



# Maternal Education and Children's School Achievement: The Roles of Values, Parenting, and Behavior Regulation

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## Abstract

The purpose of this study was to examine psychological factors that may contribute to explain the link between maternal education and children's school achievement. As explanatory factors, mothers' self-transcendence values (i.e., altruism, tolerance, and social responsibility), maternal restrictive control, and children's behavior regulation were studied as part of an integrative framework. The sample consisted of 167 Chilean fourth graders (age:  $M = 10.16$ ;  $SD = 0.42$ ), their mothers, and their teachers. Mediation analyses using a bootstrapping method confirmed the proposed integrative model, revealing a triple indirect effect, indicating that mothers' self-transcendence values, maternal restrictive control, and children's behavior regulation mediated the positive relation between maternal education and children's school achievement, even after controlling for intelligence, age, and gender. Mothers with lower levels of education reported lower self-transcendence values and used more restrictive control. Further, children of mothers who often used maternal restrictive control showed lower behavior regulation and poorer school achievement. Thus, the results of this intracultural study contribute to a better understanding of the relation between maternal education and children's school achievement. Implications of these findings for further research are addressed.

**Keywords** Maternal education · Values · Parenting · Behavior regulation · School achievement

## Highlights

- Advancement of the understanding of psychological mechanisms underlying the positive relation between maternal education and children's school achievement.
- Indirect effect of mother's self-transcendence values, maternal restrictive control, and children's behavior regulation on the relation between maternal education and children's school achievement.
- Integrative model emphasizes the importance of maternal SES and values as well as parenting practices when understanding and predicting children's outcomes.

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The importance of parental socio-economic status (SES) for children's school achievement has been well documented (e.g., Hernández Padilla & González Montesinos, 2011; Martins & Veiga, 2010; Sirin, 2005). However, the processes through which parental SES influences children's school achievement are not yet sufficiently understood. Two aspects have been mentioned frequently, first, parents' high socio-economic status influences children's school achievement because these parents can provide better resources at home, and second, these parents can provide the social capital necessary to succeed in school (Coleman, 1988; Hernández Padilla & González Montesinos, 2011; Sirin, 2005). Further, psychological research showed that several psychological factors might underlie this relation as

for example parenting practices (e.g., Davis–Kean, 2005), children's expectations of success (e.g., Brown & Putwain, 2021), self-concept (Li et al., 2020), and behavior regulation (e.g., Sektnan et al., 2010).

The present study integrates sociological and psychological perspectives and develops an integrative model (including parental values, parenting practices, and children's behavior regulation) to provide new insights on the relation between parental SES and children's school achievement. Indeed, children's behavior regulation has been shown to be essential for school achievement (e.g., Blair et al., 2015; McClelland et al., 2007; Sektnan et al., 2010), and is therefore in the focus of the present research. Moreover, the present study expands the scope of previous research by adopting a socialization approach. Applying Bronfenbrenner's (1979) ecological systems framework, the development of individuals is embedded in several inter-related contexts (micro-, meso-, exo-, macro-, and chronosystem). Distal factors such as cultural values and socio-demographic aspects (e.g., parents' SES) as well as proximate factors such as parental values and parenting practices influence children's development. The influence of parents' SES (e.g., maternal education) as a rather distal factor might be mediated by more proximal factors of the microsystem as for instance by parenting practices. From a developmental psychological view, children's developmental outcomes like children's behavior regulation and school achievement are influenced by parenting practices, which in turn are affected by parental values (Darling & Steinberg, 1993; Trommsdorff, 2012). Parents' SES (e.g., maternal education) on the other hand has an impact on parental values and parenting practices. Thus, we aim to understand the role of maternal values and parenting practices as well as the role of children's behavior regulation for the relation between maternal education and children's school achievement by building and testing an integrative model, which includes all these components.

## Chile as a Cultural Context

Previous studies on SES, values, parenting, behavior regulation, and school achievement mostly have been conducted in the United States or in Europe, therefore there is a need to explore these relations in Latin American cultural contexts. Because of this, we decided to conduct the present study in Chile, a South American country in which some previous studies were conducted on related topics (e.g., Herrera et al., 2005; Weis et al., 2016). This allows us to build on previous research in this specific cultural context. Chile is a country with high levels of socio-economic school segregation at an international level (Bellei, 2013), which is related to high income inequality (Gini index = 44.4; World

Bank, 2017). Valenzuela (2008) found with data from PISA 2006 that within the OECD (Organisation for Economic Cooperation and Development), Chile belongs to the countries which have the highest socio-economic segregation indices regarding parents' socio-economic levels (including maternal education) and children's school achievement.

Chile was formerly described as a typical interdependent (i.e., emphasis on the connectedness and relatedness to others; Markus & Kitayama, 1991) cultural context (e.g., Hofstede, 1980). However, more recent research showed high interdependence as well as high independence (i.e., conception of the self as autonomous and independent from others; Markus & Kitayama, 1991) values in Chile (Georgas et al., 2006; Kolstad & Horpestad, 2009). The combination of independent and interdependent values might be related to political changes and fast economic growth in Chile, which led to a rejection of authoritarian values and possibly also to less authoritarian parenting practices (Martínez et al., 2006; Weis et al., 2016). Martínez et al. (2006) showed that today's parents in Chile reported to use less authoritarian and power-assertive techniques than did their own parents. Further, as it is the case in many countries, gender equality in parenting increased in Chile over the past decades (OECD, 2021), and father's impact on children's developmental outcomes plays an important role (e.g., Nielsen, 2019). Nevertheless, mothers in Chile generally spend much more time caring for their children than fathers (OECD, 2021). For this reason, in the present study, we focus on the roles of mothers' education, values, and parenting practices to account for the expected higher exposure to maternal than paternal parenting, without ignoring the effects of paternal parenting on children's behavior regulation (Meuwissen & Carlson, 2015).

Results of the PISA studies of 2009 and 2012 showed that in Chile, the variance in mathematics and language achievement is explained by parents' socio-economic status (including maternal education) to a very high degree compared to the OECD average (OECD, 2010; 2013). As Chile is a country with high inequality in its educational system, it is of particular importance to investigate the underlying processes of the education levels of mothers and the influence of this on children's school achievement in Chile. Therefore, we investigated the roles of the values of mothers, parenting practices, and children's behavior regulation in the relation between maternal education and children's school achievement in Chile.

## Maternal Education, Children's Behavior Regulation, and School Achievement

Many studies and meta-analyses have shown the important role parents' SES plays in children's school achievement

(e.g., Davis–Kean, 2005; Sirin, 2005). Parents' socioeconomic status commonly reflects their income levels, education, and occupation (Sirin, 2005). The present study focuses on maternal education, the most stable characteristic of SES, which relates to parents' income and occupation (Hauser & Warren, 1997; Sirin, 2005). The predictive role of maternal education on their children's school achievement has been demonstrated in various countries and is one of the most prevalent results from developmental studies (Hernández Padilla & González Montesinos 2011; Herrera et al., 2005; Magnuson, 2007; Tan et al., 2021). However, the underlying processes driving this relation have yet to be clarified. Several factors have been discussed so far, including school variables (e.g., Martins & Veiga, 2010). Magnuson (2007) found that mother's educational level may affect the quality of the home environment, especially in less educated mothers.

In another line of research, behavior regulation has been associated with academic achievement. Here, we understand behavior regulation as the motivation and ability to pay attention, follow rules, resist temptation, and inhibit impulsive behavior (e.g., McClelland et al., 2007). As these skills are necessary to follow instructions and to concentrate on tasks, behavior regulation is necessary for school success. Recent research has shown that the ability to sustain attention, organize complex information, and inhibit impulsive responses are underlying mechanisms in the influence of behavior regulation on school achievement (Blair et al., 2015).

Current research also indicated that maternal education is associated with children's behavior regulation (Montroy et al., 2016; Størksen et al., 2015). This, in turn could explain associations between maternal education and school achievement. In their longitudinal study in the United States, Sektnan et al. (2010) found that behavioral regulation in children of kindergarten age mediated the negative predictive relation of low maternal education (from birth age to 4.5 years) on academic achievement (reading, math, vocabulary) in first grade. In the present study, we extended previous research by adopting a socialization perspective that included mothers' values and parenting practices as developmental conditions for children's behavior regulation and school achievement.

### **The Roles of Mothers' Values and Maternal Restrictive Control for Understanding the Relations Between Maternal Education, Children's Behavior Regulation, and School Achievement**

According to Darling and Steinberg's (1993) model, parental values influence parenting practices, which in turn have a direct effect on children's developmental outcomes.

Hence, parenting practices can be seen as a mechanism through which parental values affect the child (Darling & Steinberg, 1993). Thus, the mother's values may indirectly affect the child's behavior regulation and school achievement through her behavior. Likewise, according to Trommsdorff (2012), the development of behavior regulation is embedded in culturally influenced socialization conditions such as parental values and parenting practices. Parental values influence parenting practices and thus the development of children's behavior regulation and school achievement (Trommsdorff, 2012). In a study of 8- to 12-year-old children and their parents in the United States, Davis–Kean (2005) found that the influence of parents' education on their children's school achievement was explained through different paths according to the cultural background of the family including parental expectations and parental practices (warmth, reading and play).

According to Schwartz (1992), we understand values to be trans-situational goals that serve as guiding principles in life and that can help to explain individual decision making, attitudes, and behavior. In the present study, we focused on the basic values of universalism and benevolence of the mother as potential mediators of the relation between maternal education and children's school achievement. Universalism is defined as understanding, appreciating, tolerating, and protecting the welfare of all people and nature (Schwartz, 1992). Benevolence is defined as caring for ingroup members by being helpful, honest, forgiving, loyal, and responsible. In line with Schwartz's (1992) model, the values of universalism and benevolence aggregate into the higher-order value of self-transcendence, which is concerned with the enhancement of others and the transcendence of selfish interests (Schwartz, 1992). Hence, altruism, unselfishness, and tolerance are of great importance to people who highly value self-transcendence.

Considering the theoretical framework of *the developmental niche* from Super and Harkness (1997), socio-demographic aspects, parental values, and parenting practices might be subsystems which mediate the relation between the cultural environment and the individual development of the child. According to Bornstein (2012), culture influences parental cognitions, which in turn shape parenting practices. Cultural values influence the development of behavior regulation indirectly via parenting practices (Trommsdorff, 2009). Hence, intra-cultural differences in behavior regulation might also be transmitted via parental values and parenting practices. Mothers' level of education and mothers' values may represent important intra-cultural differences affecting children's self-regulation and school achievement. Educational experiences can influence people's values. Schwartz's (2007) large-scale study conducted in twenty countries showed that values of universalism are higher among individuals attending university. Schwartz

argued that a university education influences a broadening of horizons and a higher value of universalism as a result. Furthermore, persons highly valuing universalism might tend to seek higher education (Schwartz, 2007). For our study, this means that mothers with higher educational levels might have broadened their horizons through education and, therefore, might support higher values of universalism and hence higher values of self-transcendence more than mothers with lower formal education.

To our knowledge, there is little published research that has addressed the relation between values of self-transcendence and parenting practices. In general, people who put a high value on self-transcendence show little autocratic interpersonal behavior (i.e., manipulative, controlling, dominating, and aggressive behavior; Schwartz et al., 2001). Autocratic interpersonal behavior might include the parental practice of “restrictive control”. “Restrictive control” is defined here as aggressive, strict, and critical parenting behavior that typically includes anger, harshness, and intrusive control (Karreman et al., 2006). Mothers who highly value self-transcendence aim to understand, appreciate, and tolerate others. Therefore, we predict that mothers with higher values of self-transcendence will exhibit lower levels of restrictive control than mothers with lower values of self-transcendence. In turn, maternal restrictive control is expected to directly affect the developmental outcomes of children. Indeed, past research has shown that maternal restrictive control is negatively related to both children’s behavior regulation (Grolnick & Ryan, 1989; Karreman et al., 2006; Weis et al., 2016) and school achievement (Grolnick & Ryan, 1989). In addition, there might be a direct relation between maternal education and maternal restrictive control as previous studies have shown that low SES is related to the use of more maternal restrictive control (e.g., Deffaa et al., 2020; Harvey et al., 2016).

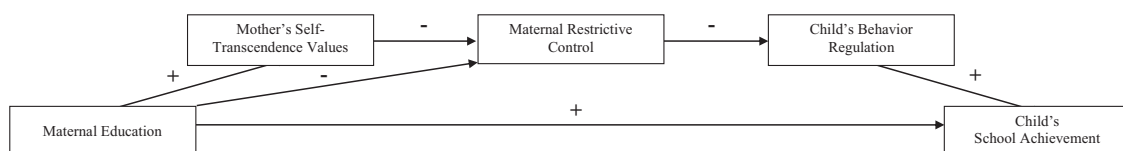
Furthermore, evidence shows that behavior regulation mediates the link between mothers’ restrictive control and children’s school achievement (e.g., Weis et al., 2016). The negative influence of maternal restrictive control on children’s behavior regulation might be rooted in developmental processes. While infants’ behavior is regulated mostly by caretakers (external regulation), in the course of their development, children learn to regulate their behavior by themselves (internal regulation; Kopp, 1982). High

maternal restrictive control may impede the development of children’s internalized behavior regulation because of the high external regulation. Finally, it is important to distinguish between qualitative different forms of parental control. While positive or gentle control (i.e., communication of clear expectations and limits, constructive guidance, and noncoercive parental discipline) may promote the development of behavior regulation, restrictive control may undermine the child’s internalization of autonomous behavior regulation processes (Grolnick & Ryan, 1989; Karreman et al., 2006).

### Mediating Roles of Values, Parenting, and Children’s Behavior Regulation for the Relation Between Maternal Education and Children’s School Achievement

Summarizing and integrating several previous theoretical contributions, we propose a model, which hypothesizes that maternal education positively affects children’s school achievement mediated by mothers’ self-transcendence values, restrictive control, and children’s behavior regulation (see Fig. 1). The well-known and often replicated relation between maternal education and children’s school achievement needs to be explained by analyzing its underlying processes. While previous investigations analyzed the influence of maternal restrictive control on children’s outcomes (e.g., Weis et al., 2016), the present study extends previous research by including maternal values as a possible factor that may help to understand the relation between mothers’ level of education and children’s academic achievement.

Broken down into separate strands, we hypothesize that mothers with a higher level of education value self-transcendence to a greater extent than mothers with a lower level of education (hypothesis 1). In addition, we expect that mothers who value self-transcendence more, in turn, use maternal restrictive control less often than mothers who exhibit lower values of self-transcendence (hypothesis 2). Moreover, high maternal restrictive control might negatively impact children’s behavior regulation (hypothesis 3), which is a positive predictor of school achievement (hypothesis 4). As a whole, we predict that the positive relation between maternal education and children’s school



**Fig. 1** Theoretical integrative model with its predicted relations and mediators: Relation between mother’s level of education and child’s school achievement mediated by mother’s self-transcendence values, maternal restrictive control, and child’s behavior regulation

achievement might be partly explained by the subsequent links between mother's self-transcendence values, maternal restrictive control, and children's behavior regulation (hypothesis 5). Moreover, we suggest a direct negative link between maternal education and maternal restrictive control (hypothesis 6). We control the statistic model by children's age, gender, and nonverbal intelligence. Children's age is included due to evidence that behavior regulation increases during the development from early through middle childhood (King et al., 2013; Raffaelli et al., 2005). Children's nonverbal intelligence is relevant as it is supposed to be a strong predictor for school achievement (e.g., Laidra et al., 2007). Gender is included due to its possible influence on school achievement as well as on behavior regulation (Duckworth & Seligman, 2006; Weis et al., 2013).

## Method

### Participants

Data for this study were collected from 167 Chilean fourth graders (56 boys, 111 girls), their mothers, and teachers. The mean age of the children was 10.16 years ( $SD = 0.42$ ). Students attended nine different fourth-grade classes in four schools in a large city in central Chile (Santiago de Chile). The sample was recruited from two public ( $N = 110$ ) and two private ( $N = 57$ ) schools to capture the socio-economic segregation of the Chilean education system. Children's mean age did not differ between public ( $M = 10.1$ ,  $SD = 0.43$ ) and private schools ( $M = 10.2$ ,  $SD = 0.40$ ;  $t(165) = 1.06$ ,  $p = 0.29$ ). On average, parents of children who attended the two public schools had lower levels of education (mothers:  $M = 4.39$ ,  $SD = 1.40$ ; fathers:  $M = 4.39$ ,  $SD = 1.46$ ; education scale ranging from 1 (incomplete primary education) to 9 (postgraduate studies) than parents of children who attended the two private schools (mothers:  $M = 7.86$ ,  $SD = 1.46$ ;  $t(165) = 14.96$ ,  $p < 0.001$ ; fathers:  $M = 7.82$ ,  $SD = 1.44$ ;  $t(165) = 14.48$ ,  $p < 0.001$ ). Moreover, the average monthly income per household was lower in public schools ( $M = 611$  €/month,  $SD = 298$ ) than in private schools ( $M = 3526$  €/month,  $SD = 2159$ ;  $t(165) = 13.94$ ,  $p < 0.001$ ).

### Procedure

Prior to the participation of the children in the study, parents and teachers provided their informed written consent. The children participated in group sessions at their schools; the sessions lasted roughly 1.5 h. The group sessions included a nonverbal intelligence test and a behavior regulation questionnaire. Mothers and teachers answered paper-and-pencil questionnaires. The mothers' questionnaire included questions

on their level of education, self-transcendence values, parenting practices (e.g., restrictive control) as well as questions on their children's behavior regulation, age, and gender. Teachers provided information about the children's behavior regulation and school achievement (language and mathematics grades).

This study was reviewed and approved by the Ethics Committee of the University of Konstanz, Germany. The Ethics Committee of the University of Konstanz confirmed that the methods and procedures of the study are ethical acceptable in accordance with the Declaration of Helsinki. All mothers and teachers were informed about the study with an information sheet and provided their written informed consent to participate in this study. Moreover, mothers gave their written informed consent to the participation of their children in this study. All teachers and mothers who participated in the study received feedback on the main results.

### Measures

#### Maternal education

To measure maternal education, a scale of educational qualification, which was derived from ISCED-97 classification and adapted to the Chilean education system, was used (see Table 1). Mothers reported their highest level of education on the scale, ranging from 1 (incomplete primary education) to 9 (postgraduate studies). The mean level of education of mothers was 5.58 ( $SD = 2.17$ ). For the frequency distribution of mothers' levels of education see Table 1.

#### Mothers' self-transcendence values

To assess the self-transcendence values of the mothers, we used the Spanish version of the Portraits Value Questionnaire

**Table 1** Scale and Frequency Distribution of Maternal Education

What is your educational level?	<i>n</i>	%
1. Incomplete primary education	3	1.8
2. Completed primary education	4	2.4
3. Incomplete secondary school	13	7.8
4. Completed secondary school	49	29.3
5. Technical school certificate	37	22.2
6. Baccalaureate	—	—
7. Incomplete university education	11	6.6
8. Completed university education	27	16.2
9. Postgraduate studies	23	13.8

$N = 167$ . This scale on maternal education was derived from ISCED-97 classification and adapted to the Chilean education system.



(PVQ) from Schwartz et al. (2001). Amongst others, verbal portraits of five people that pointed to the importance of universalism (e.g., *She thinks it is important that every person in the world should be treated equally. She believes everyone should have equal opportunities in life; It is important to her to listen to people who are different from her. Even when she disagrees with them, she still wants to understand them.*) and benevolence (e.g., *It's very important to her to help the people around her. She wants to care for their well-being; It is important to her to be loyal to her friends. She wants to devote herself to people close to her.*) were provided in the questionnaire. Mothers read the instruction (*Here we briefly describe some people. Please read each description and think about how much each person is or is not like you.*) and answered on a 6-point rating scale from 1 (*not like me at all*) to 6 (*very much like me*) how similar the portraits were to them.

One of the advantages of this indirect method to assess values is that less educated respondents commonly find it less difficult to answer the items (Schwartz, 2007). The higher-order value of self-transcendence was calculated as a mean of the values of universalism and benevolence. Reliability analyses revealed a Cronbach's  $\alpha$  of 0.72 for self-transcendence. Values were corrected for possible differences in scale use according to Schwartz et al. (2001). For this purpose, the mean scores of individuals were computed across all twenty-one items of the whole questionnaire (MRATs) and centered (MRATs were subtracted from each of the value scores of the individuals). Thus, we corrected absolute scores for differences in the use of the response scale. This correction is important in order to obtain accurate comparisons between individuals or groups as well as accurate associations with other variables (Schwartz, 2007). Schwartz et al. (2001) showed the cross-cultural validity of the Portraits Value Questionnaire (PVQ) with samples in South Africa, Italy, Uganda and Israel.

### Maternal restrictive control

To assess maternal restrictive control, the Maternal Restrictive Control Scale by Weis et al. (2016) was used, which consists of eight items from the Parenting Practice Questionnaire (PPQ) from Robinson et al. (1995). We used the Spanish version of the PPQ, which was developed for a study with Hispanic American mothers by Calzada and Eyberg (2002). Mothers reported how often they displayed certain behaviors when interacting with their children by answering items on a 5-point rating scale from 1 (*never*) to 5 (*always*). Maternal restrictive control items implied direct parental control that was characterized by punishment and compliance without reasoning (e.g., *I use threats as punishment with little or no justification*). Reliability analyses revealed a Cronbach's  $\alpha$  of 0.76.

### Children's behavior regulation

In order to measure children's behavior regulation, the short version of the Self-Control Scale (SCS) from Tangney et al. (2004) was administered. Thirteen items on a 5-point scale from 1 (*not at all*) to 5 (*very much*) were answered by the children as a self-report (e.g., *I am able to work effectively toward long-term goals, I refuse things that are bad for me, Pleasure and fun sometimes keep me from getting work done*). Moreover, the items were rephrased and answered by teachers and mothers to evaluate children's behavior regulation (e.g., *She or He is able to work effectively toward long-term goals, She or He refuses things that are bad for him or her, Pleasure and fun sometimes keep him/her from getting work done*). We used the Spanish version of the short version of the SCS by Archer et al. (2010), which is a translation of the respective scale by Tangney et al. (2004). Bertrams and Dickhäuser (2009) confirmed that the short version of the Self-Control Scale is one-dimensional, reliable, and valid. This scale was reviewed by native Chilean speakers who made some minor adaptations to Chilean Spanish. Reliability analyses revealed a Cronbach's  $\alpha$  of 0.93 for the teachers' evaluation, a Cronbach's  $\alpha$  of 0.81 for the mothers' evaluation, and a Cronbach's  $\alpha$  of 0.72 for the children's self-evaluation. Pearson correlations revealed that the evaluations of the mothers and teachers of the children's behavior regulation were significantly positively correlated ( $r = 0.38, p < 0.01$ ). Further, the children's self-evaluations were significantly positively correlated with the mothers' ( $r = 0.35, p < 0.01$ ) and teachers' evaluations ( $r = 0.35, p < 0.01$ ). Moreover, the three sources to evaluate children's behavior regulation combine to a single coherent scale with a high Cronbach's  $\alpha$  of 0.90. Accordingly, the mothers', teachers', and children's evaluations of behavior regulation were averaged to increase the validity and reliability of the behavior regulation measure.

### Children's school achievement

School achievement included language (Spanish) and mathematics grades. Grades were assessed by teachers' reports of the fourth-grade midterm reports. Grades were coded according to the Chilean grading system, ranging from 1 (*not sufficient/fail*) to 7 (*very good*). Pearson correlations revealed that language and mathematics grades were significantly positively correlated ( $r = 0.72, p < 0.01$ ). Accordingly, language and mathematics grades were averaged into one single school achievement score.

### Children's nonverbal intelligence

To measure the children's nonverbal intelligence, the Raven's Progressive Matrices test (Raven et al., 1998) was

administered. The test version of colored matrices with 36 items (including the three parts *A*, *B*, *Ab*, each consisting of 12 items) and with a time limit of 20 min was applied (Raven, Raven, and Court, 1998). Children's answers were coded according to the test's manual with 0 or 1 points per item and added to sum scores ( $Min = 22$ ;  $Max = 36$ ).

## Data analysis

To describe the pattern of relations between the children's age, gender, and intelligence with the mothers' variables (education, self-transcendence values, restrictive control) and the children's outcomes (behavior regulation, school achievement), Pearson correlations were computed. In order to test the predicted conceptual relations established in our model depicted in Fig. 1, the mediation model was tested using the bootstrapping method PROCESS by Hayes (2013). Five thousand bootstrap samples were drawn. Indirect effects, based on 95% confidence intervals (CI) are significant when the CI values do not cross zero. Unstandardized coefficients (b) are reported for each regression equation.

## Results

Descriptive statistics and Pearson correlations are presented in Table 2. Pearson correlations revealed positive links between the children's intelligence and the maternal education as well as with the children's school achievement. The children's gender was positively related to their behavior regulation (i.e., girls were rated higher on behavior regulation than boys;  $r = 0.21$ ,  $p < 0.01$ ; 0 = boy, 1 = girl). Consequently, the children's gender and intelligence were included as control variables in the mediation model. The children's age was entered as a control variable in further analyses due to its

theoretical importance for children's behavior regulation (King et al., 2013; Raffaelli et al., 2005).

We computed a multiple mediation model with maternal education as an independent variable and school achievement as the dependent variable. As mediator variables, mothers' self-transcendence values, maternal restrictive control, and children's behavior regulation were entered in this order into the model. Children's age, gender, and intelligence were included as control variables. Thus, based on this integrated mediation model as a whole, we tested whether the relation between maternal education and children's school achievement is partly explained by mothers' self-transcendence values, maternal restrictive control, and children's behavior regulation, in this order (hypothesis 5). Regarding the separate relations of the model, we expected a positive relation between maternal education and self-transcendence values (hypothesis 1) and a negative relation between self-transcendence values and maternal restrictive control (hypothesis 2). Further, we tested if maternal restrictive control is negatively related to children's behavior regulation (hypothesis 3), which might be positively related to school achievement (hypothesis 4). In addition, we expected a direct negative relation between maternal education and maternal restrictive control (hypothesis 6).

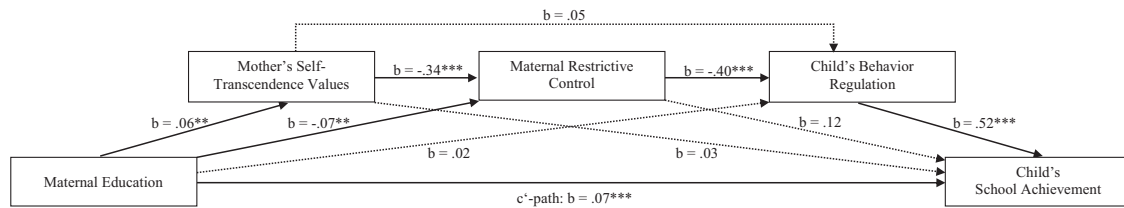
The mediation analyses (see Fig. 2) revealed a significant and positive indirect effect of maternal education on children's school achievement through the mothers' values, maternal restrictive control, and children's behavior regulation (indirect effect = 0.004,  $SE = 0.002$ , 95% CI [0.001, 0.010]). Thus, the link between the maternal education and the children's school achievement was partly explained by a triple indirect effect with mothers' values, maternal restrictive control, and children's behavior regulation, in this order, even after controlling for intelligence, age, and gender. The model accounted for 48% of the variance

**Table 2** Pearson Correlation Matrix and Descriptive Statistics

	1	2	3	4	5	6	7
1. Maternal Education	–	0.25**	–0.31***	0.21**	0.36***	–0.03	0.18*
2. Mother's Self-Transcendence Values		–	–0.33***	0.17*	0.16*	–0.15	0.04
3. Maternal Restrictive Control			–	–0.47***	–0.21**	0.03	–0.03
4. Child's Behavior Regulation				–	0.53***	0.09	0.11
5. Child's School Achievement					–	–0.06	0.42***
6. Child's Age						–	0.04
7. Child's Intelligence							–
<i>Min</i>	1.00	–0.17	1.00	1.97	3.60	8.58	22.00
<i>Max</i>	9.00	2.21	4.50	4.74	6.80	11.26	36.00
<i>M</i>	5.58	0.97	2.15	3.45	5.62	10.17	31.86
<i>SD</i>	2.17	0.55	0.63	0.63	0.65	0.42	3.10

$N = 167$ .

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .



**Fig. 2** Test of the integrative model: Multiple mediation test of the relation between mother's level of education and child's school achievement mediated by mother's self-transcendence values, maternal restrictive control, and child's behavior regulation.  $N = 167$ .  $b$  = unstandardized regression coefficient, controlled for child's age, gender, and intelligence. \* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$

( $R^2 = 0.48$ ,  $p < 0.001$ ) of children's school achievement. The model without the control variables explains 36% of the variance ( $R^2 = 0.36$ ,  $p < 0.001$ ) and yields to a similar triple indirect effect of maternal education on children's school achievement through mothers' values, maternal restrictive control, and children's behavior regulation (indirect effect = 0.005,  $SE = 0.002$ , 95% CI [0.001, 0.010]).

As predicted, the pattern of results revealed first, that the higher the maternal education, the higher the children's school achievement ( $c'$ -path:  $b = 0.07$ ,  $p < 0.001$ ). This relation was partly explained by a systematic indirect effect chain in which the higher the maternal education, the higher mothers valued self-transcendence. In turn, and in accordance with our prediction, the higher the self-transcendence values of mothers, the lower the maternal restrictive control, which in turn was negatively related to children's behavior regulation. Finally, the higher the children's behavior regulation, the higher their school achievement.

As children's behavior regulation was assessed by multiple sources (mothers, teachers, children), we tested the model separately for each of these data sources to control for the possibility of obtaining different patterns of results. All three models yielded the same pattern of results and the triple indirect effect as the model with the aggregated measure of behavior regulation. To rule out the potential impact of school type in the model, we tested the model for both groups of school type (i.e., private and public schools) simultaneously using a multiple group analyses approach in Mplus. The results of the Wald test showed that there were no significant differences based on the school type, neither for each of the separate paths, nor for the full model. For the full model, the Wald test yielded  $\chi^2(6) = 10.6$ ;  $p = 0.10$ . Thus, school type does not appear to provide additional information to the model, possibly because differences are covered by differences in maternal education.

In addition, and consistent with our predictions, the mediation analyses revealed a significant, positive, indirect effect of maternal education on children's school achievement through maternal restrictive control and children's behavior regulation, in this order (indirect effect = 0.015,  $SE = 0.006$ , 95% CI [0.006, 0.028]). A direct negative

relation between maternal education and maternal restrictive control was confirmed revealing that the higher the level of maternal education, the lower the maternal restrictive control.

## Discussion

The present study advances the understanding of psychological mechanisms underlying the positive relation between maternal education and children's school achievement. This relation was partly explained by a triple indirect effect of the mother's self-transcendence values, maternal restrictive control, and children's behavior regulation – in this sequence –, even after controlling for intelligence, age, and gender.

### Maternal Education, Children's Behavior Regulation, and School Achievement in Cultural Contexts

As hypothesized, maternal education was positively related to children's school achievement. This result is consistent with numerous studies which have shown positive relations between maternal education and children's school achievement (e.g., Davis–Kean, 2005; Magnuson, 2007; Sirin, 2005). This is an important finding as it extends findings, which mostly have been conducted in the United States or in Europe to Latin American cultural contexts. Similarly, the central function of behavior regulation for school achievement has been demonstrated in several studies in the United States and in European countries (e.g., Blair et al., 2015; McClelland et al., 2007; Sektnan et al., 2010). Hence, having found a similar pattern of these results in a South American context underlines the importance of behavior regulation for school achievement in several cultural contexts.

### Maternal Education, Values, Restrictive Control, and Children's Behavior Regulation

As expected, maternal education and mothers' values of self-transcendence were positively related. As values of



self-transcendence include benevolence and universalism, this finding is in line with Schwartz's (2007) assumption about the positive relation between levels of education and values of universalism. As there is little empiric evidence, so far, regarding relations between maternal education and values, these results are an important confirmation and also an extension of Schwartz's model, and encourage more research in this line.

Furthermore, we found a negative relation between mothers' self-transcendence values and maternal restrictive control. As there is little previous research investigating the specific link between values and parenting practices, the present study revealed new insights that confirmed our theoretical assumptions. Mothers who value self-transcendence may refrain from maternal restrictive control because they aim to protect the welfare of others. Further, this result is consistent with findings reported by Schwartz et al. (2001) identifying a negative relation between self-transcendence values and autocratic behavior (i.e., controlling, dominating).

Moreover, as expected, maternal restrictive control was negatively associated with children's behavior regulation. Consistent with previous studies (e.g., Karreman et al., 2006), this result confirms our theoretical assumption, as maternal restrictive control is a parenting practice related to high external regulation, which hinders children's internalization of behavior regulation. However, previous studies mostly have been conducted in the United States or Europe and it is important to confirm this relation in the Chilean cultural context as parenting practices as well as their relations to children's behavior regulation might differ between cultural contexts (Jaramillo et al., 2017; Trommsdorff, 2012). There is still little published research on relations between maternal restrictive control and developmental outcomes in Latin American contexts. Bush and Peterson (2014) reviewed parenting studies in Chile and recommended more cross-cultural research with adequate measurement instruments on parenting and child development. The development of self-regulation is influenced by cultural values and resulting cultural variations in parenting practices (Trommsdorff, 2009). For instance, Keller et al. (2004) found relations between cultural differences in parenting and cultural differences in infants' self-regulation development in Cameroonian, Greek and Costa Rican mothers and infants.

As in Chile, high interdependence and high independence values coexist (Georgas et al., 2006; Kolstad & Horpestad, 2009), maternal restrictive control could be expected to be related with children's behavior regulation in different ways than it is the case in contexts with high independence and low interdependence values (e.g., USA). Martínez et al. (2006) found that the political changes and the fast economic growth in Chile led to an increasing

rejection of authoritarian values and less use of authoritarian and power-assertive parenting practices in today's parents in Chile. These changes may also impact the negative relation between maternal restrictive control and children's behavior regulation. This finding is consistent with Bush and Peterson (2014) review, in which they concluded that many findings in Chile are similar to findings in the United States or European countries, which could be explained by today's influence of the combination of interdependence and independence values.

### Understanding the Relation Between Maternal Education and Children's School Achievement

The present study confirmed the hypothesized integrative model for the relation between maternal education and children's school achievement. Our tested model is consistent with Darling and Steinberg's (1993) model, which claims that parental values indirectly influence the developmental outcomes of the child through parental practices, which in turn directly affect child development. In the present study, mother's self-transcendence values as parental values influence children's outcomes (i.e., self-regulation and academic achievement) through maternal restrictive control as a parental practice.

However, since the indirect effect without self-transcendence values also proved to be significant, there might be other factors above and beyond maternal self-transcendence values that link maternal education and maternal restrictive control. Thus, maternal self-transcendence values may be only one of the factors that affect the relation between maternal education, maternal restrictive control, and school achievement. For instance, mothers with different educational levels might differ in their views of the role of authority and control in their children's development (Martínez et al., 2014). These views in turn might be related to self-transcendence values, but they might also directly affect their parenting practices. Martínez et al. (2014) found in their qualitative study in Chile that parents with low SES considered themselves to a greater extent as legitimate authority figures for their children than parents with high SES. This view of mothers with lower educational levels as legitimate authority figures might be directly related to their higher level of restrictive control in the present study. Moreover, children of mothers with lower educational levels might grant more authority to their mothers in regulating their behavior in comparison to children of mothers with higher educational levels (Martínez et al., 2014), what might lead to a higher level of restrictive control in their mothers.

Further, future studies could study the role of children's values for the relations between maternal education, values, restrictive control, and children's behavior regulation and

school achievement. Jeynes (2019) showed in his meta-analysis, that character education, which enhances moral values in students, was related to higher behavior regulation as well as to higher school achievement. Thus, further studies could investigate, if maternal self-transcendence values lead to higher moral values in children, which in turn might be positively related to their behavior regulation and school achievement. Moreover, other psychological factors as for instance children's expectations of success (e.g., Brown & Putwain, 2021) or positive self-concept (Li et al., 2020) might also partly explain the relation between maternal education and children's school achievement.

In sum, the integrative model proposed and confirmed in the present study, reaffirms the importance of considering intra- and intercultural factors such as maternal SES and values as well as parenting practices when understanding and predicting children's outcomes. The integration of these different sources of influence might add value to the literature addressing the link between maternal education, academic achievement, and the psychological processes that may be involved.

### Strengths and Limitations

A strength of this study is that it was conducted in Chile, a South American country with an initial research on self-regulation and related topics. Thus, our study extends research on relations between maternal education, values, parenting practices, and children's outcomes to cultural contexts other than the United States and European. Further strengths are the use of a composite score for behavior regulation and the use of maternal education as indicator for SES as maternal education is a stable and robust indicator of socioeconomical status. Another strength of the present study is that it revealed new insights on relations between self-transcendence values and maternal restrictive control.

However, it should be noted that the present study is cross-sectional and the studied relations could be bidirectional. For instance, maternal restrictive control might influence children's behavior regulation, but maternal restrictive control might also be a consequence of children's behavior regulation (e.g., Karreman et al., 2006). Parenting effects should be distinguished from children's characteristics regarding maternal restrictive control and behavior regulation in Chile in future longitudinal studies.

A limitation of the present study could be the use of questionnaire-based self-reporting. Future studies should include multiple measures such as interviews or focus groups. Another limitation of this study might be its focus on mothers. The reason for the focus on mothers in the present study is that in Chile, mothers are the main caring persons for children in the most cases. However, fathers play an important role for children's developmental outcomes in general (e.g., Nielsen, 2019) and for children's

behavior regulation in specific (Meuwissen & Carlson, 2015). Thus, additional studies should focus on the roles of fathers and other family members.

Regarding external validity, the present study extends previous findings by showing relations between maternal education, values, parenting practices, and children's outcomes in Chile, a Latin American context, which allows for a broader generalization of former results in the United States and European contexts. Further, the composite score for behavior regulation takes into account school as well as family situations and thus allows to interpret the results of behavior regulation across school and family settings. Moreover, the results of maternal education can be generalized to parents' SES as it relates to parents' income and occupation and is the most stable characteristic of SES (Hauser & Warren, 1997; Sirin, 2005). However, future studies could improve the extent to which the results can be generalized by including multiple measures, fathers, a representative sample, and a longitudinal design.

### Conclusion

The present study has revealed the importance of addressing the role that mothers' self-transcendence values, restrictive control, and children's behavior regulation play in understanding the relation between maternal education and children's school achievement. Thus, it has contributed to a better understanding of underlying processes (mother's self-transcendence values, maternal restrictive control, and children's behavior regulation), which partly explain the well-known and often replicated relation between maternal education and children's school achievement. These results could help educational and parenting programs to focus on interventions regarding children's behavior regulation as well as maternal restrictive control as a parenting practice associated with maternal values. Children of mothers with low educational levels could be included in intervention programs, which support the development of behavior regulation to promote their school achievement (German National Academy of Sciences Leopoldina, 2014; Sektman et al., 2010). For instance, the "Tools of the Mind" preschool intervention program has been shown to be effective in improving children's behavior regulation (Diamond et al., 2007). According to Blair et al. (2015), effective interventions to promote behavior regulation include the establishment of learning environments that allow for structured, scaffolded, and self-directed learning opportunities. Further, parenting programs which strengthen positive parenting practices (e.g., positive control instead of restrictive control) should be fruitful.

However, as our results show that underlying parenting values influence parenting practices, parenting programs might not only focus on concrete parenting practices but

also on parents' values. Finally, culture adequate intervention programs should be established to promote children's development, and especially children of mothers with low education, in their behavior regulation. Intervention programs should start from an early age on and should take into account family as well as school contexts (German National Academy of Sciences Leopoldina, 2014). Policies, which follow an integrated view on family, school education, and cultural contexts and which value preschool and early intervention programs, would support such practices.

**Author Contributions** MW was the principal investigator of the research project in Chile, development of study design and selection of instruments for the study, literature review, conceptualization of research questions, responsible for data collection, data analyses and interpretation, and preparation of written manuscript. GT was the principal investigator of the international research project to which this project in Chile belonged, development of study design and selection of instruments, conceptual input, general supervisory input, and review of the manuscript. LM assisted in the organization of the research project in Chile, in the adaptation of instruments to the Chilean sample, and in the data collection, review of the manuscript. RG gave conceptual input to the research questions, selection of instruments, data analyses, supervisory input, and review of the manuscript. All authors read and approved the final manuscript.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare no competing interests.

**Ethics** All methods and procedures of this study were carried out in the accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

**Informed Consent** For all minors who participated in the study, a written declaration of consent was signed by the parents. All parents and teachers were informed about the study with an information sheet and gave their informed consent.

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