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REVIEW ARTICLE

Associations of Parenting Styles and Dimensions with Academic Achievement in Children and Adolescents: A Meta-analysis

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Abstract Parents and researchers alike are interested in how to promote children's academic competence. The present meta-analysis integrates the results of 308 empirical studies on associations of general parenting dimensions and styles with academic achievement of children and adolescents assessed via grade point average or academic achievement tests. Parental responsiveness (warmth), behavioral control, autonomy granting, and an authoritative parenting style were associated with better academic performance both concurrently and in longitudinal studies, although these associations were small in a statistical sense. Parental harsh control, and psychological control, as well as neglectful, authoritarian, and permissive parenting styles were related to lower achievement with small to very small effect sizes. With three exceptions, parenting dimensions and styles also predicted change in academic achievement over time. Moderating effects of child age, ethnicity, reporter on parenting and academic achievement, quality of the parenting and achievement measure, and publication status were identified. It is concluded that associations of academic achievement with general parenting dimensions/styles tend to be smaller than associations of school-specific parental involvement which have been addressed in previous meta-analyses.

Keywords Academic achievement · Grade point average · Meta-analysis · Parenting

Psychological and educational researchers have long been interested in the effects of parenting on students' academic achievement (e.g., Fan and Chen 2001). Many studies have focused on parental school-related involvement in a narrow sense, such as helping children with homework, attending parent–teacher conferences, and attending children's extracurricular activities. Related meta-analyses have shown positive small to moderate associations between parental

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involvement and academic achievement (r=0.12, Castro et al. 2015; r=0.18, Hill and Tyson 2009; r=0.25, Fan and Chen 2001; r=0.25, Jeynes 2007; r=0.34, Jeynes 2005). In contrast, comprehensive meta-analyses are lacking that relate general parental behaviors and styles to academic achievement. Therefore, the present study integrates available research on associations of general dimensions and parenting styles with academic achievement of children and adolescents.

Dimensional approaches to parenting originally identified two central aspects of (general) parental behaviors, namely responsiveness (being accepting, nurturing, sensitive, supportive, and warm) and demandingness/control (Baumrind 1966; Maccoby and Martin 1983). Later, researchers further distinguished four kinds of demandingness/control (e.g., Janssens et al. 2015). First, *proactive behavioral control* consists of active parental strategies involving the communication of clear and consistent expectations of appropriate behavior and efforts to monitor the child's behavior related to these expectations. Second, *reactive behavioral control* refers to punishment if the child's behavior does not meet parental expectations. It often takes the form of harsh parenting encompassing coercive parenting tactics from frequent use of corporal punishment to escalated physical abuse (e.g., Stutz and Schwarz 2014). A third form of control, *psychological control*, refers to parents controlling the child's behavior by manipulating his or her psychological experiences, such as the use of guilt induction, shaming, and conditional loving to pressure their children (Barber 1996). Whether the amount of parental control is adequate or hinders the development of autonomy is addressed in a fourth form of parental control, parental *overcontrol* versus *autonomy granting*. Overcontrol refers to an excessive amount of involvement in the daily routines and activities of a child, encouraging dependence on the parents (Barber 1996). In contrast, autonomy granting is defined as parental encouragement of the child's individual expression and decision making, such as allowing children to make choices about activities and behavior, and encouraging the development of independence (Silk et al. 2003). While parental responsiveness/warmth and the four forms of control represent dimensions that vary from low to high, the parenting styles approach categorizes parents based on combinations of low versus high scores on parenting dimensions. Maccoby and Martin (1983) defined four parenting styles according to the levels of responsiveness/warmth and (proactive) behavioral control: an authoritative style (high warmth and high control), an authoritarian style (low warmth and high control), a permissive style (high warmth and low control), and a neglectful style (low warmth and low control). As the five parenting dimensions and the four parenting styles have received considerably empirical attention in the research on academic outcomes, the present meta-analysis integrated the available results.

Associations of Parenting Dimensions and Styles with Academic Performance

It has been hypothesized that the relation between general parenting dimensions/styles and academic achievement is mediated by students' achievement motivation (e.g., Marchant et al. 2001; Turner et al. 2009), self-efficacy beliefs (e.g., Turner et al. 2009), and self-regulation (e.g., Lee et al. 2012). Higher *responsiveness* is associated with higher interest in school and learning goal orientation which help students succeed in school (Spera 2006). When focusing on *proactive behavioral control*, parents with high maturity demands expect their children to perform up to their intellectual capacity. In addition, proactive behavioral

control promotes goal-directed behavior (Lee et al. 2012) and reduces externalizing problem behavior, such as truancy, which interferes with academic performance (Li et al. 2000). In contrast, *harsh parental control* may promote the rejection of parental standards of academic performance and reduce academic achievement (Shumov et al. 1998). Similarly, Aunola and Nurmi (2004) suggested that psychological control may be associated with low performance as guilt-inducing parents are emotional and impulsive and may not be capable of providing the cognitively oriented school-related advice and support necessary for high academic performance. In addition, in line with self-determination theory, *autonomy support* as opposed to parental overcontrol promotes self-regulation in academic work which is, again, related to better performance at school (e.g., Wong 2008).

Given the suggested associations of parenting dimensions with academic achievement, the *authoritative parenting style* (high responsiveness plus high demandingness) has been linked with adaptive achievement strategies characterized by low levels of failure expectations, task-irrelevant behavior and passivity (Aunola et al. 2000) coupled with high levels of independent problem solving and critical thinking (Gray and Steinberg 1999; Grolnick and Ryan 1989), which could promote academic achievement. In contrast, adolescents of *neglectful parents* have been found to apply most strongly maladaptive achievement strategies characterized by high levels of task-irrelevant behavior and passivity which, again, inhibits academic achievement (Aunola et al. 2000). Although *authoritarian* and *permissive parents* each show one kind of parental behavior suggested to promote academic achievement (demandingness and responsiveness, respectively), the other component of the parenting model by Maccoby and Martin (1983) is lacking (responsiveness and demandingness, respectively). Children of these parents could, therefore, be expected to perform less well academically than children of authoritative parents although they may show better academic performance than children of neglectful parents.

Research on associations between parenting dimensions/styles with academic achievement has been summarized in narrative reviews. Recently, Masud et al. (2015) reviewed 39 studies on associations of parenting styles with academic outcomes including achievement, motivation, and school behaviors. They concluded that parenting styles were one of the most important factors affecting academic achievement. However, theoretical flaws such as suggesting that authoritative parents use psychological control and the lack of inclusion of a large number of relevant, available studies limit the conclusions that can be drawn from that review. A narrative review by Brown and Iyengar (2008) reported that parental behavioral and psychological control had a direct influence on student achievement. However, they cited only two studies as support for their conclusion. Reviewing studies on general and school-specific parenting, Spera (2005) concluded that parental monitoring (as aspect of proactive behavioral control) was associated with better academic performance.

A meta-analysis by Rosenzweig (2001) found significant correlations of student achievement with authoritative (r=0.20, based on 22 findings), permissive (r=−0.08, based on 16 findings), and uninvolved/neglectful parenting (r=−0.23, based on 10 findings). In addition, parental warmth (r=0.275, based on 6 findings) and autonomy support (r=0.23, based on 12 findings) were related to better academic achievement. Unfortunately, this meta-analysis did not provide separate results for the fourth parenting style (authoritarian parenting). Relevant information remained unreported, such as tests for statistical significance of the weighted mean effect size and for homogeneity of the effect sizes. Another unpublished meta-analysis on correlates of parental autonomy support found a very small association with academic achievement (r=0.08, based on 11 studies; Crowther 2014).

As available narrative reviews and unpublished meta-analyses included only small numbers of studies and provided sparse support for some of their claims, the first goal of the present meta-analysis was to integrate the results from a much larger number of studies in order to get more robust results. Concurrent correlations do not allow for testing whether parenting may have an effect on academic achievement or vice versa, and ignoring child effects will inflate estimates of the parents' contribution to children's socialization. Thus, the second goal of the meta-analysis was to compare associations of parenting with academic outcomes across different research designs: cross-sectional data, longitudinal data relating parenting at first assessment to academic achievement at second assessment, and cross-lagged designs analyzing statistical effects of parenting on change in academic outcomes and of academic performance on change in parenting. As the results of available studies are, in part, inconsistent, the third goal of the meta-analysis was the identification of study characteristics that moderate the size of associations between parenting dimensions/styles and academic performance.

Moderating Effects of Study Characteristics

Age We tested whether associations of parenting dimensions/styles with academic achievement decline in older samples when adolescents strive for autonomy from their parents and peers become more important. Meta-analyses on school-related parenting found stronger associations with academic outcomes in elementary school students (Jeynes 2005) than in students from secondary schools (Jeynes 2007).

Child Gender Results of individual studies are contradictory on whether associations of parenting with academic achievement do (Dumka et al. 2009; Must 2007) or do not vary by child gender (Paulson 1994). The present meta-analysis tested whether there were systematic gender differences across the available studies.

Ethnicity The meaning and effects of parenting may vary according to whether individual parenting behaviors or styles are culturally accepted. For example, there is some evidence that white adolescents are more likely to benefit academically from authoritative parenting than African-American and Asian-American adolescents (Steinberg et al. 1992). Thus, the present meta-analysis tested whether associations of parenting with academic performance varied by the percentage of students from ethnic minorities.

Parental Gender The meta-analysis also tested for moderating effects of parental gender. As mothers are often the primary caregiver, they might be more influential than fathers. However, results of individual studies are inconsistent regarding whether maternal (Dumka et al. 2009) or paternal parenting dimensions/styles (Tam 2009) show stronger associations with academic achievement. We were also interested in whether the size of associations differed between same-sex dyads (e.g., mother–daughter) and cross-sex dyads.

Dependent Variable While some studies assessed students' grade point average (GPA), others used standardized academic achievement tests. Thus, we tested whether the results varied between these two outcomes. No directional hypothesis could be stated.

Reporter of Parenting and Academic Achievement Mothers' and fathers' reports on parenting may be affected by a tendency to give socially desirable answers and to avoid reporting problematic behaviors to a third party (Morsbach and Prinz 2006). Similarly, students may give socially desirable answers when asked about their academic performance (Teye and Peaslee 2015). Thus, the present meta-analysis tested whether associations between parenting and child outcomes were weaker if the information about parenting comes from the fathers and/or mothers and when information about academic performance comes from the students rather than other reporters. In addition, the meta-analysis tested whether stronger associations were found if information on parenting and academic performance comes from the same source due to shared methods variance.

Quality of the Measures Studies of high quality provide support for the validity and reliability of their measures. However, it is less clear whether the quality of the measures would have a systematic effect on the size of associations between parenting and academic achievement. The meta-analyses by Jeynes (2005, 2007) on school-related parental involvement found no moderator effect of study quality. Thus, no directional expectation could be stated.

Publication Status Because non-significant results may be less likely to be published (Lipsey and Wilson 2001), the meta-analysis tested whether the effect sizes were smaller in unpublished than in published studies.

Methods

Sample

Studies were identified through electronic databases [PSYCINFO, ERIC, Google Scholar, and PSYNDEX (an electronic database of psychological literature from German-speaking countries)—search terms: (parenting OR child rearing) and (academic achievement OR academic success OR student performance OR grade point average OR GPA OR achievement test)] and cross-referencing. Criteria for inclusion of studies in the present meta-analysis were as follows:

(a) The studies assessed parental warmth/responsiveness, (prospective) behavioral control, harsh control, psychological control, autonomy granting (versus overprotection), and/or parenting styles defined by Maccoby and Martin (1983),
(b) they assessed academic achievement of the children either via academic achievement tests or grade point average (GPA),
(c) statistical associations between parenting and achievement were reported or could be computed,
(d) mean age of the sample <20 years,
(e) the studies were completed before June, 2015.

In order to include studies from different regions of the world, we did not limit the included studies to those written in English. Unpublished studies identified by the literature search (e.g., dissertations) were also included. We identified 1173 studies. After screening and assessing for eligibility, we were able to include 308 studies in the meta-analysis. A flow chart of the search

for studies is provided in Appendix 1, and the studies included are listed in Appendices 2 and 3 (see supplementary online material).

We entered the number of students, mean age, percentage of girls and percentage of members of ethnic minorities, publication status (1=published, 2=unpublished), rater of parenting (1=child, 2=parent, 3=observer, 4=multi-informant), rater of academic performance (1=child, 2=parent, 3=teacher, 4=researcher, 5=multi-informant), assessment of academic performance (1=GPA, 2=achievement test), quality of the measures of parenting and academic performance (2=support for validity and reliability provided, 1=no such support provided), and the size of association between parenting and academic performance. If associations were provided for several subgroups within the same publication (e.g., for female and male participants), we entered them separately in our analysis instead of entering the global association. If data from more than one rater or outcome were reported, we entered the effect sizes separately. The weights of these effect sizes were adjusted in order to avoid a disproportional impact of this study on the overall effect size (Lipsey and Wilson 2001). Approximately 20 % of the studies were coded by the author and a graduate student. A mean inter-rater reliability of 94 % (range 89–100 %) was established. Differences were resolved by discussion.

Measures

Parental responsiveness (warmth) was most often assessed with the Children's Report of Parent Behavior Inventory (CRPBI; Schaefer 1965; 24 studies), the Parenting Style Questionnaire (Lamborn et al. 1991; 12 studies), and related measures (103 studies). Proactive behavioral control was most often assessed with the Parenting Style Questionnaire (Lamborn et al. 1991; 15 studies), the CRPBI (10 studies), and related instruments (106 studies). Of the 32 studies assessing harsh parental control, most researchers used measures developed specifically for their study (13 studies). Psychological control was assessed with the CRPBI (9 studies), the Psychological Control Scale-Youth Self-Report (Barber 1996; 9 studies), and related instruments (11 studies). Autonomy granting was assessed with the Parenting Style Questionnaire (Lamborn et al. 1991, 5 studies), the Parental Bonding Instrument (Parker et al. 1979; 4 studies), and other measures (33 studies). Parenting styles were most often assessed with the Parental Authority Questionnaire (Buri 1991; 29 studies), the Parenting Style Questionnaire (Lamborn et al. 1991; 22 studies), and related instruments (58 studies). Finally, academic performance was assessed via GPA (241 studies) and academic achievement tests such as the Woodcock-Johnson III Tests of Achievement (Woodcock et al. 2001; 73 studies).

Statistical Integration of the Findings

Calculations for the meta-analysis were performed in four steps, using random-effects models and the method of moments (Lipsey and Wilson 2001).

1. The correlations were transformed using Fisher's *r*-to-*z* transformation. Outliers that were more than two SD from the mean of the effect sizes were recoded to the value at two SD, based on Lipsey and Wilson (2001).
2. Weighted mean *z*-scores and 95 % confidence intervals were computed. The significance of the mean was tested by dividing the weighted mean effect size by the standard error of

the mean. To compare the mean effect sizes with the effect sizes reported in the single studies, the mean effect sizes were later converted to the original metric of product–moment correlations.

3. Homogeneity of effect sizes was tested by use of the Q statistic.
4. In order to test the influence of moderator variables, we used an analogue of an analysis of variance and weighted ordinary least squares regression analyses. A significant Q score indicates heterogeneity of the effect sizes between the compared conditions. Which conditions differ is tested by comparing the 95 % confidence intervals (CI). Differences between two conditions are significant if CI of two effect sizes do not overlap (Lipsey and Wilson 2001). As information on moderator variables (e.g., age, gender) was lacking in part of the studies, moderator effects were analyzed individually rather than including all moderators simultaneously in a common multivariate analysis.

Results

The 308 included studies have been published between 1974 and 2015. They provided data on 362,155 young people with a mean age of 13.19 years (SD=3.51). About 50.6 % of the participants were female (SD=17.9) and 42.6 % (SD=30.9) belonged to an ethnic minority.

As shown in Table 1, studies on concurrent relationships found that better academic achievement was associated with higher levels of parental responsiveness (warmth; r=0.14), behavioral control (r=0.11), autonomy granting (r=0.11), and an authoritative parenting style (r=0.17). According to Cohen's criteria for interpreting effect sizes, all associations must be interpreted as small (Cohen 1992). Parental harsh control (r=−0.16) and psychological control (r=−0.11) as well as authoritarian (r=−0.09), permissive (r=−0.05), and neglectful parenting styles (r=−0.15) were associated with lower academic performance. The size of these relationships was small to very small. The non-overlap of the 95 % CI indicates that the association of neglectful parenting with academic achievement was more negative than the associations of authoritarian and permissive parenting. Longitudinal studies relating parenting at first assessment with achievement at follow-up (mean interval 3.6 years) replicated the concurrent associations of warmth (r=0.17), behavioral control (r=0.11), harsh control (r=−0.13), psychological control (r=−0.23), autonomy granting (r=0.15), and authoritative parenting (r=0.15; Table 1). However, associations of initial authoritarian, permissive, and neglectful parenting with academic achievement at follow-up were not significant in longitudinal studies, possibly due to low statistical test power (only three to seven effect sizes were available for these analyses).

Analyses of cross-lagged effects showed that parental warmth (r=0.10), behavioral control (r=0.04), autonomy granting (r=0.06), and authoritative parenting (r=0.10) predicted increases in academic achievement over time while harsh control (r=−0.11), psychological control (r=−0.14), and a neglectful parenting style (r=−0.09) predicted decreases in achievement. Associations of initial achievement with changes in parenting could only be analyzed for three out of nine aspects of parenting dimensions/styles. Better initial achievement was associated with increases in parental warmth (r=0.11) and behavioral control (r=0.08), thus indicating bidirectional associations (Table 1).

Weighted linear regression analyses were used in order to analyze statistical effects of continuous moderator variables (mean age, percentage of female participants and of

Table 1 Associations of parenting with academic performance

	Parental warmth						Parental behavioral control						Parental harsh control					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
$Parent_1$–$Achiev_1$	217	0.14	0.12	0.15	16.61***	179.39	213	0.11	0.09	0.12	12.18***	195.55	43	−0.16	−0.20	−0.12	−8.10***	40.02
$Parent_1$–$Achiev_2$	61	0.17	0.13	0.20	9.71***	55.84	53	0.11	0.07	0.15	5.69***	39.68	12	−0.13	−0.19	−0.06	−3.86***	13.64
$Parent_1$–$Achiev_{12}$	28	0.10	0.07	0.13	6.68***	21.75	35	0.04	0.00	0.07	2.13*	50.01*	6	−0.11	−0.18	−0.05	−3.34***	4.98
$Achiev_1$–$Parent_{12}$	10	0.11	0.20	0.05	2.36*	3.03	18	0.08	0.03	0.12	3.50***	15.90	0					
	Parental psychological control						Parental autonomy granting						Authoritative parenting style					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
$Parent_1$–$Achiev_1$	76	−0.11	−0.13	−0.10	−16.87***	71.28	62	0.11	0.08	0.14	7.36***	50.00	162	0.17	0.15	0.20	13.35***	162.27
$Parent_1$–$Achiev_2$	14	−0.23	−0.27	−0.19	−9.18***	3.49	17	0.15	0.09	0.22	4.77***	24.28	9	0.15	0.04	0.25	2.61**	1.35
$Parent_1$–$Achiev_{12}$	10	−0.14	−0.23	−0.05	−2.93**	9.20	9	0.06	0.02	0.11	3.05**	7.05	8	0.10	0.08	0.12	10.57***	5.93
$Achiev_1$–$Parent_{12}$	0						5	0.02	−0.10	0.13	0.27	8.12	0					
	Authoritarian parenting style						Permissive parenting style						Neglectful parenting style					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
$Parent_1$–$Achiev_1$	145	−0.09	−0.12	−0.07	−6.68***	148.06	128	−0.05	−0.07	−0.02	−3.72***	125.72	62	−0.15	−0.19	−0.12	−9.92***	64.58
$Parent_1$–$Achiev_2$	7	−0.10	−0.23	0.03	−1.48	1.83	6	0.03	−0.10	0.16	0.45	4.33	3	−0.12	−0.26	0.02	−1.63	1.51
$Parent_1$–$Achiev_{12}$	4	−0.03	−0.07	0.01	−1.30	2.05	4	0.01	−0.03	0.05	0.37	6.00	1	−0.09	−0.13	−0.05	−4.36***	
$Achiev_1$–$Parent_{12}$	0						0						0					

$Parent_1$ parenting at time 1; $Achiev_1$/$Achiev_2$ academic achievement at time 1/time 2; $Achiev_{12}$/$Parent_{12}$ change in achievement/parenting between time 1 and time 2; *k* number of effect sizes included; *r* effect size (weighted mean correlation coefficient), *Z* test for significance of *r*; 95 % *CI* lower and upper limits of 95 % confidence interval; *Q* test for homogeneity of effect sizes

*$p<0.05$, **$p<0.01$, ***$p<0.001$

participants from ethnic minorities). Associations of autonomy granting and authoritarian parenting with academic achievement were weaker in older samples (Table 2).

Adolescent gender did not moderate the association of parenting styles/dimensions with academic achievement. Based on the work by Steinberg et al. (1992), tests for moderating effects of ethnicity were restricted to studies from Western countries where most ethnic minorities endorse collectivistic values to a larger extent than members of the majority. Two moderating effects of ethnicity were found, with associations of autonomy granting and authoritative parenting with academic achievement being weaker (less positive) in samples with more participants from ethnic minorities (Table 2).

Regarding categorical moderator variables, we found stronger associations of psychological control with academic achievement if achievement test scores (r=−0.17) rather than GPA (r=−0.11) was used as academic outcome variable (Table 3). Only one out of nine analyses identified a moderating effect of parental gender: Associations of maternal warmth with academic achievement were stronger (r=0.16) than associations of paternal warmth (r=0.10). In order to test interaction effects between parental gender and child gender, the analysis of parental warmth was repeated in subsamples of girls and boys. There was a significant moderating effect of parental gender on associations of warmth with achievement of girls (Q=5.82, p<0.02), with maternal warmth showing a stronger association (r=0.17, t=4.66, p<0.001) than paternal warmth (r=0.05, t=1.47, n.s.). In contrast, associations of boys'

Table 2 Influences of child age, gender, and ethnicity on associations between parenting and academic achievement

Independent variable	Warmth				Behavioral control				Harsh control			
	k	*B*	*β*	*t*	*k*	*B*	*B*	*t*	*k*	*B*	*β*	*t*
Age	221	−0.004	−0.11	−1.49	211	0.003	0.06	0.80	43	−0.003	−0.09	−0.60
% Female children	250	0.000	0.04	0.50	237	−0.000	−0.06	−0.91	44	0.000	0.01	0.08
% Ethnic minority[a]	119	−0.001	−0.18	−1.95	139	−0.000	−0.08	−0.94	37	0.001	0.17	1.02
Independent variable	Psychological control				Autonomy granting				Authoritative parenting style			
	k	*B*	*β*	*t*	*k*	*B*	*β*	*t*	*k*	*B*	*β*	*t*
Age	70	0.006	0.18	1.34	59	−0.011	−0.28	−2.17*	106	−0.000	−0.00	−0.02
% Female children	84	0.000	0.03	0.24	62	−0.001	−0.14	−1.04	138	−0.001	−0.05	−0.62
% Ethnic minority[a]	33	0.000	0.16	0.83	41	−0.002	−0.52	−3.57***	92	−0.001	−0.26	−2.57**
Independent variable	Authoritarian parenting style				Permissive parenting style				Neglectful parenting style			
	k	*B*	*β*	*t*	*k*	*B*	*β*	*t*	*k*	*B*	*β*	*t*
Age	97	0.017	0.30	3.09**	82	0.003	0.07	0.54	28	−0.001	−0.10	−0.49
% Female children	119	0.001	0.05	0.56	102	0.001	0.08	0.74	40	−0.001	−0.05	−0.30
% Ethnic minority[a]	80	0.001	0.19	1.76	70	0.000	0.13	1.05	37	0.001	0.26	1.61

k number of studies, *B*/*β* non-/standardized regression coefficient, *t* test for significance

*p<0.05, **p<0.01, ***p<0.001

[a] Only studies from western countries were included in that analysis

Table 3 Influences of categorical moderators on the association between parenting and academic achievement

	Warmth						Behavioral control						Harsh control					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
Dependent variable						0.94						3.69						0.00
Achievement test	53	0.16	0.12	0.19	8.92***	56.20	45	0.07	0.02	0.11	3.09**	40.36	12	−0.15	−0.22	−0.08	−4.28***	12.28
GPA	222	0.14	0.12	0.15	16.86***	173.51	217	0.11	0.10	0.13	13.40***	191.11	43	−0.15	−0.19	−0.11	−7.88***	42.24
Target parent						10.39**						0.30						0.04
Mothers	122	0.16	0.14	0.18	13.91***	112.91	89	0.11	0.08	0.14	7.13***	83.99	20	−0.15	−0.20	−0.10	−5.71***	20.79
Fathers	70	0.10	0.07	0.13	6.70***	32.68	44	0.10	0.05	0.14	4.34***	16.43	8	−0.14	−0.23	−0.05	−3.09**	3.59
Mix	86	0.15	0.12	0.17	12.41***	87.48	133	0.11	0.09	0.13	10.54***	134.40	27	−0.15	−0.20	−0.10	−6.21***	30.24
Reporter: parenting						20.04***						29.64***						7.16
Child	204	0.14	0.12	0.16	17.07***	179.81	190	0.12	0.10	0.14	14.09***	171.26	21	−0.09	−0.14	−0.04	−3.56***	15.88
Parent	54	0.11	0.07	0.14	5.98***	31.90	61	0.03	0.00	0.07	1.98*	40.95	27	−0.18	−0.22	−0.14	−8.44***	38.47
Observer	16	0.24	0.19	0.30	9.05***	20.34	8	0.26	0.12	0.39	3.76***	2.39	5	−0.17	−0.25	−0.08	−3.54***	1.45
Multi-informant	4	0.22	0.08	0.36	3.12**	0.89	7	0.23	0.12	0.35	4.08***	0.84	2	−0.16	−0.30	−0.01	−2.12*	0.00
Reporter: academic achievement						4.34						13.30**						3.40
Child	141	0.13	0.11	0.15	13.23***	108.49	136	0.13	0.11	0.15	12.55***	118.31	8	−0.14	−0.22	−0.06	−3.32***	11.82
Parent	10	0.16	0.09	0.22	4.64***	5.47	14	0.02	−0.04	0.09	0.68	12.30	3	−0.24	−0.33	−0.13	−4.41***	2.41
Teacher	65	0.14	0.11	0.17	8.25***	53.55	65	0.09	0.06	0.12	5.63***	55.16	30	−0.13	−0.17	−0.09	−5.98***	27.86
Researcher	51	0.16	0.12	0.19	8.78***	55.43	37	0.08	0.03	0.12	3.41***	36.39	11	−0.15	−0.23	−0.08	−4.25***	12.08
Multi-informant	6	0.21	0.12	0.29	4.51***	6.25	12	0.09	0.00	0.17	2.00*	13.75	2	−0.16	−0.31	−0.01	−2.04*	0.00
Mono-informant bias						1.54						5.14						0.10
No	126	0.14	0.11	0.16	11.34***	114.45	113	0.08	0.06	0.11	6.32***	90.01	43	−0.15	−0.18	−0.11	−7.60***	41.87
In part	4	0.21	0.10	0.31	3.65***	0.19	5	0.13	0.01	0.25	2.20*	6.38	2	−0.16	−0.31	0.00	−1.96*	0.00
Yes	145	0.14	0.12	0.16	14.81***	117.77	146	0.12	0.10	0.14	11.92***	136.35	9	−0.16	−0.23	−0.08	−4.09***	12.03
Quality of parenting measure						10.84***						1.16						0.22
Support for validity/ reliability	189	0.12	0.11	0.14	13.66***	141.85	130	0.12	0.09	0.14	10.54***	117.92	32	−0.14	−0.19	−0.10	−6.36***	31.87
No support	87	0.17	0.15	0.20	14.49***	89.82	134	0.10	0.00	0.12	8.37***	116.36	23	−0.16	−0.21	−0.11	−6.39***	22.73
Quality of achievement measure						0.00						3.60						0.12
Support for validity/ reliability	138	0.14	0.12	0.16	12.82***	143.80	124	0.09	0.06	0.11	7.21***	100.45	44	−0.15	−0.19	−0.11	−8.07***	43.91

Table 3 (continued)

No support	137	0.14	0.12	0.16	13.90***	89.05	140	0.12	0.10	0.14	11.54***	132.30	10	−0.14	−0.21	−0.06	−3.63***	9.96
Publication status						0.94						6.55*						1.36
Unpublished	52	0.13	0.09	0.16	7.91***	34.47	48	0.06	0.03	0.10	3.10**	33.43	10	−0.11	−0.18	−0.04	−3.09**	8.43
Published	226	0.15	0.13	0.16	17.95***	201.49	218	0.12	0.10	0.13	13.51***	200.92	45	−0.16	−0.19	−0.12	−8.68***	46.61
	Psychological control						Autonomy granting						Authoritative parenting style					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
Dependent variable						6.14*						0.01						1.25
Achievement test	21	−0.17	−0.22	−0.13	−7.42***	7.70	17	0.12	0.05	0.19	3.53***	20.87	29	0.14	0.08	0.20	4.76***	28.99
GPA	69	−0.11	−0.13	−0.09	−12.57***	58.71	61	0.12	0.10	0.15	8.22***	52.07	142	0.18	0.15	0.20	12.77***	133.85
Target parent						0.31						1.46						0.80
Mothers	40	−0.10	−0.13	−0.08	−7.26***	33.22	25	0.15	0.10	0.20	5.75***	27.78	23	0.15	0.08	0.22	4.34***	9.99
Fathers	28	−0.12	−0.15	−0.09	−7.95***	13.83	15	0.11	0.04	0.18	3.17**	6.23	23	0.15	0.07	0.22	3.87***	16.88
Mix	22	−0.14	−0.16	−0.11	−9.61***	22.90	38	0.11	0.07	0.15	5.93***	40.47	123	0.18	0.15	0.21	12.01***	133.25
Reporter: parenting						0.71						19.75***						1.04
Child	72	−0.12	−0.14	−0.10	−13.01***	63.07	62	0.11	0.09	0.14	8.01***	55.53	131	0.17	0.14	0.19	11.78***	126.09
Parent	18	−0.14	−0.19	−0.09	−5.30***	6.36	12	0.10	0.03	0.17	2.82**	15.17	29	0.19	0.13	0.25	6.10***	31.55
Observer	0						4	0.39	0.27	0.51	6.33c	0.47	0					
Multi-informant	0						0						9	0.12	−0.02	0.24	1.72	2.01
Reporter: academic achievement						9.94**						6.56						3.79
Child	57	−0.11	−0.12	−0.09	−12.08***	47.49	37	0.13	0.09	0.16	6.95***	31.72	111	0.17	0.14	0.20	11.02***	107.01
Parent	4	−0.14	−0.24	−0.03	−2.43*	0.06	3	0.14	0.02	0.26	2.28*	2.76	7	0.24	0.10	0.39	3.27**	7.62
Teacher	8	−0.15	−0.20	−0.11	−6.73***	14.81*	20	0.09	0.04	0.14	3.26**	18.99	27	0.22	0.14	0.28	5.61***	20.15
Researcher	21	−0.17	−0.22	−0.13	−7.82***	8.122	14	0.16	0.09	0.24	4.11***	18.08	23	0.13	0.07	0.20	3.97***	23.30
Multi-informant	0						1	−0.11	−0.33	0.12	−0.94		3	0.18	0.01	0.33	1.91	0.46
Mono-informant bias						9.45**						0.90						0.64
No	34	−0.16	−0.19	−0.13	−10.79***	26.77	39	0.10	0.06	0.15	4.65***	41.99	52	0.18	0.14	0.23	7.78***	57.89
In part	0						0						1	0.10	−0.21	0.39	0.63	

Table 3 (continued)

Yes	56	−0.11	−0.12	−0.09	−12.44***	47.95	36	0.13	0.09	0.17	6.84***	28.21	113	0.17	0.14	0.20	10. 67***	100.16
Quality of parenting measure	4.05*						0.73						2.29					
Support for validity/ reliability	79	−0.11	−0.13	−0.10	−13.12***	59.82	44	0.11	0.08	0.15	5.58***	34.91	103	0.16	0.12	0.19	9.60***	101.92
No support	11	−0.16	−0.19	−0.13	−7.51***	12.75	35	0.13	0.10	0.17	6.68***	39.21	67	0.19	0.15	0.23	9.59***	59.07
Quality of achievement measure						9. 39**						0.46						1.55
Support for validity/ reliability	32	−0.16	−0.19	−0.13	−10.47***	20.93	46	0.11	0.07	0.15	5.45***	46.78	56	0.15	0.10	0.19	6.56***	56.12
No support	58	−0.11	−0.12	−0.09	−12.23***	51.69	31	0.13	0.09	0.17	6.36***	25.87	113	0.18	0.15	0.21	11.90***	105.78
Publication status						0.00						3.04						2.04
Unpublished	17	−0.12	−0.16	−0.08	−5.61***	20.97	16	0.08	0.03	0.13	3.07**	19.84	36	0.13	0.08	0.19	4.75***	50.43
Published	73	−0.12	−0.14	−0.10	−12.81***	48.76	63	0.14	0.10	0.17	8.38***	53.35	135	0.18	0.15	0.21	12.79***	111.28
	Authoritarian						Permissive						Neglectful					
	k	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*	*k*	*r*	95 % CI		*t*	*Q*
Dependent variable						0.26						0.45						0.00
Achievement test	23	−0.11	−0.18	−0.04	−3.18**	23.24	21	−0.03	−0.09	0.03	−0.92	21.39	12	−0.16	−0.22	−0.09	−4.71***	15.60
GPA	129	−0.09	−0.12	−0.06	−6.09***	126.52	113	−0.05	−0.08	−0.02	−3.72***	109.18	53	−0.15	−0.19	−0.12	−8.88***	50.75
Target parent						5.15						0.12						1.86
Mothers	18	−0.07	−0.14	0.01	−1.63	22.13	17	−0.03	−0.10	0.04	−0.96	10.32	3	−0.07	−0.20	0.06	−1.03	6.30*
Fathers	19	−0.18	−0.25	−0.10	−4.31***	19.66	17	−0.04	−0.12	0.03	−1.13	8.34	1	−0.20	−0.42	0.05	−1.57	
Mix	113	−0.09	−0.12	−0.06	−5.55***	105.47	98	−0.05	−0.07	−0.02	−3.36***	109.51	60	−0.16	−0.19	−0.13	−10.05***	58.87
Reporter: parenting						3.80						4.37						6.38*
Child	118	−0.08	−0.11	−0.06	−5.64***	110.00	105	−0.03	−0.06	−0.01	−2.63**	106.94	61	−0.15	−0.18	−0.12	−9.68***	60.94
Parent	22	−0.16	−0.24	−0.09	−4.22***	30.33	17	−0.12	−0.19	−0.04	−3.04**	14.62	2	−0.33	−0.45	−0.17	−4.11***	3.49
Observer						0						0						0
Multi-informant	10	−0.06	−0.18	0.07	−0.86	7.25	10	−0.08	−0.19	0.03	−1.38	5.67	1	−0.31	−0.52	−0.05	−2.30*	
Reporter: academic achievement						4.46						4.64						7.43

Table 3 (continued)

Child	99	−0.08	−0.11	−0.05	−4.99***	90.39	88	−0.04	−0.07	−0.01	−2.73**	82.65	46	−0.16	−0.19	−0.12	−8.81***	40.93
Parent	7	−0.22	−0.35	−0.07	−2.82**	6.34	7	−0.09	−0.22	0.04	−1.41	1.07	2	−0.33	−0.45	−0.17	−4.16***	3.58*
Teacher	20	−0.11	−0.19	−0.04	−2.85**	29.61	18	−0.11	−0.18	−0.03	−2.87**	23.41	5	−0.11	−0.21	−0.01	−2.20*	6.67
Researcher	19	−0.12	−0.20	−0.05	−3.28**	14.48	17	−0.01	−0.08	0.05	−0.32	19.56	10	−0.13	−0.20	−0.07	−3.89***	13.94
Multi-informant	3	−0.15	−0.33	0.04	−1.57	5.30	1	0.01	−0.27	0.28	0.04		1	−0.31	−0.52	−0.05	−2.32*	
Mono-informant bias						1.10						2.00						1.37
No	44	−0.11	−0.16	−0.06	−4.35***	57.08	38	−0.07	−0.12	−0.02	−2.83**	55.40	15	−0.13	−0.18	−0.07	−4.27***	19.13
In part	2	−0.16	−0.35	0.05	−1.50	0.85	2	−0.11	−0.27	0.07	−1.21	0.73	0					
Yes	102	−0.09	−0.12	−0.05	−5.33***	87.97	91	−0.03	−0.06	−0.01	−2.31*	69.33	49	−0.17	−0.20	−0.13	−9.31***	47.05
Quality of parenting measure						0.07						3.59						0.22
Support for validity/ reliability	67	−0.09	−0.13	−0.05	−4.37***	55.54	57	−0.02	−0.05	0.02	−1.04	55.21	40	−0.15	−0.19	−0.11	−7.63***	41.09
No support	84	−0.10	−0.13	−0.06	−5.25***	93.44	76	−0.06	−0.10	−0.03	−4.04***	74.70	24	−0.16	−0.21	−0.11	−6.50***	24.41
Quality of achievement measure						2.87						0.17						1.39
Support for validity/ reliability	102	−0.08	−0.11	−0.05	−4.82***	98.34	89	−0.04	−0.07	−0.01	−2.88**	80.43	48	−0.16	−0.20	−0.13	−9.37***	47.43
No support	49	−0.13	−0.18	−0.08	−5.14***	50.10	44	−0.05	−0.10	−0.01	−2.32*	48.01	17	−0.12	−0.18	−0.07	−4.29***	19.62
Publication status						4.63*						3.88*						5.94*
Unpublished	32	−0.03	−0.09	0.03	−1.08	35.77	31	−0.09	−0.14	−0.04	−3.49***	26.56	12	−0.08	−0.14	−0.01	−2.16*	20.67*
Published	120	−0.11	−0.14	−0.08	−7.16***	112.75	103	−0.03	−0.06	−0.01	−2.52*	104.94	53	−0.17	−0.20	−0.14	−10.66***	46.01

k number of effect sizes included; *r* effect size (weighted mean correlation coefficient), *Z* test for significance of *r*; 95 % *CI* lower and upper limits of 95 % confidence interval; *Q* test for homogeneity of effect sizes

*$p<0.05$, **$p<0.01$, ***$p<0.001$

academic achievement with maternal warmth (r=0.09, t=2.69, p<0.01) and paternal warmth (r=0.06, t=1.53, n.s.) did not differ significantly (Q=0.42, n.s.).

Academic achievement showed stronger associations with behavioral control (r=0.12 vs. r=0.03) if child reports rather than parental reports on parenting were used. In addition, associations of warmth and autonomy support with achievement were stronger if observer ratings (r=0.24 and r=0.39) rather than child or parent ratings on parenting (r=0.11/0.14 and r=0.10/0.11) were used. As indicated by the Q statistics, there was also a significant moderator effect of the reporter on the association between neglectful parenting and achievement. However, the 95 % CIs of the subgroups overlapped, which precluded a clear interpretation of between-group differences. Two significant moderator effects were observed for sources of information about academic achievement: Associations with behavioral control were stronger if children (r=0.13) rather than parents (r=0.02) provided information on GPA. In addition, associations with psychological control were stronger if information from researchers (on results of achievement tests, r=−0.17) were used rather than child reports on their grades (r=−0.11). There was no empirical support for the suggestion that shared methods variance leads to stronger effect sizes if information on parenting and achievement come from the same rater. Associations of psychological control and academic achievement were even weaker if the information was collected from the same respondent (r=−0.11 vs. r=−0.16).

Two associations varied by the quality of the assessment of parenting dimensions/styles. Studies that provided support for the validity and reliability of the parenting measures found weaker associations of parental warmth (r=0.12 vs. r=0.17) with academic achievement. In contrast, associations of psychological control with academic achievement were stronger if the study provided support for the validity of the measure of academic achievement, such as using validated achievement tests (r=−0.16 vs. r=−0.11).

Finally, there were moderating effects of publication status. Associations of behavioral control (r=0.12 vs. r=0.06) and neglectful parenting (r=−0.17 vs. r=−0.08) were stronger in published than in unpublished studies.

Discussion

The present meta-analysis found significant concurrent, longitudinal, and cross-lagged associations of parental warmth, behavioral control, harsh control, psychological control, autonomy support, and authoritative parenting with academic achievement, although the associations were weak or very weak in a statistical sense. Statistically significant associations of authoritarian, permissive, and neglectful parenting with academic achievement were only identified in cross-sectional studies. In addition, some moderating effects of child age, ethnicity, kind of academic outcome, reporter on parenting and academic achievement, quality of the parenting and achievement measure, and publication status were detected.

While meta-analyses on associations of school-specific parental involvement and academic achievement found associations of about r=0.2 (Castro et al. 2015; Hill and Tyson 2009; Fan and Chen 2001; Jeynes 2005, 2007) with correlations up to r=0.40 for selected aspects (parental aspiration/expectations of children's education achievement, Fan and Chen 2001), the present meta-analysis indicates that associations of general parenting dimensions and styles with academic achievement tend to be smaller. Thus, specific parental behaviors aimed at directly promoting academic achievement (such as communication with the child about school issues) can be expected to produce larger effects than general parental behaviors or parenting

styles that will have rather indirect effects on academic achievement mediated by achievement motivation (Marchant et al. 2001), self-regulation (Lee et al. 2012), or other variables.

Although few correlates of academic achievement exceed r=0.20 (e.g., academic self-efficacy, r=0.31; effort regulation, r=0.32; test anxiety, r=−0.24; Richardson et al. 2012), the present results do not support the claim by Masud et al. (2015) that parenting styles are one of *the most important* factors affecting academic achievement. In addition, analyses of cross-lagged effects indicated that correlations between parenting dimensions and achievement are not only based on the effects of parental behaviors on achievement but also reflect, in part, effects of achievement on parenting dimensions. For example, success in school may promote positive emotions of the parents toward their child. Unfortunately, studies are lacking that relate initial academic achievement with changes in parenting styles. Some cross-lagged effects were very small in a statistical sense (Cohen 1992). Because academic achievement at pretest already explains a large amount of variance in achievement at posttest (e.g., Aunola and Nurmi 2004), less variance remains to be explained by parenting than when predicting absolute levels of initial achievement. In addition, the combination of parenting behaviors and styles of mothers and fathers could be expected to explain more variance than the present focus on single aspects of behavior of the individual parent.

When comparing correlates of academic achievement across different parenting dimensions/styles, we found the strongest association with psychological control (in longitudinal studies) and the weakest association with the permissive parenting style. Because psychologically controlling parents increase a child's focus on internal distress and adult approval rather than on the learning process itself, psychological control may undermine learning and academic success (Aunola and Nurmi 2004). As permissive parents have a warm relationship with their children despite low levels of parental control (Maccoby and Martin 1983), their warmth may partially compensate for negative effects of lack of control.

Moderator analyses found some evidence of weaker associations of parenting dimensions/styles with academic achievement in older samples. This result indicates that parental influences decline when older adolescents spend less time with their parents, for example when leaving their parental home in order to study at university. Nonetheless, associations of most assessed parenting styles/dimensions with academic achievement did not vary by the age of the offspring.

We observed weaker associations of autonomy granting and authoritative parenting with academic achievement in samples with more participants from ethnic minorities. In Western countries, there is some evidence that adolescents from ethnic minorities expect to achieve autonomy later than their peers from the ethnic majority (e.g., Fuligni 1998), which could, again, reduce the importance of parental autonomy granting for adolescent development. Steinberg et al. (1992) found that African American and Hispanic students were less likely than White students to believe that not doing well in school would have negative consequences for their future. The authors speculated that this belief might have reduced the effect of authoritative parenting on their academic achievement. Unfortunately, we did not have enough data for separate analyses in different ethnic minorities.

The observed stronger associations of psychological control with achievement test scores rather than GPA may indicate that achievement test scores are more valid than students' reports on their grades, which could lead to more meaningful associations with parenting.

There was only weak support for the suggestion that maternal parenting dimensions/styles show stronger associations with student achievement than paternal dimensions/styles. Separate data on fathers were only available in a smaller subsample of studies, which reduced the

chance of finding significant moderating effects of parental gender. Regarding interaction effects of child and parental gender, we found that maternal warmth showed stronger associations with girls' achievement than paternal warmth while no such effect was observed for boys. Mothers tend to be the primary caregivers in most families, but parents spend relatively more time with a same-sex child and are more involved in a same-sex child's life (Maccoby 2003). These factors may lead to stronger associations of maternal warmth than paternal behavior with daughters' outcomes in particular. As too few studies were available to analyze interaction effects of parental and child gender on other parenting dimensions/styles, it could not be tested whether similar results would be found for parental control and other parenting variables.

The present meta-analysis identified some rater effects. Stronger effect sizes of child reports on behavioral control rather than parental reports may indicate that parental behaviors have to be perceived by the child in order to affect child outcomes. In addition, some mothers and fathers give socially desirable answers on their parenting (Morsbach and Prinz 2006), which masks the real effects of parental behaviors on child outcomes. The observed stronger associations of psychological control with researcher reports on academic achievement rather than child reports probably indicate that child reports on their grades tended to be less valid than achievement tests applied by researchers. Nonetheless, such a difference appeared in only one analysis, thus indicating a rather low effect of biased self-reports on GPA.

There was no evidence of bias due to shared methods variance that may emerge when information on parenting dimensions/styles and academic grades come from the same source. Such a bias may be more likely to appear when analyzing associations between different subjective evaluations rather than when relating evaluations of parenting to GPA.

Results on moderating effects of the methodological quality of the measures were inconsistent, thus indicating that studies with parenting measures of lower quality may underestimate as well as overestimate associations with academic achievement. For example, results may differ when researchers combine items from related well-established measures rather than constructing new items that do not fit well to the assessed construct.

Finally, there was some evidence of a publication bias as two associations were stronger in published than in unpublished studies. Nonetheless, the associations of parenting behaviors/styles were still statistically significant in the unpublished studies.

Limitations and Conclusions

Some limitations of the present meta-analysis have to be mentioned. First, despite the large number of included studies, only limited numbers of studies were available on cross-lagged associations, and on cross-lagged effects of parenting styles in particular. Second, although longitudinal and cross-lagged analyses offer some insight into the direction of effects, they do not allow for analysis of causal relations. Third, the selection of the assessed parenting dimensions and styles was mainly based on the work of Baumrind (1966) and successors (Maccoby and Martin 1983). Some parenting scales assess additional dimensions such as verbosity (Arnold et al. 1993) that were not included in the present meta-analysis. In addition, some included parenting dimensions could be further divided into subdimensions (e.g., behavioral control in different forms of monitoring, consistency of rules, etc.). Fourth, although we addressed general rather than school-specific parenting styles/dimensions, these measures sometimes include an item that refers to school. As many studies did not provide the

complete list of items used, we were not able to test whether pure non-academic and other general measures of parenting dimensions/styles produce different results. Fifth, we could only use a dummy measure of the methodological quality of the measures because many studies provided insufficient information for a more detailed coding of the validity and reliability of their measures. Sixth, as many moderator variables consisted of several categories and information on individual moderators was lacking in some studies, we did not compute multivariate analyses of moderator variables. Finally, we did not analyze the interplay of maternal and paternal parenting.

Despite these limitations, several conclusions can be drawn. First, our meta-analysis indicates that researchers and practitioners should not place unduly high expectations on the effects of *general* parenting dimensions or styles on change in academic achievement. Effects of single parenting styles and dimensions are small or even very small in a statistical sense. Second, analyses of cross-lagged associations indicate that correlations of parenting with academic achievement cannot be interpreted as pure effects of parenting on the child outcome. There are at least some bidirectional associations and there is still not enough research available to evaluate whether child achievement may predict changes in parenting styles over time. Third, the analysis of cross-lagged effects indicates that, in order to promote academic achievement of their children, parents may in particular increase warmth and authoritative parenting and avoid harsh control as well as psychological control. Given the fact that the observed associations of general parenting dimensions/styles with change in academic achievement are, on average, small, effective ways of promoting academic performance should also include other measures, such as promoting school-specific parental involvement (Fan and Chen 2001; Hill and Tyson 2009). With regard to future research needs, more cross-lagged studies are needed on the interplay of academic achievement with parenting, and with parenting styles in particular. In addition, experimental studies are recommended in order to test causal effects of parenting on change in children's academic achievement. In addition, more research is recommended on variables that mediate the association between general parenting dimensions/styles and academic achievement.

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