		
3. GPA	$.42^{***}$	$.48^{***}$	
M	28.78	30.18	7.66
SD	7.02	15.53	1.02

Note. GPA = grade point average.

Two-tailed test: $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

Table 2. Correlations of the independent variables at Time 1 with mothers' causal attributions at Time 2 and means (*M*s) and standard deviations (*SD*s)

	Time 2: Causal attributions							
	Success				Failure			
Variable	Teaching	Effort	Ability	Task difficulty	Teaching	Effort	Ability	Task difficulty
Time 1								
Causal attribution	.50***	.42***	.52***	.42***	.23*	.11	.24**	.29**
Math performance	−.17*	−.23**	.42***	−.13	.12	.05	−.24**	.01
Reading performance	−.15	−.29**	.34***	.03	.04	.11	−.12	.03
Time 2								
GPA	−.13	−.26***	.50***	−.33***	.18*	−.07	−.29*	−.03
M	2.68	2.66	3.30	1.61	2.73	3.16	1.78	2.58
SD	0.76	0.88	0.84	0.87	0.87	0.87	0.90	0.97
M[a]	2.94	2.54	3.31	1.40	2.92	3.21	1.75	2.31
SD[a]	0.77	0.91	0.81	0.70	0.81	0.90	1.01	0.90

Note. GPA = grade point average.

[a] Means and standard deviations of the corresponding causal attributions measured at Time 1.

Two-tailed test: * $p < .05$. ** $p < .01$. *** $p < .001$.

(Time 2). In these models, all paths were estimated to be equal for girls and boys. The fit of the model was good for causal attributions to effort, ability, and task difficulty in success situations, as well as for all attributions in failure situations—that is, to teaching, effort, ability, and task difficulty [$\chi^2(10) = 4.98$–15.19, $p > .05$; RMSEA = .00–.07], the estimates thus suggesting that there were no differences based on gender. Next, consequently, the models were run for these causal attributions without using the multisample procedure. Because the models were saturated, the fit was perfect in each case.

The results showed, overall, that mothers' causal attributions to effort, ability, and task difficulty for their child's successes and their causal attributions to teaching, ability, and task difficulty for their child's failures in Grade 9 were predicted by the corresponding attributions in Grade 1 (see Table 4), after controlling for the children's GPA in Grade 9 and previous performance in reading and math in Grade 1. These interindividual

Table 3. Correlations of the independent variables at Time 1 with fathers' attributions at Time 2, and means (*M*s) and standard deviations (*SD*s).

Variable	Time 2: Causal attributions							
	Success				Failure			
	Teaching	Effort	Ability	Task difficulty	Teaching	Effort	Ability	Task difficulty
Time 1								
Causal attribution	.18	.24*	.40***	.34**	.40***	.33**	.34**	.34**
Math performance	−.10	−.19*	.37***	−.05	.14	.05	−.16	−.05
Reading performance	−.16	.01	.26**	−.03	.07	.16	−.14	.03
Time 2								
GPA	−.08	−.06	.40***	−.22*	.14	−.04	−.19	.19
M	2.72	2.81	3.30	1.56	2.82	3.24	1.76	2.56
SD	0.81	0.96	0.75	0.81	0.91	0.83	0.81	0.90
M[a]	2.81	2.94	3.17	1.41	3.00	3.31	1.74	2.26
SD[a]	0.83	0.98	0.89	0.77	0.80	0.88	0.89	0.99

Note. GPA = grade point average.

[a] Means and standard deviations of the corresponding attributions measured at Time 1.

Two-tailed test: * $p < .05$. ** $p < .01$. *** $p < .001$.

stabilities were stronger for causal attributions in success situations than for attributions in failure situations. Overall, the beta coefficients did not differ substantially from the product–moment correlations between the same variables. The results showed further that the higher the child's GPA, the more likely the mother was to attribute her child's success to ability, and failure to teaching, plus the less likely the mother was to attribute her child's success to task difficulty.

The fit of the model for mothers' causal attribution to teaching in success situations was poor: $\chi^2(10) = 35.04$, $p < .000$; RMSEA = 0.15. The modification indices suggested that estimating (a) the path from the child's GPA and (b) the path from the mother's attribution in Grade 1 to the mother's attribution in Grade 9 separately for boys and girls would improve the fit of the model. With these specifications, the model fit the data well: $\chi^2(8) = 6.80$, $p = 0.56$; RMSEA = 0.00; $\chi^2_{diff}(2) = 31.10$, $p < 0.001$. The results showed that the positive connection of mothers'

Table 4. Results of the path models of mothers' causal attributions (standardized betas).

Predictor	Time 2: Causal attributions								
	Success					Failure			
	Teaching β		Effort β[a]	Ability β[a]	Task difficulty β	Teaching β[a]	Effort β[a]	Ability β[a]	Task difficulty β[a]
	Girls	Boys	All	All	All	All	All	All	All
Time 1									
Causal attribution	.26*	.72***	.36***	.36***	.37***	.25**	.09	.22*	.29**
Math performance	−.01	−.01	−.01	.17	−.19	.14	−.00	−.22	−.01
Reading performance	.06	.06	−.01	−.04	.26*	−.13	.18	.13	.05
Time 2									
GPA	−.40***	.21*	−.07	.29***	−.34***	.19*	−.14	−.19	−.05
R^2	.23*	.51***	.23***	.39***	.30***	.11*	.04	.12*	.09

Note. GPA = grade point average.

[a] The model is saturated—that is, the fit is perfect.

* $p < .05$. ** $p < .01$. *** $p < .001$.

teaching attribution in Grades 1 and 9 was stronger with regard to boys than regarding girls (see Table 4), suggesting that mothers' teaching attributions for boys' success were more stable than teaching attributions for girls' success. The results showed further that the lower the girls' GPA, the more the mothers attributed the girls' success to teaching, but the higher the boys' GPA, the more the mothers attributed the boys' success to teaching.

Changes in the Mean Level of Mothers' Causal Attributions

Next, mean-level changes, and the gender differences in these changes, were tested separately for each causal attribution variable. The results showed that mothers' task difficulty attributions both in success (*estimate* = 0.41, *SE* = 0.15, $p < .01$) and failure situations (*estimate* = 0.50, *SE* = 0.19, $p < .01$) increased at the mean level from Time 1 (Grade 1) to Time 2 (Grade 9), whereas mothers' teaching attributions, both in success (*estimate* = −0.54, *SE* = 0.13, $p < .001$) and failure situations (*estimate* = −0.37, *SE* = 0.17, $p < .05$), decreased from Time 1 (Grade 1) to Time 2 (Grade 9).

Further, the results showed that mothers, on average, attributed girls' success more often to ability (*M* = 3.40, *SD* = 0.69) than was the case regarding boys' success (*M* = 3.15, *SD* = 0.83): *estimate* = 0.49, *SE* = 0.22, $p < .05$. Moreover, boys' success was attributed more often to task easiness (*M* = 1.62, *SD* = 0.79) than was girls' success (*M* = 1.38, *SD* = 0.61): *estimate* = −0.41, *SE* = 0.15, $p < .01$. In failure situations, mothers attributed girls' performance (*M* = 2.95, *SD* = 0.70), more often than boys' performance (*M* = 2.70, *SD* = 0.75), to poor teaching: *estimate* = 0.37, *SE* = 0.17, $p < .05$. Furthermore, boys' performance (*M* = 3.30, *SD* = 0.73), compared to girls' performance (*M* = 3.05, *SD* = 0.75), was more often attributed to lack of effort: *estimate* = −0.42, *SE* = 0.20, $p < .05$. No statistically significant gender differences were found regarding the changes in maternal attributions from Time 1 (Grade 1) to Time 2 (Grade 9).

Interindividual Stability of Fathers' Causal Attributions

Next, analogous analyses were conducted with regard to fathers. The correlations showed, first, that fathers' causal attributions for success at Time 1 (Grade 1) had statistically significant correlations with their corresponding causal attribution at Time 2 (Grade 9), except for the attribution to teaching not having been statistically significant (see Table 3). However, fathers' causal attributions for failure at Time 1 (Grade 1) showed moderate correlations with their corresponding causal attributions at Time 2 (Grade 9).

Children's math and reading performance in Grade 1 and GPA in Grade 9 showed moderate positive associations with fathers' ability attributions and moderate negative association with effort attributions after success. In failure situations, children's math and reading performance in Grade 1 and GPA in Grade 9 were not associated with fathers' causal attributions.

Further, fathers' causal attributions at Time 2 (Grade 9) were predicted by their causal attributions at Time 1 (Grade 1), as well as by their child's math and reading performance in Grade 1 and GPA in Grade 9. The fit of the model was good for attributions to teaching in success situations and for attributions to teaching, ability and task difficulty in failure situations [$\chi^2(10) = 7.57–10.91$, $p > .05$; RMSEA = .00–.03], with the estimates suggesting that there were no differences based on gender. Therefore, the models were next run for these attributions without using the multisample procedure.

The results showed, overall, that fathers' causal attributions to teaching, ability, and task difficulty in failure situations at Time 2 (Grade 9) were predicted by the corresponding attributions at Time 1 (Grade 1) (see Table 5). However, the causal attribution to teaching in success situations at Time 2 (Grade 9) did not predict the corresponding attribution at Time 1 (Grade 1). Overall, the beta coefficients did not differ substantially from the product–moment correlations between the same variables.

The fit of the models were poor regarding causal attributions to effort, ability, and task difficulty in success situations and regarding effort attribution in failure situations: $\chi^2(10) = 19.21–27.50$, $p < .05$; RMSEA = .09–.13. Regarding the effort attribution in success situations, the modification indices suggested that estimating the correlation between reading performance and fathers' causal attribution at Time 1 (Grade 1) separately for boys (*standard estimate* = –0.09, *ns*) and girls (*standard estimate* = –0.49, $p < .001$) would improve the fit of the model. After this specification, the model fit the data well: $\chi^2(9) = 12.40$, $p = .19$; RMSEA = .06; $\chi^2_{diff}(1) = 9.41$, $p < 0.01$. The results showed that the causal attribution to effort in success situations at Time 2 (Grade 9) was not predicted by the corresponding attribution at Time 1 (Grade 1) (see Table 5).

Regarding the ability attribution in success situations, the modification indices suggested that estimating the correlation between math performance and fathers' attribution at Time 1 (Grade 1) separately for boys (*standard estimate* = 0.20, $p = .05$) and girls (*standard estimate* = 0.42, $p < .001$) would improve the fit of the model. After this specification, the model fit the data well [$\chi^2(9) = 14.84$, $p = .10$; RMSEA = .08; $\chi^2_{diff}(1) = 11.76$, $p < 0.01$], showing that the causal attribution to ability in success situations at Time 2 (Grade 9) was positively predicted by the corresponding attribution at Time 1 (Grade 1) (see Table 5). The results showed further that girls' math performance at Time 1 (Grade 1) correlated with fathers' causal attributions at Time 2 (Grade 9), but boys' math performance did not.

The modification indices for the task-difficulty attribution in success situations suggested that estimating the path from fathers' causal attribution at Time 1 (Grade 1) to the attribution at Time 2 (Grade 9) separately for boys and girls would improve the fit of the model. After this specification, the model fit the data well [$\chi^2(9) = 10.14$, $p = .34$; RMSEA = .04; $\chi^2_{diff}(1) = 16.92$, $p < 0.001$], showing that fathers' causal attribution to task difficulty in success situations at Time 1 (Grade 1) predicted the corresponding attribution at Time 2 (Grade 9) regarding boys but not regarding girls (see Table 5).

Finally, the modification indices regarding the effort attribution in failure situations suggested that estimating the path from children's reading

Table 5. Results of the path models of fathers' causal attributions (standardized betas)

Predictor	Time 2: Causal attributions									
	Success					Failure				
	Teaching β [a]	Effort β [a]	Ability β [a]	Task difficulty β		Teaching β [a]	Effort β		Ability β [a]	Task difficulty β [a]
	All	All	All	Girls	Boys	All	Girls	Boys	All	All
Time 1										
Causal attribution	.21	.20	.33**	.14	.69***	.45***	.29**	.29**	.37**	.33***
Math performance	.06	−.26**	.26*	−.05	−.05	.23	−.06	−.06	−.08	−.13
Reading performance	−.15	.25*	−.14	.11	.11	−.24	.47***	.01	.11	−.05
Time 2										
GPA	−.02	−.05	.24**	−.16	−.16	.14	−.12	−.12	−.20	−.25*
R^2	.07	.10	.29***	.05	.53***	.21**	.25**	.11	.17	.16*

Note. GPA = grade point average

[a] The model is saturated—that is, the fit is perfect.

* $p < .05$. ** $p < .01$. *** $p < .001$.

performance at Time 1 (Grade 1) to fathers' attribution at Time 2 (Grade 9) separately for boys and girls (see Table 5) would improve the fit of the model. After this specification, the model fit the data well: $\chi^2(9) = 12.27$, $p = .20$; RMSEA = .06; $\chi^2_{diff}(1) = 6.19$, $p < 0.05$. The results showed that fathers' causal attribution to effort in failure situations at Time 1 (Grade 1) predicted the corresponding attribution at Time 2 (Grade 9). Children's high level of reading performance at Time 1 (Grade 1) positively predicted fathers' effort attribution at Time 2 (Grade 9) regarding girls but not regarding boys.

Changes in the Mean Level of Fathers' Causal Attributions

Finally, mean-level changes and possible gender differences in these changes were tested separately for each causal attribution variable. The results showed that, on average, fathers' task difficulty attribution in failure situations increased from Time 1 (Grade 1) to Time 2 (Grade 9) (*estimate* = 0.66, *SE* = 0.21, $p < .05$), but their teaching attribution (*estimate* = –0.40, *SE* = 0.18, $p < .05$) decreased across the same period. No mean-level changes were found in fathers' causal attributions for their child's success. Moreover, no gender differences were found regarding paternal attributions or changes in the attributions.

Discussion

Although a lot of research has been conducted on parents' causal attributions for their children's academic performance, the interindividual stability and mean-level changes in causal attributions over longer periods have rarely been examined. The results of the present study showed that parental causal attributions evidence moderate interindividual stability from first to ninth grades, which supports the notion that parents' attributional styles may play an important role in this interindividual stability.

The first aim of the present study was to investigate whether mothers' and fathers' causal attributions for their children's successes and failures in school show interindividual stability from first through ninth grades, after controlling for the children's skill level both in first and ninth grades. The results for both mothers and fathers showed that, when their child was in ninth grade, parents attributing the cause for their child's success to ability and task difficulty, and the cause for their child's failure to teaching, ability, and task difficulty, were predicted by corresponding causal attributions when their child was in first grade. In addition, when the children were in ninth grade, mothers attributing the cause for their child's success to teaching and effort, and fathers attributing the cause of failure to effort, were predicted by corresponding attributions when their child was in first grade. The only causal attribution that did not show interindividual stability among mothers during the 9-year period was effort in failure situations. Among fathers, attributing success to either teaching or effort was not stable across the 9-year period.

There are several possible explanations for the moderate interindividual stability of these causal attributions over 9 years. Firstly, it has been suggested that parents' causal attributions for their children's social behavior and misconduct reflect the attributional styles typical for them (Bugental & Happaney, 2002). The results of the present study suggest that parent's causal attributions for their children's academic performance also reflect a stable attributional style. Secondly, based on the findings in earlier longitudinal studies, S. Miller (1995) suggested that once parents have formed a general conception of their child's competence, they use this to guide their future reasoning about how the child performs in particular contexts. The results of the present study suggest that parents' causal attributions for their children's competence at certain points in time do indeed provide a basis for the kinds of causal attributions they construct later for their offspring's academic performance. Thirdly, it has been argued that, in cases where the situation itself does not provide an explanation for the event (such as completing the questionnaire in this particular study), the subjects typically rely on a means of explaining the event that they are accustomed to (Peterson & Steen, 2009). Fourthly, according to the concept of memory-dependent attributions, in the absence of exact information, parents will rely on their own past experience of their child's academic performance, as encoded in their previous attributional patterns (Bugental, Johnston, New, & Silvester, 1998). Fifthly, the stability may be explained by the extent to which parents use attributional bias in the context of their children's academic outcomes. Stability of such a tendency is likely to be also reflected in a stability of interpersonal differences in causal attributions that parents give for their children's academic outcomes. Finally, one finding of particular interest was that the beta coefficients between causal attributions in Grade 1 and Grade 9 (after controlling for academic performance and GPA) did not differ substantially from the product–moment correlations between the same variables. This result suggests that, although academic performance was associated with parental causal attributions, controlling for them in the analyses did not substantially decrease the predictive power of earlier parental causal attributions. Overall, the results of this study support the notion that parental attributional styles are important factors behind the stability of parental causal attributions. This is an important finding because it suggests that the stability of parents' causal attributions, and their attributional styles, are important for child development because they form a lasting developmental environment for the child.

There are also alternative explanations for the interindividual stabilities that were found between parents' causal attributions for their children in Grade 1 and Grade 9. For example, Finland's relatively egalitarian culture might provide a solid basis for the stability of parents' causal attributions because it creates a safe, steady environment for both the parents and children. For instance, up until the end of Grade 9, academic competitiveness in the Finnish educational system is relatively nonexistent when compared to educational systems in many other nations. Such an easygoing atmosphere of low competitiveness may decrease the pressure on parents to change their causal attributions for their child's academic performance. Another cultural aspect that may explain the moderate interindividual stability in parents' causal attributions might stem from certain child-rearing goals and practices inherent in Finland. Finnish parents typically aim to raise their children to be trustworthy and hardworking and to believe in their own abilities, with less emphasis placed on being obedient or becoming particularly influential, successful, respected, or smart (Tulviste & Ahtonen, 2007; see also Laukkanen, Ojansuu, Tolvanen, Alatupa, & Aunola, 2014). Because these kinds of child-rearing practices are bound up in the culture, it can be assumed that they persist and change slowly over the years and are thus reflected in the results for stability in this study.

Also an unexpected result was that mothers' causal attributions were more stable in situations of success than fathers', whereas in situations of failure the inverse was true. These results suggest that mothers are more likely to form stable evaluations of their children on the basis of successful results in academic settings, whereas fathers will be more likely to base their later evaluations on their child's past failures. The gender differences were most evident in causal attributions regarding teaching in success situations and attributions regarding effort both in success and failure situations. One possible explanation for the finding is that fathers are typically less involved than mothers in their child's school performance and may be informed only when the child performs poorly. Hence, fathers' may not have experiences of child's successes and therefore have not been able to form a stable way of attributing it. Another possible explanation is that, because being more involved in child's school going, mothers may have more empathy toward teachers than fathers do, and therefore mothers are more likely to credit the teacher for the child's success than are the fathers. Overall, it appears that parental causal attributions reflect the parents' own experiences with the child and his/her school environment.

The second aim of this study was to investigate whether the interindividual stability of parents' causal attributions for their child's first-grade and ninth-grade academic successes and failures varied depending on the child's gender. Overall, the gender differences were minor: They were evident in regard to only two of 16 of the parents' causal attributions. These results would seem to indicate, firstly, that the association between mothers' causal attribution to teaching for their children's successes in both Grades 1 and 9 was stronger for boys than for girls. Secondly, the fathers' causal attribution of task difficulty for their children's successes was stable only with regard to boys. These findings may reflect some gender stereotypes evident in Finnish academic settings: Girls are typically perceived as more hardworking and independent, whereas boys are assumed to need more help and guidance. This may reflect also the fact that Finnish girls usually fare better academically at many levels and at many school subjects than do boys (Finnish National Board of Education, 2004; Kupari et al., 2013).

Overall, the gender differences were minor, though, suggesting that the possible stereotypes affecting parental attributions are somewhat weaker in Finnish culture than in the United States, for example (e.g., see Eccles et al., 1990).

The third aim of this study was to investigate to what extent parental causal attributions for their children's academic performance change at the mean level from Grade 1 through Grade 9. The results showed that, overall, parents typically use self-serving attributions (Chan & Wong, 2013; D. T. Miller & Ross, 1975) when it comes to explaining their children's academic outcomes. In other words, parents attributed success most typically to ability, whereas failure was seen to be due either to a lack of effort or to situational factors. Furthermore, the results for both mothers and fathers showed that, in failure situations, teaching-related attributions decreased and task difficulty attributions increased on average across this period. And, among mothers, the causal attributions of teaching decreased and those of task difficulty increased on average in successful contexts, too.

According to previous theories (Dix et al., 1986, 1989; Gretarsson & Gelfand, 1988), as their children age, parents attribute their children's academic performance increasingly to internal, stable, and controllable causes such as ability and effort and decreasingly to external causes such as teaching and task difficulty. The results of this study are partly in line with this conclusion, showing that parents attribute their offspring's performance less to teaching as their children age. This may reflect the increasing responsibility that parent's give to their children as the children age. On the other hand, our results also showed that parents attribute their offspring's performance, whether it meets with success or failure, increasingly to task difficulty as the children age, which does not tally with previous theories. The finding of this study is, however, in accordance with the findings in the study by Rytkönen et al. (2005) in that it shows that from Grade 1 through Grade 2 the parents' causal attributions to task difficulty in failure situations increased (Rytkönen et al., 2005). One possible explanation for our findings and those of Rytkönen et al. is that, as the child moves from one grade to another, the tasks provided in school become more difficult, and thus it seems natural that they would increasingly attribute the child's failure to task difficulty. It looks as though the results of our study realistically reflect the objective changes in education: In elementary school classrooms, the teacher plays a major role, whereas, academic demands have substantially increased by ninth grade.

Although the mean-level changes in parental causal attributions were found to be similar with regard to both girls and boys, some gender differences emerged in the overall levels of maternal attributions. The results of the present study show that mothers attributed a daughter's success more to ability and a son's to task easiness. Furthermore, mothers attributed a daughter's failure more to lack of good teaching but in the son's case to lack of effort. The results of this study are different from those of some previous studies conducted in the United States, which show that mothers typically attribute their daughters' success to effort and their sons' success to ability (Dunton et al., 1988; Eccles et al., 1990; Holloway & Hess, 1985; Parsons et al., 1982; Yee & Eccles, 1988). One possible explanation for the difference in the findings between the present study and previous research is that earlier studies have focused mostly on success in mathematics, whereas the present study focused on more general school performance (both reading and mathematics). It has been shown that Finnish parents already perceive their sons' mathematical competence to be greater than their daughters' at preschool, whereas their daughters are seen to have more proficiency in the mother tongue (Räty, 2003). However, once the children have entered upper primary school, the gender stereotype no longer generally applies (Räty & Kärkkäinen, 2010). This development may be due to girls increasingly achieving better in school. For example, the Program for International Student Assessment (PISA) survey in 2012 showed that, in Finland, there was no statistically significant difference between girls' and boys' performance in mathematics, whereas girls were faring significantly better in reading and science than were boys (Kupari et al., 2013).

Limitations

At least four limitations should be considered in any attempt to generalize the findings of the present study. Firstly, this study has focused on four types of causal attribution: teaching, effort, ability, and task difficulty. It has examined these separately and only with regard to situations of academic success and failure. Previously, it has been found that mothers spontaneously make other kinds of causal attributions, as well (Jaworski & Hubert, 1994). Therefore, some of the findings of the present study should perhaps be replicated but use open-ended procedures. Secondly, parental causal attributions have often been investigated by using domain-specific procedures, whereas, in our study, the first-grade questionnaire concerned the parents' causal attributions about their children's general school performance. This particular limitation may have led to overestimation of the stability in the parent's causal attributions. Thirdly, stability was examined between only two fairly distant time points—that is first and ninth grades—instead of more frequently throughout the 9-year period. Consequently, there is an evident need to examine more closely the dynamics in the stability of parental causal attribution through more frequent measurement over the elementary- and secondary-school years. Fourthly, the present study was conducted in only one country: Finland. Consequently, some of these results, especially those concerning gender differences, could differ somewhat if the same study were to be conducted in a different sociocultural context.

Conclusions

Overall, the results of the present study revealed high interindividual stability over a 9-year period in both mothers' and fathers' causal attributions for their children's academic performance. In addition, the mean-level changes in parents' causal attributions were similar among mothers and fathers. One possible explanation for the interindividual stability in parental causal attributions over 9 years is that parents do not only have a stable attributional style that they employ when evaluating their own child's social behavior (Bugental & Happaney, 2002) but also form similar attributional styles when it comes to their child's academic performance.

References

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology 87*(1), 49–74. doi:10.1037/0021-843X.87.1.49

Ames, C., & Archer, J. (1987). Mothers' beliefs about the role of ability and effort in school learning. *Journal of Educational Psychology, 79*(4), 409–414. doi:10.1037/0022-0663.79.4.409

Aunola, K., Leskinen, E., Lerkkanen, M. K., & Nurmi, J. E. (2004). Developmental dynamics of math performance from preschool to Grade 2. *Journal of Educational Psychology, 96*(4), 699–713. doi:10.1037/0022-0663.96.4.699

Aunola, K., & Nurmi, J. E. (2002). [Comparison of test scores of children's reading performance, and teachers' evaluation of it.] Unpublished data, University of Jyväskylä, Jyväskylä, Finland.

Bagozzi, R., & Yi, Y. (2012). Specification, evaluation, and interpretation of structural equation models. *Journal of the Academy of Marketing Science, 40*(1), 8–34. doi:10.1007/s11747-011-0278-x

Bird, J. E., & Berman, L. S. (1985). Differing perceptions of mothers, fathers, and children concerning children's academic performance. *Journal of Psychology:*

Interdisciplinary and Applied, 119(2), 113–124. doi:10.1080/00223980.1985.10542877

Bugental, D., & Happaney, K. (2002). Parental attributions. In M. H. Bornstein (Ed.), *Handbook of parenting: Vol. 3. Being and becoming a parent* (2nd ed., pp. 509–535). Hillsdale, NJ: Erlbaum.

Bugental, D. B., Johnston, C., New, M., & Silvester, J. (1998). Measuring parental attributions: Conceptual and methodological issues. *Journal of Family Psychology, 12*(4), 459–480. doi:10.1037/0893-3200.12.4.459

Cashmore, J. A., & Goodnow, J. J. (1986). Parent-child agreement on attributional beliefs. *International Journal of Behavioral Development, 9*(2), 191–204. doi:10.1177/016502548600900204

Chan, S. M., & Wong, A. (2013). Shyness in late childhood: Relations with attributional styles and self-esteem. *Child: Care, Health and Development, 39*(2), 213–219. doi:10.1111/j.1365-2214.2011.01351.x

Cote, L. R., & Azar, S. T. (1997). Child age, parent and child gender, and domain differences in parents' attributions and responses to children's outcomes. *Sex Roles*, *36*(1–2), 23–50. doi:10.1007/BF02766237

Dix, T., & Grusec, J. (1985). Parent attribution processes in the socialization of children. In I. E. Sigel (Ed.), *Parental belief systems: The psychological consequences for children* (pp. 201–233). Hillsdale, NJ: Erlbaum.

Dix, T., Ruble, D. N., Grusec, J. E., & Nixon, S. (1986). Social cognition in parents: Inferential and affective reactions to children of three age levels. *Child Development, 57*(4), 879–894. doi:10.2307/1130365

Dix, T., Ruble, D. N., & Zambarano, R. J. (1989). Mothers' implicit theories of discipline: Child effects, parent effects, and the attribution process. *Child Development, 60*(6), 1373–1391. doi:10.2307/1130928

Dunton, K. J., McDevitt, T. M., & Hess, R. D. (1988). Origins of mothers' attributions about their daughters' and sons' performance in mathematics in sixth grade. *Merrill-Palmer Quarterly, 34*(1), 47–70.

Eccles, J. S., Jacobs, J. E., & Harold, R. D. (1990). Gender role stereotypes, expectancy effects, and parents' socialization of gender differences. *Journal of Social Issues, 46*(2), 183–201. doi:10.1111/j.1540-4560.1990.tb01929.x

Finnish National Board of Education. (2004). *Koulu-sukupuoli-oppimistulokset* [School-sex-learning result]. Helsinki: Finnish National Board of Education.

Frome, P. M., & Eccles, J. S. (1998). Parents' influence on children's achievement-related perceptions. *Journal of Personality and Social Psychology, 74*(2), 435–452. doi:10.1037/0022-3514.74.2.435

Georgiou, S. N. (1999). Parental attributions as predictors of involvement and influences on child achievement. *British Journal of Educational Psychology, 69*(3), 409–429. doi:10.1348/000709999157806

Gretarsson, S. J., & Gelfand, D. M. (1988). Mothers' attributions regarding their children's social behavior and personality characteristics. *Developmental Psychology, 24*(2), 264–269. doi:10.1037/0012-1649.24.2.264

Holloway, S. D. (1986). The relationship of mothers' beliefs to children's mathematics achievement: Some effects of sex differences. *Merrill-Palmer Quarterly, 32*(3), 231–250.

Holloway, S. D., & Hess, R. D. (1985). Mothers' and teachers' attributions about children's mathematics performance. In E. S. Irving (Ed.), *Parental belief systems: The psychological consequences for children* (pp. 177–199). Hillsdale, NJ: Erlbaum.

Holopainen, L., & Savolainen, H. (2005). *The validity of self-reported grade point average.* Unpublished manuscript.

Ikäheimo, H. (1996). *Matematiikan keskeisten käsitteiden diagnoosi* [Diagnostic Test for Basic Mathematical Concepts]. Helsinki: Oy OPPERI Ab.

Jaworski, T. M., & Hubert, N. C. (1994). Mother's attributions for their children's cognitive abilities. *Infant Behavior & Development, 17*(3), 265–275. doi:10.1016/0163-6383(94)90005-1

Kamins, M., & Dweck, C. (1999). Person versus process praise and criticism: Implications for contingent self-worth and coping. *Developmental Psychology, 35*(3), 835–847. doi:10.1037/0012-1649.35.3.835

Khodayarifard, M., Brinthaupt, T. M., & Anshel, M. H. (2010). Relationships of parents' and child's general attributional styles to academic performance. *Social Psychology of Education, 13*(3), 351–365. doi:10.1007/s11218-010-9114-2

Kupari, P., Välijärvi, J., Andersson, L., Arffman, I., Nissinen, K., Puhakka, E., & Vettenranta, J. (2013). *PISA12—Ensituloksia* [PISA12: First results] (Publication 20). Turku, Finland: Ministry of Education and Culture.

Laukkanen, J., Ojansuu, U., Tolvanen, A., Alatupa, S., & Aunola, K. (2014). Child's difficult temperament and mothers' parenting styles. *Journal of Child and Family Studies, 23*(2), 312–323. doi:10.1007/s10826-013-9747-9

Lindeman, J. (1998). *ALLU—Ala asteen Lukutesti* [Reading Test for Primary School]. Turku, Finland: Oppmistutkimuksen keskus [Center for Learning Research], University of Turku.

Miller, D. T., & Ross, M. (1975). Self-serving biases in the attribution of causality: Fact or fiction. *Psychological Bulletin, 82*(2), 213–225. doi:10.1037/h0076486

Miller, S. (1995). Parents' attributions for their children's behavior. *Child Development, 66*(6), 1557–1584. doi:10.1111/j.1467-8624.1995.tb00952.x

Mueller, C., & Dweck, C. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology, 75*(1), 33–52. doi:10.1037/0022-3514.75.1.33

Murphey, D. (1992). Constructing the child: Relations between parents' beliefs and child outcomes. *Developmental Review, 12*(2), 199–232. doi:10.1016/0273-2297(92)90009-Q

Muthén, L. K., & Muthén, B. O. (2011). *M*plus *statistical modeling software* (Version 6.12). Los Angeles: Muthén & Muthén.

Natale, K., Aunola, K., & Nurmi, J. E. (2009). Children's school performance and their parents' causal attributions to ability and effort: A longitudinal study. *Journal of Applied Developmental Psychology, 30*(1), 14–22. doi:10.1016/j.appdev.2008.10.002

Normaalikoulu. (1985). *Beginner's reading test: Jyväskylä University teacher training school (primary level).* Unpublished test material. Jyväskylä, Finland: University of Jyväskylä.

Nurmi, J., & Aunola, K. (1999–2009). *Jyväskylä entrance into primary school study (JEPS).* Jyväskylä, Finland: University of Jyväskylä.

Official Statistics of Finland (OSF). (2010a). Appendix Table 2: Comprehensive school drop-outs in academic years 1999/2000–2010/2011. In *Discontinuation of education* [E-publication]. Helsinki: Statistics Finland. Retrieved January 25, 2013, from http://www.stat.fi/til/kkesk/2010/kkesk_2010_2012-03-20_tau_002_en.html

Official Statistics of Finland (OSF). (2010b). Appendix Table 1: Population aged 15 or over by level of education and gender 2010. In *Educational structure of population* [E-publication]. Helsinki: Statistics Finland. Retrieved June 18, 2013, from http://www.stat.fi/til/vkour/2010/vkour_2010_2011-12-02_tau_001_en.html

Parsons, J. E. (1980). *Instrumentation: Final report.* Ann Arbor: University of Michigan.

Parsons, J. E., Adler, T. F., & Kaczala, C. M. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development, 53*(2), 310–321. doi:10.2307/1128973

Peterson, C., & Steen, T. A. (2009). Optimistic explanatory style. In S. J. Lopez & C. R. Snyder (Eds.), *Oxford handbook of positive psychology* (2nd ed., pp. 313–321). New York, Oxford University Press.

Phillipson, S. (2006). Cultural variability in parent and child achievement attributions: A study from Hong Kong. *Educational Psychology, 26*(5), 625–642. doi:10.1080/01443410500390772

Räty, H. (2003). At the threshold of school: Parental assessments of the competencies of their preschool-aged children. *Journal of Applied Social Psychology, 33*(9), 1862–1877. doi:10.1111/j.1559-1816.2003.tb02084.x

Räty, H., & Kärkkäinen, R. (2010). Are parents' academic gender stereotypes and changes in them related to their perceptions of their child's mathematical competence? *Educational Studies, 37*(3), 371–374. doi:10.1080/03055698.2010.506344

Räty, H., & Kärkkäinen, R. (2011). Talent or effort? Parents' explanations of their children's mathematical performance in relation to mathematical competence. *Social Behavior and Personality, 39*(5), 691–700. doi:10.2224/sbp.2011.39.5.691

Räty, H., Vänskä, J., Kasanen, K., & Kärkkäinen, R. (2002). Parents' explanations of their child's performance in mathematics and reading: A replication and extension of Yee and Eccles. *Sex Roles*, *46*(3–4), 121–128. doi:10.1023/A:1016573627828

Raykov, T., & Marcoulides, G. A. (2006). *A first course in structural equation modeling* (2nd ed.). Mahwah, NJ: Erlbaum.

Rytkönen, K., Aunola, K., & Nurmi, J. (2005). Parents' causal attributions concerning their children's school achievement: A longitudinal study. *Merrill-Palmer Quarterly, 51*(4), 494–522. doi:10.1353/mpq.2005.0027

Rytkönen, K., Aunola, K., & Nurmi, J. (2006). *Parents' causal attributions questionnaire.* Unpublished manuscript.

Rytkönen, K., Aunola, K., & Nurmi, J. (2007). Do parents' causal attributions predict the accuracy and bias in their children's self-concept of math ability? A longitudinal study. *Educational Psychology, 27*(6), 771–788. doi:10.1080/01443410701309316

Satorra, A., & Bentler, P.M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 60*(4), 507–514. doi:10.1007/BF02296192

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online, 8*(2), 23–74.

Tulviste, T., & Ahtonen, M. (2007). Child-rearing values of Estonian and Finnish mothers and fathers. *Journal of Cross-Cultural Psychology, 38*(2), 137–155. doi:10.1177/0022022106297297

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*(4), 548–573. doi:10.1037/0033-295X.92.4.548

Weiner, B. (1986). *An attributional theory of motivation and emotion.* New York: Springer-Verlag.

Yee, D. K., & Eccles, J. S. (1988). Parent perceptions and attributions for children's math achievement. *Sex Roles*, *19*(5–6), 317–333. doi:10.1007/BF00289840