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Family Environment and Self-Esteem Development: A Longitudinal Study from Age 10 to 16

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Abstract

In this study, we examined the effect of family environment on self-esteem development from late childhood (age 10) through adolescence (age 16), using 4-wave longitudinal data from 674 Mexican-origin families living in the United States. To assess family environment, a multi-informant approach was used (i.e., mother, father, child) to construct latent variables that minimize the influence of response biases. Using cross-lagged panel models (CLPMs) and random intercepts cross-lagged panel models (RI-CLPMs), we tested the prospective effects of parenting behaviors (warmth, hostility, monitoring, involvement in child's education) and other characteristics of the family environment (quality of parental relationship, positive family values, maternal and paternal depression, economic conditions of the family, and presence of father). In the CLPMs, significant positive effects on children's self-esteem emerged for warmth, monitoring, low maternal depression, economic security (vs. hardship), and presence (vs. absence) of father. With regard to the reciprocal effects, children's self-esteem predicted positive family values (i.e., importance and centrality of the family) of mother and father. In the RICLPMs, the pattern of results was similar (in terms of point estimates of the effects); however, only the effect of maternal depression on child self-esteem, and the effect of child self-esteem on family values of father, were statistically significant. In all models, the effects did not differ significantly for boys and girls, or across ages 10 to 16. The findings suggest that multiple features of the family environment shape the development of self-esteem during late childhood and adolescence.

Keywords

family environment; parenting behavior; self-esteem; childhood and adolescence; longitudinal

Research suggests that self-esteem—which has been defined as the “individual's subjective evaluation of her or his worth as a person” (Trzesniewski, Donnellan, & Robins, 2013, p. 60)—is positively associated with important life outcomes in the work, relationship, and health domains (for a review, see Orth & Robins, 2014). Specifically, longitudinal studies indicate that high self-esteem prospectively predicts relationship satisfaction, job success, and physical health, and reduces the risk of depression (Marshall, Parker, Ciarrochi, & Heaven,

2014; Orth, Robins, & Widaman, 2012; Sowislo & Orth, 2013; Trzesniewski et al., 2006). Given the importance of self-esteem, it is critical to understand how individuals develop a positive self-image. Despite the voluminous literature on self-esteem, only a few influential factors have been identified. A review of the literature (Orth & Robins, 2019) indicated that there is now relatively strong evidence suggesting that stressful life events (Orth & Luciano, 2015) and relationships (Denissen, Penke, Schmitt, & van Aken, 2008; Gruenenfelder-Steiger, Harris, & Fend, 2016; Luciano & Orth, 2017; Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015) lead to changes in people's self-esteem. However, there remains a considerable lack of knowledge with regard to the question of why some individuals see themselves in a positive light while others suffer from feelings of inadequacy.

It may be particularly important to identify factors that shape the emergence of individual differences in self-esteem early in life, that is, in childhood and adolescence. Individual differences in personality characteristics, including self-esteem, become more stable and more difficult to change as individuals grow up and become adults (Donnellan, Kenny, Trzesniewski, Lucas, & Conger, 2012; Kuster & Orth, 2013; Trzesniewski, Donnellan, & Robins, 2003). Thus, interventions attempting to increase self-esteem might be more effective in childhood and adolescence compared to adulthood.

Research focusing on early childhood has suggested that family environment is a crucial factor for the development of the self (Harter, 2015). A recent longitudinal study by Orth (2018) even suggested that the early childhood family environment has a long-term, and possibly enduring, effect on self-esteem that can still be observed in adulthood. In Orth (2018), the most important predictor was the quality of home environment, including quality of parenting and parental stimulation of learning. Moreover, the quality of the home environment partially mediated the effects of other characteristics of the family environment, such as the quality of parental relationship, maternal depression, presence of father, and poverty. However, an important limitation in that study was that initial levels of self-esteem could not be controlled for.

Therefore, in the present research, we examined prospective effects of the family environment on children's self-esteem, using data from a longitudinal study in which repeated assessments of both constructs were available over time. The goal of the research was to identify factors that affect the development of self-esteem in children and adolescents. Specifically, we examined the effects of parenting behaviors (such as warmth, hostility, monitoring, and involvement in child's education) and other characteristics of the family environment (such as quality of parental relationship, family values, maternal and paternal depression, economic conditions of the family, and presence of father). Research from the broader field of child temperament suggests that self-esteem could show a reciprocal relation with parenting; that is, parenting behavior may lead to changes in children's self-esteem, and children's self-esteem may elicit changes in parenting behavior (Bates, Schermerhorn, & Petersen, 2012; Schofield & Atherton, in press). Consequently, we examined prospective effects in both directions, from parenting to self-esteem and from self-esteem to parenting. For reasons of completeness, we also tested whether self-esteem had prospective effects on other family environment variables (in addition to parenting).

Parenting Behavior and Children's Self-Esteem

In this section, we describe the key categories of parenting behavior and how they are related to children's self-esteem. Specifically, we will discuss warmth, hostility, monitoring, and parental involvement in children's education. However, before focusing on specific categories of parenting behavior, we outline three theoretical frameworks suggesting that parenting has an important influence on the development of children's self-esteem. First, the theory of symbolic interactionism (Blumer, 1986; Cooley, 1902; Mead, 1934) proposes that the self develops, and is continuously shaped throughout the life course, through social interactions. It is assumed that social interactions reflect how much others appreciate an individual. Therefore, the individual might then interpret these social interactions as symbolic for his or her self-worth. In early life, a large proportion of children's social interaction occurs in the relationship with parents, so these interactions could be particularly formative. Second, attachment theory (Bowlby, 1969, 1973, 1980) posits that a secure attachment to the caregiver contributes to the development of a positive internal working model in the child (i.e., the mental representation of being accepted and valuable). Empirical findings suggest that attachment security is related to higher self-esteem in children (Verschuere & Marcoen, 1999; Verschuere, Marcoen, & Schoefs, 1996) and adolescents (Arbona & Power, 2003; Laible, Carlo, & Roesch, 2004; Wilkinson, 2004). Since sensitive and responsive caregiving fosters secure attachment (Cassidy, 2008), attachment theoretical perspectives suggest that parenting is an important factor in the development of children's self-esteem. Third, sociometer theory (Leary, 2012) proposes that self-esteem belongs to a psychological system that monitors social acceptance and inclusion. According to this theory, self-esteem reflects the person's relational value as subjectively perceived by the person him- or herself (i.e., assumptions about how desirable a relationship with oneself is for others). Correspondingly, longitudinal studies suggest that being valued by others increases self-esteem in children and adolescents (Gruenenfelder-Steiger et al., 2016; Reitz, Motti-Stefanidi, & Asendorpf, 2016).

Parental Warmth

Research on the effects of parental warmth—which is characterized by love, support, nurturance, affection, involvement, responsiveness, and acceptance (e.g., Maccoby & Martin, 1983; Schaefer, 1965)—shows that there is a positive association with children's self-esteem (Rollins & Thomas, 1979). In a meta-analysis (Khaleque, 2013), including studies with participants ranging from 9 to 18 years, parental warmth was correlated with self-esteem at medium effect size (i.e., the correlations were .26 for maternal warmth and .21 for paternal warmth). Moreover, a small number of longitudinal studies have found that parental warmth positively predicts children's self-esteem (Amato & Fowler, 2002; Brummelman et al., 2015; Felson & Zielinski, 1989; Harris et al., 2017). Some of these longitudinal studies also suggested that there is a reciprocal link between parental warmth and children's self-esteem (Brummelman et al., 2015; Felson & Zielinski, 1989).

Parental Hostility

Parental hostility is characterized by rejection, neglect, maltreatment, punishment, and verbal and physical aggression (Schaefer, 1965). When children are ignored, humiliated, or

beaten by their parents, they may learn from their parents' behavior that they are incompetent and worthless. In a recent meta-analysis by Khaleque (2017), parental hostility was negatively correlated with self-esteem at medium to large effect size (i.e., the correlations were $-.33$ for maternal hostility and $-.37$ for paternal hostility). Moreover, the few available longitudinal studies suggest that parental hostility negatively predicts children's self-esteem (Amato & Fowler, 2002; Heaven & Ciarrochi, 2008).

Parental Monitoring

Parental monitoring is characterized by awareness, attention, watchfulness, and tracking and supervision of children's activities (e.g., Dishion & McMahon, 1998; Small & Kerns, 1993). Monitoring may contribute to setting appropriate boundaries that help parents in protecting the child from potentially harmful situations (including self-esteem threatening situations). Cross-sectional research suggests that parental monitoring is positively associated with children's self-esteem (Bush, Peterson, Cobas, & Supple, 2002; Bush, Supple, & Lash, 2004; Parker & Benson, 2004; Patterson, Reid, & Dishion, 1992). However, a longitudinal study found no evidence for a prospective effect of monitoring on children's self-esteem (Amato & Fowler, 2002). It is important to distinguish parental monitoring from parental control. In contrast to parental control, parental monitoring does not necessarily restrict the autonomy of the child. Moreover, parental control is negatively associated with self-esteem, whereas parental monitoring shows positive associations (Bean, Bush, McKenry, & Wilson, 2003; Garber, Robinson, & Valentiner, 1997; Gecas & Schwalbe, 1986).

Parental Involvement in Child Education

Parental involvement in the child's education represents a parenting behavior characterized by interest, participation, encouragement, and supervision of the child's schoolwork (e.g., Cotton & Wikelund, 1989). Flouri (2006) argues that parents' interest in their child's education conveys respect that leads to a sense of personal significance and thus, to heightened feelings of self-esteem in the child. Also, parental involvement in the child's education might lead to better learning conditions, improved school performance, and an increase in the child's sense of competence. Empirical research suggests that interventions aimed at parental involvement in education improve children's self-esteem (Hara & Burke, 1998; Henderson, 1987). Yet, there is a dearth of longitudinal research on the effects of parental involvement in child's education on children's self-esteem.

Parental Characteristics and Children's Self-Esteem

In addition to parenting behavior, other characteristics of the family environment may be influential in the development of children's self-esteem. In this article, we will use the term parental characteristics to denote these other characteristics of the family environment (i.e., nonparenting variables).

Quality of Parental Relationship

The quality of the relationship between parents could be an important influence on children's self-esteem. Cross-sectional studies indicate that the quality of parental relationship is positively associated with children's self-esteem (Amato, 1986; Doyle &

Markiewicz, 2005). In a longitudinal study, quality of parental relationship had a small, but significant, effect on children's self-esteem when measured several years and even decades later (Orth, 2018). However, as yet, only little longitudinal research examined the effect of quality of parental relationship on children's self-esteem.

Family Values

The concept of family values (also referred to as familism) captures the importance and centrality of the family, as perceived by the individual (Kuhlberg, Peña, & Zayas, 2010). Positive family values include a strong orientation towards the family, commitment to the family, and prioritizing the interests of the family over personal interests (e.g., Bush et al., 2004; Corona, Campos, & Chen, 2017). Family values are of particular importance in Hispanic cultural contexts (e.g., Knight et al., 2010; Rodriguez, Mira, Paez, & Myers, 2007; Sabogal, Marín, Otero-Sabogal, Marín, & Perez-Stable, 1987), and are positively associated with self-esteem among Hispanic adolescents (Bush et al., 2004; Kuhlberg et al., 2010; Li & Warner, 2015). However, longitudinal evidence on the relation between family values and children's self-esteem is not yet available.

Maternal and Paternal Depression

Another relevant characteristic of the family environment is the mental health of parents. Research focusing on maternal depression has reported consistent negative associations with children's emotional and behavioral functioning (Goodman et al., 2011). A longitudinal study based on data from the sample used in the present research suggested that maternal depression has a negative effect on children's self-esteem (Orth, Robins, Widaman, & Conger, 2014).¹ Moreover, cross-sectional evidence on fathers suggests that paternal depression may have negative effects similar to maternal depression (Sweeney & MacBeth, 2016). However, it is important to note that most studies on maternal and paternal depression focused on the child's functioning in general, but not specifically on the child's self-esteem.

Economic Hardship

Poverty is a characteristic of the family environment that is associated with many problems in child development (Bradley & Corwyn, 2002; Conger, Conger, & Martin, 2010; McLoyd, 1998). The family stress model of economic hardship suggests that poverty leads to parental emotional distress (e.g., depression), interparental conflict, impaired parenting behavior, and, in turn, to adjustment problems in children (e.g., Conger & Donnellan, 2007). In line with this theory, several studies reported a negative effect of family economic hardship on children's self-esteem that was mediated by maladaptive parenting; however, a limitation of the evidence is that all of these studies used cross-sectional designs (Conger, Ge, Elder, Lorenz, & Simons, 1994; Mayhew & Lempers, 1998; Whitbeck et al., 1991).

¹The data used in Orth et al. (2014) overlap slightly with the present study. In Orth et al., maternal depression was examined as control variable for the link between child self-esteem and child depression, but no other family environment variables (or paternal depression) were examined. In the present report, we included the findings on maternal depression for reasons of completeness and because the effect could now be tested over four waves instead of two. Except for this overlap, the present analyses do not overlap with any analyses reported in previous publications using data from the California Families Project (CFP). Moreover, the research questions addressed in the present article have not been examined in previous publications with the CFP data.

Presence of Father

Finally, an important objective characteristic in children's family environment is whether the father is present (i.e., lives in the same household as mother and child). There are many reasons for why a father might be absent, for instance, due to divorce or separation, illness, death, work abroad, or because the mother was never in a committed relationship with the father. Findings from cross-sectional studies indicate that the absence of the father is associated with lower self-esteem among children and adolescents (Luo, Wang, & Gao, 2012; Smith Hendricks et al., 2005). A possible mechanism for this effect may be that children interpret the absence of their father as a sign that he does not love and accept them. Moreover, if the father is absent, there is one less significant other who could potentially show warmth, love, and interest towards the child.

Parenting Behavior as a Mediator of the Effects of Parental Characteristics on Child Self-Esteem

Theoretical perspectives and empirical evidence on most of the parental characteristics reviewed in the previous section suggest that their effects on children's self-esteem may be mediated by parenting behavior. For example, the spillover hypothesis posits that the quality of the parental relationship leads to changes in other domains such as parenting behavior (Easterbrooks & Emde, 1988; Engfer, 1988). Empirical support for the spillover hypothesis is provided by a meta-analysis showing a medium-sized negative association between interparental conflict and adaptive parenting behaviors (Krishnakumar & Buehler, 2000). Also, in a longitudinal study with a large sample, parenting behavior mediated the self-esteem effects of quality of parental relationship, maternal depression, poverty status of the family, and presence of father (Orth, 2018). In sum, parents having a high-quality relationship with each other, good mental health, secure economic conditions and support by a second parent might have more emotional resources to respond with warmth and devotedness to the child's needs (e.g., Cummings & Davies, 1994; Lamb, 2010; Orth, 2018). Thus, these parental characteristics could influence the quality of parenting behavior and thereby affect children's self-esteem. In the present research, we therefore tested whether the effects of parental characteristics are mediated, at least partially, by parenting behavior. We conducted these tests for the non-parenting and parenting variables that showed significant effects on children's self-esteem.

The Importance of Controlling for Shared Method Variance

In the present research, we used a multi-informant approach (i.e., mothers, fathers, and children from the same families), allowing us to control for the influence of shared method variance. Specifically, we constructed latent variables that helped control for response biases unique to individual raters and, consequently, captured only the construct variance shared among raters (in theory at least). In fact, shared method variance is an important methodological problem in many fields of the behavioral sciences (Bagozzi & Yi, 1991; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Shared method variance is even considered more critical than random error because it may provide an alternative explanation of the observed relations (Podsakoff et al., 2003).

Shared method variance arises when information on two or more variables is obtained from the same source. In particular, reports from the same rater frequently are influenced by response biases, such as implicit theories, social desirability, or mood (Podsakoff et al., 2003). For example, if family environment and child self-esteem were both assessed by parent report, then the association between the constructs might reflect, at least partially, shared method variance rather than a true association between the constructs. This is the case for two reasons. First, implicit theories of parents about how their parenting behavior affects their child's adjustment could bias their reports of both parenting and child self-esteem in similar ways. Second, although many parents prefer not to fail at being good caregivers and therefore tend to rate their parenting behavior and the adjustment of their child in positively biased ways, parents differ in the degree of social desirable responding, which leads to inflated correlations between variables that are assessed by parent report. To give another example, if family environment and child self-esteem were both assessed by child report, then the correlation between the constructs could be inflated by mood effects. More precisely, a child with negative affectivity tends to view everything in a bad light (in this case, his or her self-esteem and family environment), as opposed to a child with positive affectivity. In sum, if information on family environment and self-esteem comes from a single source, then the relation between the constructs could simply result from response biases.

In this research, we therefore used the ratings by mothers, fathers, and children (where available) as multiple indicators of family environment characteristics and allowed for correlations between the residuals of indicators from the same source of information (e.g., the residuals of the child report on mother and the child report on father). Self-esteem of children was measured by self-report only, which is widely considered the best method to assess a phenomenological construct like self-esteem (Donnellan, Trzesniewski, & Robins, 2011). However, given that the family environment latent variables were controlled for method variance, the analyses ensured that any observed relation between family environment and self-esteem cannot be explained by shared method variance.

The Present Research

The goal of the present research was to examine prospective reciprocal associations between family environment and children's self-esteem. For the analyses, we used 4-wave longitudinal data from a large sample of Mexican-origin youth (and their parents) followed from age 10 years (Time 1) to 16 years (Time 4).

The present research extends previous research in several ways. First, we examined a large number of characteristics of family environment, including measures of parenting behaviors (i.e., parental warmth, parental hostility, parental monitoring, and parental involvement in child's education) and measures of other characteristics of the family environment (i.e., quality of parental relationship, family values, maternal and paternal depression, economic hardship, and presence of father). The comprehensive assessment enabled us to compare the effects of key characteristics of the family environment within the same sample. Second, for many of these variables (e.g., parental involvement in child's education, family values, paternal depression), the present research provides the first longitudinal test of their effects

on children's self-esteem. For all variables, the longitudinal design of the research allowed us to control the effects for previous levels in the constructs. Third, since there were four waves of repeated assessments of all constructs, all effects were aggregated across waves, which increased the precision and robustness of the estimates. Fourth, the multi-informant approach (i.e., for many of the family environment variables, the study included assessments by mothers, fathers, and children) allowed us to construct latent variables that were free, at least theoretically, from the confounding influence of response biases inherent in the unique perspectives of mothers, fathers, and children.

Based on the previous research reviewed above, we derived the following hypotheses. Regarding parenting behaviors, we predicted that warmth, monitoring, and involvement in child's education would have a positive effect on children's self-esteem, and that hostility would have a negative effect. Also, we predicted that children's self-esteem would have a positive effect on parental warmth and a negative effect on parental hostility. We did not expect any effects of children's self-esteem on parental monitoring or parental involvement in child's education. Regarding the other characteristics of the family environment (i.e., non-parenting variables), we predicted that the quality of parental relationship, family values, and presence of father would have a positive effect on children's self-esteem and that maternal depression, paternal depression, and poor economic conditions of the family would have a negative effect. However, we did not expect effects of children's self-esteem on these factors.

In addition, we conducted the following analyses. First, we tested whether child gender or child age moderated the reciprocal associations between family environment and self-esteem. Based on past research, we did not expect either gender or age to moderate any of these associations. Second, we tested whether parental monitoring has a curvilinear effect on children's self-esteem, such that the effect becomes smaller and, possibly, negative at *very* high levels of monitoring (for this analysis, we had no expectations about the results). Finally, we tested whether any of the observed effects of non-parenting variables on self-esteem were mediated, at least partially, by parenting behavior.

To examine our research questions, we originally planned to exclusively use cross-lagged panel models (CLPMs; for information on the preregistered research plan, see the beginning of the Method section). During the review process, the editor and reviewers recommended additional analyses with an alternative model. Currently, there is considerable debate about the most appropriate model that should be used when testing for prospective effects between constructs on the basis of longitudinal data (e.g., Berry & Willoughby, 2017; Hamaker, Kuiper, & Grasman, 2015; Orth, Clark, Donnellan, & Robins, 2018; Usami, Hayes, & McArdle, 2016; Usami, Murayama, & Hamaker, 2019).

A major concern about the CLPM is that the stable between-person variance (i.e., in the present context, the stable between-family variance) is not controlled for in the wave-specific construct factors and that the cross-lagged effects could be confounded by the unmodeled influence of the stable components of the constructs (Berry & Willoughby, 2017; Hamaker et al., 2015). This problem is not solved simply by specifying autoregressive paths in the model. Consequently, a number of alternative models have been proposed that

explicitly model stable individual differences (e.g., Bollen & Curran, 2004; Curran, Howard, Bainter, Lane, & McGinley, 2014; Hamaker et al., 2015; Kenny & Zautra, 1995).

From these alternative models, we selected the random intercepts cross-lagged panel model (RI-CLPM; Hamaker et al., 2015) for three reasons. First, this model has received a great deal of attention, and was suggested by the reviewers. Second, compared to other models that distinguish within-person and between-person variance, the RI-CLPM is a relatively simple extension of the CLPM by including two random intercept factors that are correlated between constructs. Third, in a study that tested the CLPM and six alternative cross-lagged models across 10 longitudinal samples (most of which included four waves of data, as in the present study), the RI-CLPM showed a perfect convergence rate (as did the CLPM), whereas all of the other models frequently did not converge properly or did not converge at all (Orth, Clark, et al., 2018). The analyses with the RI-CLPM were preregistered in a supplemental research plan (see beginning of Method section).

It is important to note that those models that control for stable between-person variance in the constructs do not allow to examine prospective effects at the between-person level; in these models, between-person effects are modeled as correlations (e.g., as correlation between the random intercepts, as in the RI-CLPM). However, researchers are frequently interested in gaining information not only about the consequences of within-person variance, but also of between-person differences. For example, in the context of the present research, a central question is whether children growing up in a relatively warm family environment (i.e., warmer than most other families included in the sample) tend to show more positive changes in self-esteem (as indicated by positive changes in the rank order in the construct) than children growing up in less warm family environments. Although the CLPM does not model stable between-person variance, it does provide information on how individual differences in one construct predict changes in individual differences in the other construct over time, which is the reason for why we originally had planned, as described in our preregistration, to use the CLPM. In contrast, the RI-CLPM is mute with regard to whether differences between families in their level of warmth predict later differences between children in their level of self-esteem (or even more specifically, predict changes in the rank-order of children in their level of self-esteem). Instead, the RI-CLPM focuses on within-person effects by examining cross-lagged paths after residualizing out stable between-person differences (for a more detailed description of the model, see Results section). In this model, the residualized scores are deviations that fluctuate, in the long term, around the trait level. Consequently, the RI-CLPM provides insight into whether a within-person deviation from the trait level of one construct (e.g., the level of warmth in a family) predicts subsequent change in the within-person deviation from the trait level of another construct (e.g., children's self-esteem). Given that these models provide complementary information, we believe that it is informative to use both types of models (i.e., CLPM and RICLPM) when examining the prospective association between family environment and children's self-esteem.

Method

This research has been approved by the Institutional Review Board of the University of California, Davis (217484–25, “Mexican Family Culture and Substance Use Risk and Resilience”). The present study has been preregistered on the Open Science Framework (<https://osf.io/yajmp>). During the review process, the editor and the reviewers recommended additional analyses (see above), which have been registered in a supplemental research plan prior to conducting these analyses (<https://osf.io/jz7nv>). Code and results for all models are available at <https://osf.io/gjw3e>.

Since we preregistered analyses with existing data, we briefly describe our familiarity with the data prior to registering the analyses. The first author had no previous exposure to the data (i.e., the California Families Project, CFP). The second author had conducted two studies with data from the CFP (Orth, Robins, Meier, & Conger, 2016; Orth et al., 2014). These studies involved analyses with self-esteem and maternal depression; however, the second author had not conducted analyses with any of the other variables examined in the present research. The third author is the principal investigator of the CFP and is deeply familiar with the overall dataset. The research plan was written by the first and second author, on the basis of the CFP codebook. The third author provided required information and gave general feedback on the research plan. After preregistering the research plan, the analyses were conducted by the first author, with support from the second author.

Participants and Procedures

Data came from the CFP, an ongoing longitudinal study of 674 Mexican-origin families that began in 2006.² The focal child had to be in the 5th grade, of Mexican origin, and living with his or her biological mother, in order to participate in the study. Children and their families were drawn at random from rosters of students in the school districts of Sacramento and Woodland, California. Of the eligible families, 73% agreed to participate.

Participants were interviewed in their homes in Spanish or English, depending on their preference. Interviewers were all bilingual and most were of Mexican heritage. Sixty-three percent of mothers and 65% of fathers had less than a high school education (median = 9th grade for both mothers and fathers). Median total household income was between \$30,000 and \$35,000 at Wave 1. Eighty-four percent of mothers, 88% of fathers, and 29% of children were born in Mexico. At Wave 1, 549 of the families were two-parent households and 124 of the families were single-parent households (mothers only).

The present study used four waves of data, with a two-year interval between waves. Specifically, data came from Waves 1, 3, 5, and 7 of the CFP, because nearly all constructs relevant to this research were measured only at these assessments (at Waves 2, 4, 6, 8, and 9, only limited assessment interviews were conducted). For reasons of clarity, in the remainder

²The data are not publicly available because of confidentiality risks when data from family studies are public; in particular, it is possible that participants could identify data from other members of their family, which would compromise the confidentiality of their individual responses (Finkel, Eastwick, & Reis, 2015). Information on how to access the data, a codebook with descriptions of the measures, and a list of publications using the data are available at <https://www.icpsr.umich.edu/icpsrweb/NAHDAP/studies/35476>.

of this article the four waves used in the present research are denoted as Time 1 to Time 4. At Time 1, mean age of the children (50% female) was 10.4 years ($SD = 0.60$).

Data on study variables were available for 672 families at Time 1, 579 families at Time 2, 610 families at Time 3, and 607 families at Time 4. Thus, from Time 1 to Time 4, the overall attrition was 10%. To investigate the potential impact of attrition, we compared families who did and did not participate at Time 4 on study variables assessed at Time 1. From families who dropped out, mothers reported significantly less economic hardship on one subscale (Can't Make Ends Meet; $M_s = 2.25$ vs. 2.54 ; $d = -0.38$); for all other variables, differences were nonsignificant.

Measures

Self-esteem.—Given that two measures of self-esteem were available in the CFP, we employed both measures and used them as indicators of a latent self-esteem factor. The first measure was the General Self scale from the Self-Description Questionnaire II short-form (SDQII-S; Marsh, Ellis, Parada, Richards, & Heubeck, 2005). The General Self scale includes six items, as for example “Overall, you have a lot to be proud of” and “You can do things as well as most people.” Responses were measured on a 4-point scale (1 = *not at all true*; 2 = *somewhat true*; 3 = *mostly true*; 4 = *very true*). The second measure was the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965). Item examples are “On the whole, I am satisfied with myself” and “I feel that I have a number of good qualities.” Responses were measured on a 4-point scale (1 = *totally disagree*; 2 = *disagree*; 3 = *agree*; 4 = *totally disagree*). Both the SDQII and RSE are well-validated and widely used measures of self-esteem (Donnellan, Trzesniewski, & Robins, 2015).

Warmth.—Parental warmth towards the child was assessed with two measures, both originally developed for the Iowa Youth and Families Project (e.g., Conger et al., 1992, 1993). For both measures, reports by multiple raters were available, specifically (a) child report on mother's behavior, (b) child report on father's behavior, (c) mother report on father's behavior, and (d) father report on mother's behavior. The first measure was the 9-item Behavioral Affect Rating Scale (BARS; Conger, 1989a). Raters were instructed to assess the behavior within the preceding three months. Item examples for the child report are “During the past 3 months when you and your [mom/dad] have spent time talking or doing things together, how often did your [mom/dad] listen carefully to your point of view?” and “During the past 3 months, how often did your [mom/dad] let you know that [she/he] appreciates you, your ideas or the things you do?” Items for the parent report were appropriately modified and parentheses were replaced by the persons' names (e.g., “During the past 3 months when your partner and [child] have spent time talking or doing things together, how often did [mother/father] listen carefully to [child's] point of view?”). The second measure was the 9-item Iowa Parenting Scale (IPS; Conger, 1989b). In this measure, warmth is measured with items assessing positive reinforcement (e.g., “When you have done something your [mom/dad] likes or approves of, how often does [she/he] let you know [she/he] is pleased about it?”) and inductive reasoning (e.g., “How often does your [mom/dad] give you reasons for [her/his] decisions?”). In both the BARS and IPS, responses were

measured on a 4-point scale (1 = *almost never or never*; 2 = *sometimes*; 3 = *a lot of the time*; 4 = *almost always or always*).

Hostility.—Parental hostility towards the child was assessed with items from the same measures as parental warmth, namely, BARS and IPS. Again, for both measures reports by multiple raters were available, that is, (a) child report on mother's behavior, (b) child report on father's behavior, (c) mother report on father's behavior, and (d) father report on mother's behavior. The BARS assesses hostility with 13 items. Raters were instructed to assess the behavior within the preceding three months. Item examples are “During the past 3 months when you and your [mom/dad] have spent time talking or doing things together, how often did your [mom/dad] get angry at you?” and “During the past 3 months, how often did your [mom/dad] call you bad names?” In the IPS, hostility is measured with four items assessing harsh discipline, for example, “When you do something wrong, how often does your [mom/dad] hit or slap you?” and “When you do something wrong, how often does your [mom/dad] tell you to get out or lock you out of the house?” Again, in both the BARS and IPS, responses were measured on a 4-point scale (1 = *almost never or never*; 2 = *sometimes*; 3 = *a lot of the time*; 4 = *almost always or always*).

Monitoring.—Parental monitoring of the child was assessed with a 14-item scale adapted from Small and Kerns (1993). Reports by multiple raters were available, specifically (a) child report on mother's behavior, (b) child report on father's behavior, (c) mother report on her own behavior, (d) mother report on father's behavior, (e) father report on his own behavior, and (f) father report on mother's behavior. Raters were instructed to assess the behavior within the preceding three months. Item examples for the child reports are “Over the past 3 months, your [mom/dad] knew what you were doing after school” and “When you went out at night, your [mom/dad] knew where you were going to be.” Responses were measured on a 4-point scale (1 = *almost never or never*; 2 = *sometimes*; 3 = *a lot of the time*; 4 = *almost always or always*).

Involvement in child's education.—The extent to which the parents are involved in their child's education was assessed with a 4-item measure adapted from Epstein and Salinas (1993). Reports by multiple raters were available, specifically (a) child report on mother's behavior, (b) child report on father's behavior, (c) mother report on her own behavior, and (d) father report on his own behavior. Raters were instructed to assess the behavior within the past year. Item examples are “In the past year, [your parent/you] helped [you/child] with homework or a school project” and “[Your parent/you] encouraged [you/child] to study.” Responses were measured on a 4-point scale (1 = *never*; 2 = *once or twice*; 3 = *a few times*; 4 = *many times*).

Quality of parental relationship.—The quality of parental relationship was assessed with a 5-item scale (e.g., Yeh, Lorenz, Wickrama, Conger, & Elder, 2006). Reports were provided by mothers and fathers. Item examples are “You have a good relationship” and “Your relationship with [father/mother] is very stable.” Responses were measured on a 4-point scale (1 = *not at all true*; 2 = *somewhat true*; 3 = *mostly true*; 4 = *very true*).

Family values.—Family values were assessed with a 5-item scale adapted from Villarreal, Blozis, and Widaman (2005). Validity and factorial invariance have been confirmed in a representative sample of U.S. Hispanics (Villarreal et al., 2005). Reports were provided by mothers and fathers. Item examples are “You are proud of your family” and “Your family members and you share similar values and beliefs.” Responses were measured on a 4-point scale (1 = *strongly disagree*; 2 = *disagree*; 3 = *agree*; 4 = *strongly agree*).

Maternal and paternal depression.—Maternal and paternal depression were assessed with the 10-item short form (Cole, Rabin, Smith, & Kaufman, 2004) of the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a well-validated measure (Eaton, Smith, Ybarra, Muntaner, & Tien, 2004). For each item, mothers and fathers reported how frequently they experienced the symptom during the past month. Item examples are “You felt that everything you did was an effort” and “You felt lonely.” Responses were measured on a 4-point scale (1 = *almost never or never*, 2 = *sometimes*, 3 = *a lot of the time*, 4 = *almost always or always*).

Economic hardship.—Economic hardship of the family was assessed with three subscales measuring economic pressure (see Conger et al., 2002). The subscale Can’t Make Ends Meet included two items, the subscale Unmet Material Needs six items, and the subscale Financial Cutbacks nine items (thus, the total scale included 17 items). Ratings were provided by both mothers and fathers. All items were assessed with regard to the past three months. An item example of the subscale Can’t Make Ends Meet is, “Now, think back over the past 3 months and tell me how much difficulty you had with paying your bills. Would you say you had . . .,” with responses measured on a 4-point scale (1 = *no difficulty at all*, 2 = *some difficulty*, 3 = *quite a bit of difficulty*, 4 = *a great deal of difficulty*). An item example of the subscale Financial Cutbacks is, “Your family changed food shopping or eating habits a lot to save money during the past 3 months.” For the subscale Financial Cutbacks, responses were measured on a dichotomous scale (1 = *no*, 2 = *yes*).

Presence of father.—At each wave, mothers reported which adults (i.e., father, new partner, etc.) were living in the home with her and the child. We created a dichotomous variable, with 0 indicating that only the mother was living with the child, and 1 indicating that both mother and father were living with the child. All other situations (e.g., biological mother with a new partner) were treated as missing values; however, other situations were rare (6%).

Statistical Analyses

Analyses of structural equation models were conducted with the Mplus 8 program (Muthén & Muthén, 2017). To deal with missing values, we employed full information maximum likelihood estimation to fit models directly to the raw data (Schafer & Graham, 2002). Model fit was assessed with the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis index (TLI; Tucker & Lewis, 1973), and the root mean square error of approximation (RMSEA; Steiger, 1990). Good fit was indicated by values equal to or higher than .95 for CFI and TLI, and equal to or less than .06 for RMSEA (Hu & Bentler, 1999). Model

comparisons were made by using the test of small difference in fit (MacCallum, Browne, & Cai, 2006, Program C).

To assess the reliability of the measures, we used coefficient omega (Revelle & Zinbarg, 2009). Omega was computed with the “psych” package (Revelle, 2018) in R (R Core Team, 2018). However, this package does not allow computing omega for two-item scales. Therefore, in these cases we computed omega following the procedure described by Widaman, Little, Preacher, and Sawalani (2011).

Wherever possible, we used multiple indicators to measure the constructs as latent variables, which allowed us to control for measurement error and systematic bias included in the measures. In particular, for family environment variables, we used the ratings by mothers, fathers, and children (where available) as multiple indicators of latent variables, thereby controlling for the unique biases of family members. To fully control for bias due to specific raters, the residuals between appropriate indicators were correlated (e.g., the residuals of the child report on mother and the child report on father were correlated). Furthermore, the residuals of identical indicators were correlated across waves, to control for additional bias due to indicator-specific variance (Cole & Maxwell, 2003).

Child self-esteem was measured by three indicators: The General Self scale of the SDQII-S and two parcels from the RSE based on item valence (i.e., positive and negative item wording). A methodological complication was that at Time 1, only the SDQII-S but not the RSE was available. We resolved this issue by imposing measurement invariance on the SDQII-S, which allows using the SDQII-S indicator as an anchor to equate the latent self-esteem factors across waves (Edwards & Wirth, 2009). Maternal and paternal depression, as well as family values of mother and father, were each measured by three parcels (based on the balancing technique; Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013). Presence of father was a single-item indicator, and appropriately defined as a categorical variable in Mplus.³

Results

Descriptive information on means, standard deviations, and reliability of study variables across waves is reported in Tables 1 and 2. Intercorrelations among all family environment characteristics at Time 1 (averaged across raters) can be found in Supplemental Table S1.

Measurement Invariance

For each construct, we tested whether longitudinal metric measurement invariance was supported by the data (Widaman, Ferrer, & Conger, 2010). When using cross-lagged models such as the CLPM and RI-CLPM, this level of measurement invariance is required to ensure that latent constructs have the same meaning across waves (Schmitt & Kuljanin, 2008). To test measurement invariance, we compared the fit of two measurement models. In the first model, factor loadings were constrained to be equal across time, whereas in the second

³When a dichotomous outcome variable is defined as categorical in Mplus, it is treated as a binary dependent variable in the model and its estimation (i.e., probit regression with a robust weighted least squares estimator).

model, factor loadings were free to vary across time. For all constructs, the test of small difference in fit indicated that the constraints did not significantly decrease model fit, supporting metric measurement invariance (Supplemental Table S2). Consequently, we used these constraints in the remainder of the analyses.

Cross-Lagged Panel Models

Bivariate analyses.—Because of the large number of family environment variables examined in this research, each of the factors was tested in a separate model. Figure 1 provides a generic illustration of the bivariate CLPMs. The cross-lagged paths indicate the prospective effect of one variable on the other (e.g., effect of parental warmth at Time 1 on self-esteem at Time 2), after controlling for their concurrent associations (e.g., family environment at Time 1 with self-esteem at Time 1) and their stabilities across time (e.g., effect of self-esteem at Time 1 on self-esteem at Time 2). Overall, the fit of the models tested was good (Table 3).

Table 4 shows the standardized estimates of the cross-lagged effects and the Time 1 correlations from the CLPMs (standardized estimates of the stability effects can be found in Supplemental Table S3). Unstandardized estimates, standard errors, and exact *p*-values are reported in Supplemental Table S4. A number of family environment variables had significant cross-lagged effects on child self-esteem. As expected, parental warmth, parental monitoring, and the presence of father positively predicted later child self-esteem, whereas depression of mother and economic hardship negatively predicted later child self-esteem.⁴ However, contrary to our predictions, no significant effects emerged for parental hostility, parental involvement in child's education, the quality of parental relationship, family values of mother and father, and paternal depression.⁵

Regarding the reciprocal effect of child self-esteem on family environment, there were only two significant effects: child self-esteem positively predicted subsequent family values of mother and father.⁶ Contrary to our expectations, child self-esteem did not predict parental warmth or hostility. However, all other nonsignificant effects of child self-esteem on family environment were as expected.

Moreover, for each family environment construct, we tested whether child gender moderated the prospective effects between the construct and self-esteem. For this purpose, we compared the fit of two models. In the first model, structural coefficients were constrained to be equal across gender, whereas in the second model, the coefficients were allowed to vary across gender. For all family environment variables, the test of small difference in fit indicated that the constraints across gender did not significantly decrease model fit,

⁴In the model for presence of father, the cross-lagged effect of self-esteem on presence of father, and the correlations between self-esteem and presence of father, had to be omitted to allow for convergence of the model. A likely reason is that presence of father was very stable across waves (the estimated stability was .89, averaged across the two-year intervals).

⁵In the model for depression of father, we constrained the residual variance of one indicator to zero to allow for proper convergence of the model (Chen, Bollen, Paxton, Curran, & Kirby, 2001).

⁶A deviation from the preregistration is that family values were examined separately for mothers and fathers, instead of creating a single latent construct combining the different perspectives. When constructing a family-level latent variable, the factor loadings were small and did not allow to measure a meaningful latent construct, corresponding to small zero-order correlations between the different perspectives (.13 averaged across waves).

suggesting that child gender did not moderate the effects between family environment and child self-esteem (Supplemental Table S5).

Also, for each family environment construct, we tested whether the effect of the construct on child self-esteem differed across waves and, consequently, across age, given that participants were of the same age and went through adolescence between Time 1 to Time 4, from age 10 to 16 years. For each family environment variable, the test of small difference in fit indicated that cross-wave constraints on structural coefficients did not significantly decrease model fit, suggesting that the participants' age did not moderate the effects of the family environment on their self-esteem (Supplemental Table S6).

Finally, we tested whether parental monitoring had a curvilinear effect on child self-esteem. Specifically, we included the squared latent variable of the monitoring construct in the model and tested its effect over and above the effect of the non-squared latent variable. The results showed that there was no evidence of a curvilinear effect of monitoring ($p = .344$).

Mediation analyses.—As reported above, parental warmth and parental monitoring were both associated with child self-esteem. As described in the Introduction (and in the preregistration), we therefore used longitudinal mediation analyses to test whether parental warmth and parental monitoring account for the prospective effects of the more distal parental characteristics that showed significant effects on child self-esteem (i.e., depression of mother, economic hardship, and presence of father).⁷ Each mediation effect was tested in one model, resulting in six analyses. Figure 2 provides a generic illustration of the mediation models used, following the recommendations by Cole and Maxwell (2003).

To test for mediation and assess its effect size, we examined the overall direct and indirect effect from the parental characteristic at Time 1 to child self-esteem at Time 4. Figure 2A shows the paths included in the overall direct effect (i.e., all paths from the parental characteristic at Time 1 to child self-esteem at Time 4 that do not pass through parenting behavior at any wave) and Figure 2B shows the paths involved in the overall indirect effect (i.e., all paths from the parental characteristic at Time 1 to child self-esteem at Time 4 that pass through parenting behavior at least once).

The results of the mediation analyses are reported in Table 5, including the standardized and unstandardized estimates of the total effect, the overall direct effect, and the overall indirect effect. For the unstandardized estimates, bootstrapped bias-corrected 95% confidence intervals were computed. In three of the six models, the overall indirect effect differed significantly from zero. First, the effect of economic hardship on child self-esteem was mediated by parental warmth. The standardized estimate of the overall indirect effect was $-.020$, indicating a small effect (accounting for 20% of the total effect). Second, the effect of economic hardship on child self-esteem was mediated also by parental monitoring. The standardized estimate of the overall indirect effect was $-.015$, indicating a small effect (accounting for 17% of the total effect). These two mediation effects suggested that

⁷In the mediation analyses with presence of father, the constraints described in Footnote 4 were not needed for proper convergence. We therefore computed the model without these constraints.

economic hardship reduces parental warmth and parental monitoring and thereby decreases child self-esteem. Third, there was an indirect effect of presence of father on child self-esteem through parental monitoring. The standardized estimate of the indirect effect was .020, indicating a small effect (accounting for 38% of the total effect). However, we note that in this case the total effect was nonsignificant. Therefore, this mediation effect should be interpreted with caution.

Random Intercepts Cross-Lagged Panel Models

Bivariate analyses.—In addition to using CLPMs, we tested the relations between family environment and child self-esteem also on the basis of RI-CLPMs. Figure 3 provides a generic illustration of the bivariate RI-CLPMs. In the RI-CLPM, the residual variances of the latent constructs are set to zero and the variances of the latent constructs are completely decomposed into a stable component and residualized scores. In the context of the present study, the stable components, called random intercept factors, capture the between-family variances in the constructs while the residualized scores capture the within-family variances. In each of our models, there was one random intercept factor for child self-esteem and one random intercept factor for the family environment variable. These two random intercepts were allowed to be correlated. All structural relations were then modeled as in the traditional CLPM but between the residualized scores (for a multiple indicator version of the RI-CLPM, see Hamaker, 2018).

In contrast to the CLPM, the RI-CLPM explicitly models the stable between-family variance for each construct. Consequently, a cross-lagged effect tests for the prospective effect of a within-family deviation from the trait level of one construct (e.g., parental hostility) on change in the within-family deviation from the trait level of the other construct (e.g., child self-esteem). For example, a negative cross-lagged effect from hostility to child self-esteem would indicate that when parents act more hostile than usual at a given time point, the child shows a drop in self-esteem at a subsequent time point.

As in the analyses with the CLPM, we tested each family environment variable in a separate model. Also, all measurement models and statistical procedures remained the same. Overall, the fit of the models tested was good (Table 6). However, we were unable to test the effects of four of the constructs examined because the RI-CLPMs did not converge, or did not converge properly, for warmth, monitoring, involvement in education, or presence of father.

Table 4 shows the standardized estimates of the cross-lagged effects and the correlations between the random intercepts from the RI-CLPMs (standardized estimates of the stability effects can be found in Supplemental Table S3). Unstandardized estimates, standard errors, and exact *p*-values are reported in Supplemental Table S7. The only family environment variable that had a significant cross-lagged effect on child self-esteem was depression of mother. Thus, there was a negative prospective effect from maternal depression to child self-esteem. Regarding the reciprocal effect of child self-esteem on family environment, there was one significant cross-lagged effect: Child self-esteem had a positive prospective effect on family values of the father. The stability effects in the RI-CLPMs capture autoregressive effects between the within-family deviations from the trait level of a construct. Therefore, it was not surprising that these stability effects were smaller than those from the CLPMs (in

the CLPM, the stability effect is an indicator of rank-order stability in a construct, which is not the case in the RI-CLPM).

Next, as in the analyses with the CLPM, we tested whether child gender moderated the prospective associations between family environment and self-esteem. These tests were possible for 3 of the 11 family environment constructs (i.e., eight of the models showed convergence issues). The test of small difference in fit indicated that the constraints across gender did not significantly decrease model fit, suggesting that child gender did not moderate the effects between family environment and child self-esteem (Supplemental Table S8). Then, we tested whether the effect of the family environment on child self-esteem differed across waves and, consequently, across age. These tests were possible for 6 of the 11 family environment constructs (i.e., five of the models showed convergence issues). The tests of small difference in fit indicated that cross-wave constraints did not significantly decrease model fit, suggesting that the participants' age did not moderate the effects of the family environment on their self-esteem (Supplemental Table S9). Given that the RI-CLPM for parental monitoring did not converge properly, we did not test for a curvilinear effect of monitoring on child self-esteem.

Mediation analyses.—Given that none of the parenting behaviors showed a significant effect on child self-esteem, we did not conduct any mediation analyses for the RI-CLPMs.

Discussion

In the present study, we examined the relation between family environment and children's self-esteem in a large sample of Mexican-origin families. Data came from the CFP, a longitudinal study that uses a multi-informant approach (i.e., including assessments of mothers, fathers, and children from the same families). Results from the CLPMs indicated that a number of family environment variables affected child self-esteem. Specifically, parental warmth, parental monitoring, and presence of father positively predicted subsequent child self-esteem, whereas maternal depression and economic hardship negatively predicted subsequent child self-esteem. Regarding the opposite direction of the relation, the results suggested that child self-esteem positively shaped family values of mother and father. Moreover, longitudinal mediation analyses suggested that the effect of economic hardship on child self-esteem was partially mediated by parental warmth and by parental monitoring. In terms of point estimates, results from the RI-CLPMs evidenced a similar pattern compared to the results from the CLPMs. However, the RI-CLPMs yielded only two significant cross-lagged effects: a negative effect of maternal depression on child self-esteem, and a positive effect of child self-esteem on family values of father. These two effects were consistent with the effects found using CLPMs, but all other cross-lagged effects that were significant with CLPMs were nonsignificant with the RICLPMs.

Implications Based on the Findings from the CLPMs

As expected, parental warmth and parental monitoring significantly predicted later child self-esteem. These findings are in line with multiple theories, such as symbolic interactionism (Blumer, 1986; Cooley, 1902; Mead, 1934), attachment theory (Bowlby, 1969, 1973, 1980), and sociometer theory (Leary, 2012). The present research provides

empirical support for a key hypothesis that can be derived from these theories, specifically, that parenting behavior influences the development of children's and adolescents' self-esteem.

Theory might suggest that *very* high levels of parental monitoring could have a negative effect on child self-esteem through compromising the development of the child's autonomy (Ryan & Deci, 2002). Overly protective parents who frequently intervene in their children's affairs and make all decisions for them are also called "helicopter parents" (Cline & Fay, 2014). Research suggests that high levels of psychological control and low levels of autonomy of the child are negatively associated with self-esteem (e.g., Bean et al., 2003). However, in the present research we did not find any evidence for a curvilinear effect that would qualify the positive effect reported above. Thus, the present findings indicate that even very high levels of monitoring promote children's and adolescents' self-esteem. In our opinion, the concept of monitoring as a parenting behavior needs to be clearly distinguished from the concept of parental control. If monitoring entails being aware of, and genuinely interested in, the child's activities rather than interfering, then its positive effect on child self-esteem is no longer surprising.

In contrast to our predictions, parental hostility and the parents' involvement in the child's education did not show prospective effects on children's self-esteem. However, it is important to note that the concurrent relations between these family environment variables and child self-esteem were substantial and in the expected direction (as indicated by the Time 1 correlations between the constructs). Thus, even if no prospective effects emerged, the present findings do not suggest that hostility and involvement in the child's education are unrelated to the child's self-esteem. A possible explanation of the nonsignificant hostility effect, and potential limitation of the present research, is that the means of the hostility measures were relatively low (from the perspective of parents and children), suggesting that floor effects may have suppressed a negative effect of hostility. However, although floor effects are undesirable from a methodological perspective, in this particular case they are positive from a substantive perspective, because they indicate a low level of severe hostility in this sample. A similar, but slightly different explanation for the nonsignificant hostility effect might be that the effect of parenting behavior on child self-esteem depends on the predominant interaction style between parents and children. Thus, even if hostile interactions occur, if they are much less frequent than warm interactions, then these hostile interactions might not have a detrimental effect on children's self-esteem. In any case, although in the present research no significant hostility effect emerged, we believe that future research should continue to test for effects of parental hostility on child self-esteem.

Consistent with our hypotheses, maternal depression negatively predicted child self-esteem. However, in contrast to our predictions, this effect was not mediated by parenting behavior, suggesting that other mechanisms might account for the effect. For example, maternal depression might result in a stressed and dismal atmosphere at home, which in turn might lead to a higher likelihood of social isolation of the child if he or she is hesitant to take peers and friends home. Another possible explanation for the nonsignificant mediation effect of parenting behavior is that maternal depression exerts a direct effect on child self-esteem. For example, the child might perceive him- or herself as less valuable *because* the mother

frequently shows depressive symptoms. Still another possibility is that the effect of maternal depression on child self-esteem can be explained by underlying genetic effects. However, in the present case it is unlikely that genes account for the effect of maternal depression on children's self-esteem, given that paternal depression did not show any effect. If the genetic explanation were correct, then we would expect that the depression levels of mothers and fathers show at least similar effects on the child's self-esteem. For this reason, we believe that the effect of maternal depression should be explained by an environmental, not genetic, pathway. The environmental explanation is also consistent with the fact that, in most families, mothers spend more time with the child than fathers do (Phares, Fields, & Kamboukos, 2009), which could account for stronger effects of affective characteristics of mothers compared to fathers.

As hypothesized, family economic hardship had a negative prospective effect on child self-esteem, which was partially mediated by parental warmth and by parental monitoring. The mediation effects are consistent with the family stress model, which proposes that economic hardship initiates a sequential cascade of problems including disruptions in parenting, which in turn increase the risk for adolescent adjustment problems (e.g., Conger & Donnellan, 2007). However, the mediation effects were relatively small and the confidence intervals of the indirect effects were very close to including zero, indicating that the evidence for the indirect effects is weak. Nevertheless, given the strong theoretical support for the mediation effects, we believe that the findings are potentially important. Future research should address the mediational processes that lead from economic hardship to low self-esteem in more detail. For example, in addition to parenting behavior, the effect could be accounted for by other mediators such as peer approval. If adolescents have much more limited financial resources than their peers, they cannot afford joining at least some social activities and may need to do without fashionable and popular products, such as clothes, smartphones, and so on. Consequently, economic hardship may compromise the popularity of adolescents among their peers, which in turn may compromise their self-esteem.

Presence of father had a positive effect on child self-esteem.⁸ However, this finding should be interpreted only tentatively, because the model converged only when imposing additional constraints (see Footnote 4). The constraints could be removed in the mediation analyses, which, however, resulted in a nonsignificant total effect of presence of father on child self-esteem. We therefore concluded that the present evidence on the effect of presence of father is not sufficiently robust. In future research, it would be interesting to test whether the family situation (single parent vs. two parents, heterosexual parents vs. homosexual parents, biological parents vs. adoptive parents, etc.) affects self-esteem development in children and adolescents.

Based on research on the relation between child temperament and parenting behavior (Bates et al., 2012; Schofield & Atherton, in press), we hypothesized that child self-esteem prospectively predicts parental warmth (with a positive sign) and parental hostility (with a

⁸Since presence (vs. absence) of father might be associated with socioeconomic status of the family, we tested whether the effect of presence of father on children's self-esteem was reduced when controlling for family income (specifically, we used mother's and father's report on estimated family income at Time 1). However, the effect of presence of father was virtually unaltered.

negative sign). However, the present findings did not support these hypotheses. With regard to parental warmth, it is possible that two different effects cancel each other out. First, the temperament literature suggests that positive affectivity of the child (which is related to high self-esteem) prospectively predicts parental warmth (Bates et al., 2012). Second, however, insecurity and anxiety (which is related to low self-esteem) frequently elicits compensatory soothing and protective parental behavior and, over time, also predicts parental warmth (Bates et al., 2012). Thus, if both mechanisms are present (i.e., high self-esteem leading to more parental warmth due to its relation to positive affectivity, and low self-esteem leading to more parental warmth due to its relation to insecurity and anxiety) and of similar size, then the resulting overall effect of self-esteem on parental warmth might be a null effect. Nevertheless, although research suggests that the concurrent reciprocal relations between child temperament and parenting behaviors are robust (Bates et al., 2012), few longitudinal studies have tested for prospective effects between the constructs and, moreover, their findings are inconsistent. Future research might benefit from using meta-analytic methods to gain more robust insights into the reciprocal relation between parenting behavior and child personality characteristics, including self-esteem.

The only significant effects from child self-esteem on family environment emerged for the family values of mother and father. A possible explanation for this effect is that children with high self-esteem may contribute to their parents' feelings of pride about their family, which in turn may contribute to positive family values. We note, however, that such an effect could be qualified by cultural and ethnic differences since familism is a central value in Hispanic Americans more than in other ethnic groups in the United States (Knight et al., 2010). Thus, future research is needed to replicate the effect of child self-esteem on parents' family values.

Implications Based on the Findings from the RI-CLPMs

With regard to parenting behaviors, due to convergence issues it was only possible to test the effect of parental hostility on child self-esteem. We expected that when parents act more hostile than usual on a given occasion, the child would show a drop in self-esteem at a subsequent occasion. However, this effect was not statistically significant. With regard to parental characteristics, the only significant effect on child self-esteem emerged for maternal depression. Adolescents whose mothers were more depressed than usual experienced a subsequent decrease in their self-esteem relative to their baseline level across all waves. This within-person effect suggests that interventions aimed at preventing the recurrence of depression in mothers are likely to lead to improvements in their children's self-esteem. In contrast to the results from the CLPM, the negative effect of economic hardship on child self-esteem was not significant. This result suggests that a within-family deviation from the usual level of financial resources does not predict subsequent change in the child's self-esteem.

Due to convergence issues in fitting the models, the effects of child self-esteem on parenting behaviors could only be tested for hostility. However, this effect was not significant, indicating that within-person deviations from the child's trait level of self-esteem did not predict changes in parental hostility at a later time point. The only significant effect from

child self-esteem to family environment emerged for family values of father. Thus, fathers whose children showed higher self-esteem than usual experienced a subsequent increase in their family values. In contrast to the results from the CLPM, the effect of child self-esteem on family values of the mother was not significant in the RI-CLPM.

We note that two methodological issues emerged in the analyses with the RI-CLPM. First, a substantial number of the RI-CLPMs (4 out of 11 models) did not converge or did not converge properly. These convergence issues are likely due to the complexity of the models in the present research (the models were complex because of the multi-informant measurement models and the residual correlations needed to control for shared method variance).⁹ Second, in the RI-CLPM, even moderate effects (such as standardized coefficients at a size of .20) were not significant, which is notable given a sample size of 674 families. In fact, for the RI-CLPM, the standard errors indicated that the coefficients were estimated with relatively low precision, and none of the correlations between the random intercept factors (ranging from .09 to .22 in absolute values) were significant, which is difficult to reconcile with the many significant (and generally much stronger) concurrent associations between self-esteem and family factors. In future research, it would be informative to systematically investigate the conditions under which RI-CLPMs converge properly and provide precise estimates.

When focusing on effect sizes in terms of point estimates (and when leaving significance levels aside), the pattern of findings was actually quite similar for the CLPMs and RI-CLPMs (see Table 4). If anything, the cross-lagged effects from the RI-CLPMs tended to be larger than the effects from the CLPMs. Thus, if the observed point estimates replicate in larger samples (and, consequently, would then be statistically significant), both models would lead to similar conclusions about the effects between family environment and children's self-esteem.

If family environment exerts a causal influence on child self-esteem, it is possible that the effects are reflected in the results from both the CLPM and RI-CLPM. For example, the cross-lagged effect in the CLPM would tell us that children raised in a warm parenting environment are more likely to develop high self-esteem than children raised in a less warm parenting environment. The cross-lagged effect in the RI-CLPM would tell us that children who experience more parental warmth than usual will show a subsequent increase in self-esteem, whereas children who experience less parental warmth than usual will show a subsequent drop in self-esteem. Although developmental theorizing about effects between constructs often takes place at the level of the individual (consequently, these effects should be reflected by the RI-CLPM, which focuses on within-person effects), theory frequently also addresses the developmental consequences of differences between persons or between families (e.g., research on risk and resilience factors). If we take parenting as an example, we would expect individuals raised in a warm parenting environment to develop higher self-esteem than individuals raised in a less warm parenting environment. Typically, a within-

⁹Some readers might wonder whether the four RI-CLPMs with convergence issues would converge, if the cross-lagged paths were set to zero. For exploratory reasons, we tested those models. The results showed that the convergence issues remained. However, we generally do not recommend modifying the models in an exploratory way, to maintain the confirmatory character of the analyses.

person effect of parental warmth should also occur, but in a scenario where parental warmth is stable across time (i.e., no variability in the level of warmth), according to the RI-CLPM, parental warmth cannot possibly have any influence on how the child's self-esteem develops, which does not make sense from a theoretical perspective.

Thus, at this point we return to the debate about cross-lagged models that we raised in the Introduction. Although the CLPM has the limitation that it does not distinguish within-person and between-person variance (Hamaker et al., 2015), the RI-CLPM does not test the prospective effect of between-person differences. In our opinion, to fully understand the relations between psychological constructs it is important to examine the consequences of differences on both the within-person and the between-person level. With regard to the substantive issue of this article, we hope that by using two of the most frequently applied models (i.e., the CLPM and RICLPM), the present research contributes to a better understanding of the link between family environment and children's self-esteem.

Effect Sizes

For both models, the prospective effects between family environment and child self-esteem were not large, which raises the question of whether the observed effects are practically important or not. We believe that the effects are meaningful for several reasons. First, all effects were controlled for the previous levels of the constructs, or, more precisely – in the case of the RI-CLPM – for the previous deviation in the construct from the trait level. These autoregressive effects already account for a large portion of variance in the outcomes, which strongly limits the theoretically-possible range of cross-lagged effects from other constructs. For this reason, effect size conventions for correlation coefficients (Cohen, 1992; e.g., with .10 indicating a small effect) do not apply to cross-lagged effects (Adachi & Willoughby, 2015). In fact, as shown in the CLPM analyses, most of the constructs examined in the present research showed substantial stability across the two-year intervals. Second, the effects of family environment on self-esteem may accumulate over childhood and adolescence; thus, effect sizes based on two-year intervals likely underestimate the aggregate effect of family environment over time. Third, other socialization agents, such as peers and teachers gain increasing importance over the course of childhood and adolescence (Maccoby, 2000), which consequently may reduce the relative importance of parents in adolescent development. Thus, it is possible that studies testing the influence of family environment on children's self-esteem would show larger effect sizes in samples from childhood than in adolescence. If so, then the present research with an adolescent sample should be considered a conservative test of the self-esteem effects of family environment.

Limitations and Future Directions

Several limitations merit consideration when interpreting the findings. First, the present research does not provide a test of causality, given the non-experimental design of the study. Longitudinal designs provide some information about the hypothesized model by testing the effects over time (i.e., having a clear temporal order of predictor and outcome) and by controlling for previous levels of the constructs (i.e., autoregressive effects; Finkel, 1995; Gollob & Reichardt, 1987). However, as in all observational studies, it is possible that the effects are confounded by third variables that were not controlled for, such as genetic factors

or environmental factors outside of the family (omitted variable problem; Little, Preacher, Selig, & Card, 2007).

Second, the present research used data from Mexican-origin families living in the United States, raising the question of whether the findings generalize to other ethnic groups in the United States and to other countries. Whereas some studies suggest that characteristics of the family environment such as parenting behavior differs across ethnic and cultural contexts (e.g., Chao & Kanatsu, 2008), other studies find more similarities than differences (e.g., Julian, McKenry, & McKelvey, 1994). Nevertheless, even if there are cultural differences in mean levels of family environment variables, this does not necessarily imply differences in the relation between family environment and socio-emotional development. For example, research suggests that many attachment-related processes are universal (Mesman, van IJzendoorn, & Sagi-Schwarz, 2016). Also, even if there are ethnic differences in mean levels of self-esteem—specifically, Hispanic adolescents tend to have slightly lower levels of self-esteem than Whites (Bachman, O'Malley, Freedman-Doan, Trzesniewski, & Donnellan, 2011; Erol & Orth, 2011)—research suggests that the patterns and mechanisms of self-esteem development do not substantially differ between cultures (Bleidorn et al., 2016; Orth, Erol, & Luciano, 2018; Robins, Trzesniewski, Tracy, Gosling, & Potter, 2002). In sum, there is reason to believe that the present findings may replicate in samples from other ethnic groups and countries, but future research is needed to address this issue empirically.

Third, the present research did not test for the effects of other social factors in the family environment that might influence children's self-esteem. Especially siblings are a relevant part of the family environment of children and adolescents. Their temperament and the quality of the relationship with the focal child might play an important role in self-esteem development. A cross-sectional study indicated that social support from siblings is associated with higher self-esteem and may even compensate for low support from parents (Milevsky, 2005). Future research should address the prospective impact that siblings and other family members (e.g., grandparents) might have on self-esteem development in childhood and adolescence.

Important strengths of the present study include the prospective longitudinal design, the availability of multiple waves of data, the large sample size, the systematic control of previous levels of the outcomes, and the multi-informant approach allowing us to control for specific biases in the reports of children, mothers, and fathers. Since measurement error and response biases have been controlled, the observed effects are unlikely to be due to shared method variance. Finally, in conducting the research, we followed the preregistered hypotheses, methods, and procedures. Taken together, these methodological characteristics significantly strengthen confidence in the robustness and validity of the findings.

Conclusion

The present research improves our understanding of the link between family environment and children's self-esteem. Overall, the pattern of findings suggests that parental warmth, parental monitoring, low maternal depression, economic security, and presence of father positively predict child self-esteem, and that these effects hold across children's gender and

age. In sum, the present research provides crucial information about factors in the family environment that affect children's self-esteem.

Thus, the findings suggest that effective interventions aimed at improving the self-esteem of children and adolescents should target relevant factors of the family environment. Improving the family environment might be particularly beneficial because research suggests that some of its effects on self-esteem might be enduring and shape children's self-esteem even when these children have grown up and become adults (Orth, 2018). Moreover, improving family environment has positive consequences in many other domains of children's and adolescents' development, such as well-being, health, and education (Biglan, Flay, Embry, & Sandler, 2012; Bradley, Corwyn, Burchinal, McAdoo, & García Coll, 2001; Repetti, Taylor, & Seeman, 2002; Shek, 1997). Admittedly, it might be difficult, or even impossible, to improve some of the relevant factors of the family environment through interventions, such as maternal and paternal depression, economic hardship, and presence of father. Consequently, one of the most promising targets of interventions could be parenting behavior, given that effective interventions are available (e.g., Sanders, Kirby, Tellegen, & Day, 2014) and given that some of the effects of other family environment characteristics, such as economic hardship, might be mediated by parenting behavior.

The present research suggests that parental warmth and monitoring are key parenting behaviors for self-esteem development. Warmth can be realized for example by showing affection and care, accepting the child, helping, encouraging, and praising (Rollins & Thomas, 1979). In particular, contingent praise and attributional feedback effectively improve the self-esteem of children and adolescents (O'Mara, Marsh, Craven, & Debus, 2006). However, we also note that noncontingent praise (e.g., "You are so smart") and inflated praise (e.g., "You drew an incredibly beautiful picture") can be dysfunctional and may even worsen children's self-esteem (Brummelman, Crocker, & Bushman, 2016; Brummelman, Nelemans, Thomaes, & Orobio de Castro, 2017). Good monitoring includes being generally informed about the child's activities (i.e., where and with whom is the child and what is he or she doing), without being intrusive. Monitoring thus provides the basis for protecting the child (e.g., from deviant behavior; Dishion & McMahon, 1998) and for setting boundaries that are appropriate for the developmental status of the child. Protecting the child in appropriate ways may be as important for self-esteem development as supporting autonomy and independence.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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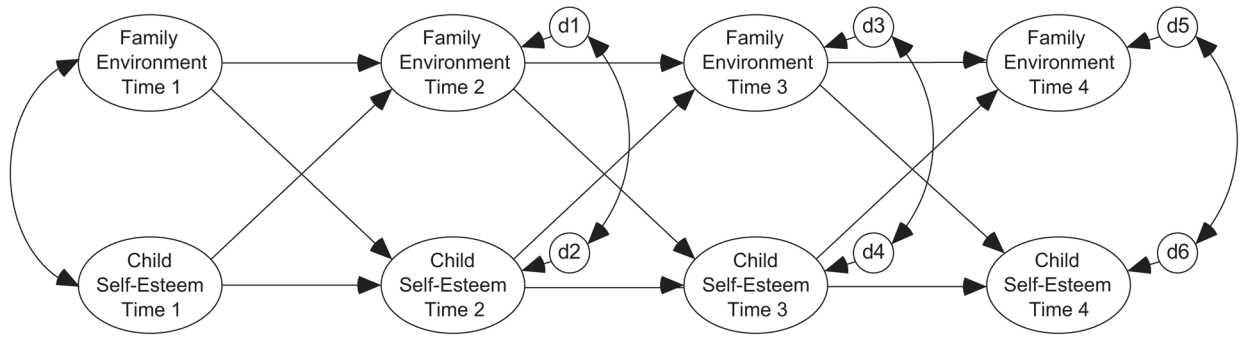


Figure 1. Generic cross-lagged panel model of a family environment factor and child self-esteem. Residual variances (i.e., disturbances) are indicated by *d1* to *d6*. Only latent constructs are shown (i.e., observed variables are omitted).

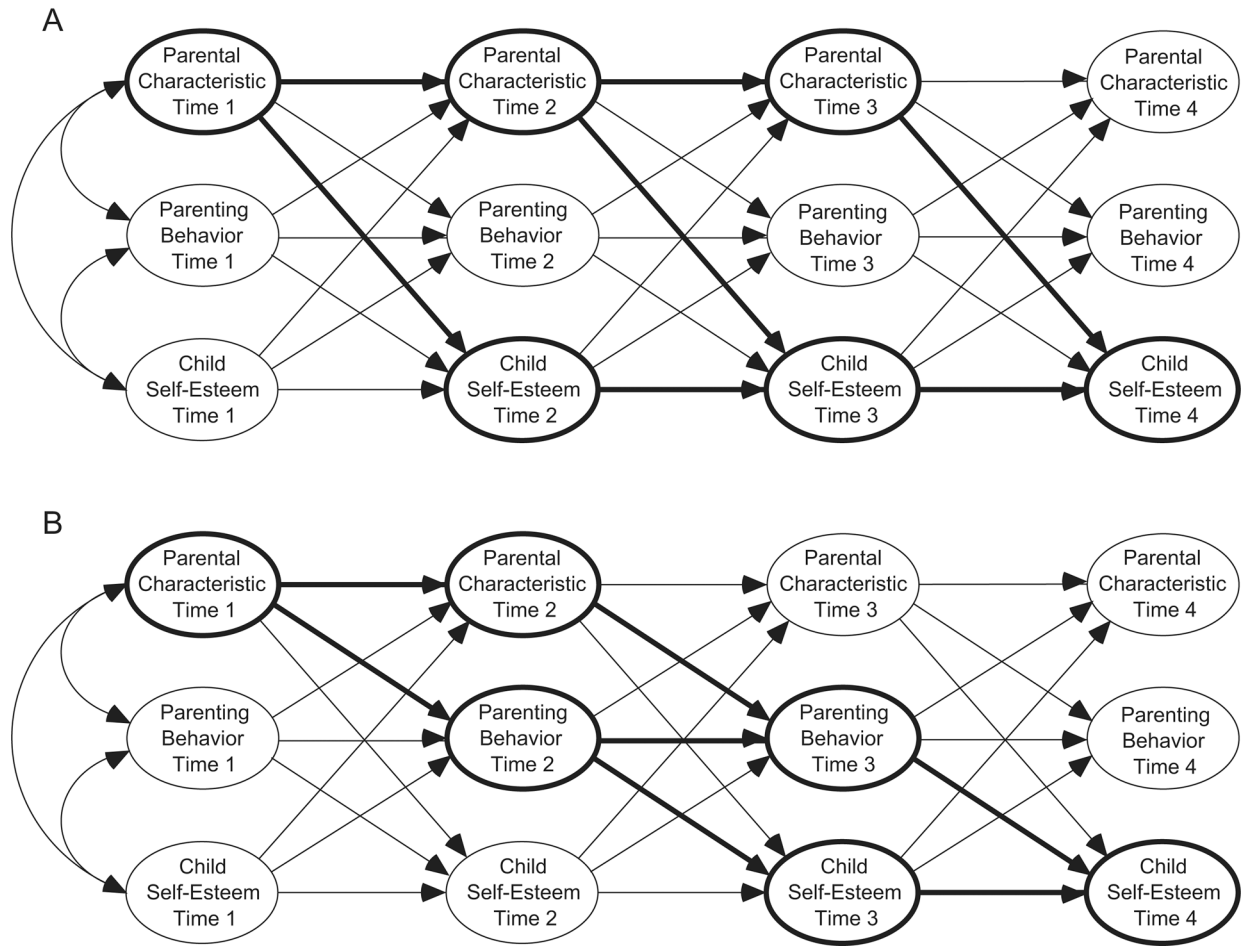


Figure 2. Longitudinal mediation model of parental characteristics, parenting behaviors, and child self-esteem. Figure 2A shows the paths included in the overall direct effect (i.e., all paths from the parental characteristic at Time 1 to child self-esteem at Time 4 that do not pass through parenting behavior at any wave) and Figure 2B shows the paths involved in the overall indirect effect (i.e., all paths from the parental characteristic at Time 1 to child self-esteem at Time 4 that pass through parenting behavior at least once).

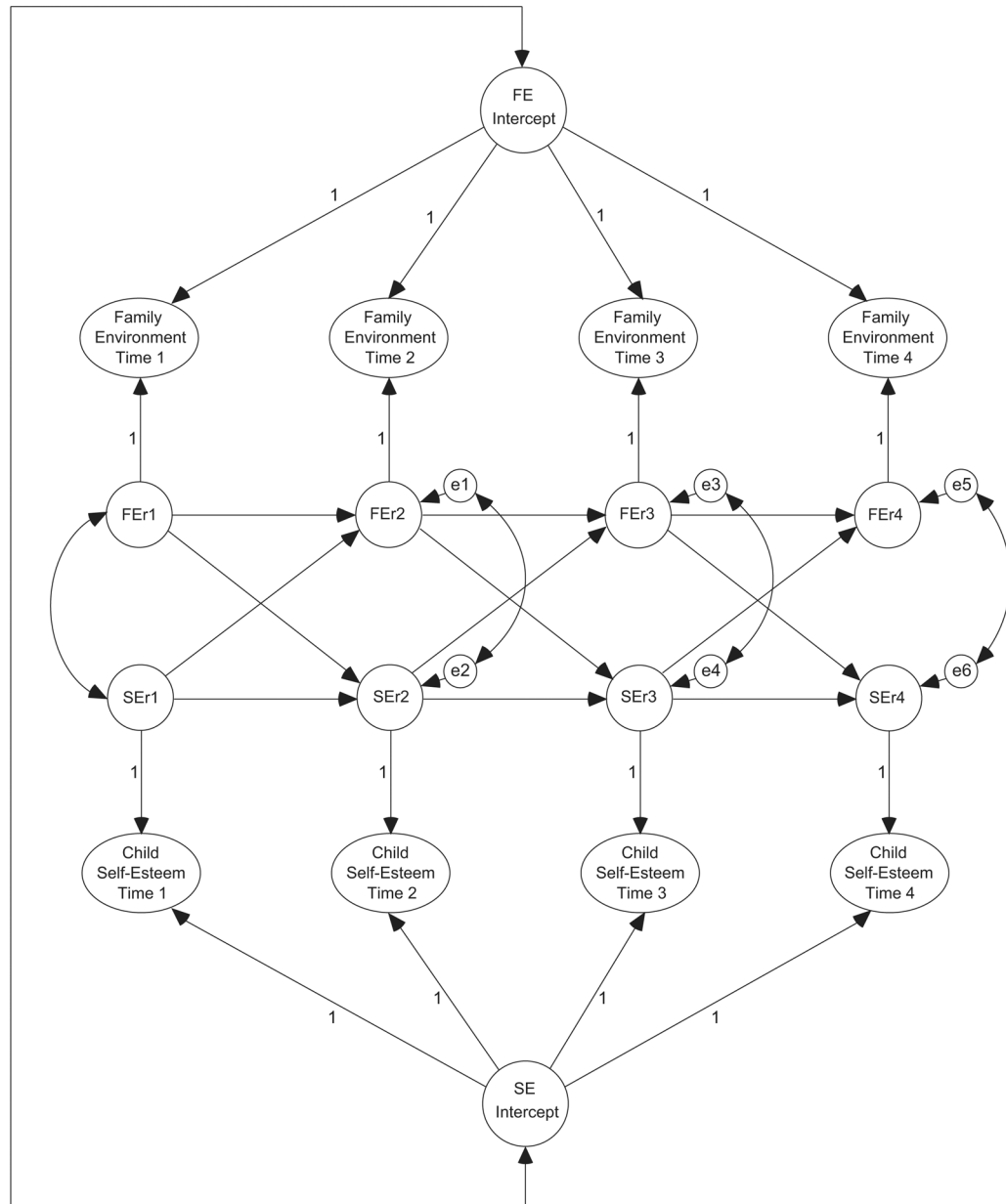


Figure 3. Generic random intercepts cross-lagged panel model of a family environment factor and child self-esteem. Error terms are indicated by *e1* to *e6*. Only latent constructs are shown (i.e., observed variables are omitted). FE = family environment; SE = self-esteem; FEr = family environment residualized; SEr = self-esteem residualized.

Table 1

Means and Standard Deviations of Study Variables

Variable (indicator)	Age 10 years		Age 12 years		Age 14 years		Age 16 years	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Self-esteem								
SDQ	3.22	0.53	3.27	0.49	3.18	0.48	3.14	0.46
RSE	—	—	3.19	0.42	3.13	0.42	3.11	0.43
Warmth								
Child rates mother	3.05	0.50	2.92	0.57	2.79	0.59	2.69	0.60
Child rates father	2.94	0.62	2.79	0.67	2.59	0.67	2.44	0.68
Mother rates father	3.03	0.54	2.90	0.63	2.81	0.65	2.75	0.64
Father rates mother	3.24	0.45	3.19	0.45	3.12	0.49	3.04	0.52
Hostility								
Child rates mother	1.45	0.30	1.36	0.28	1.44	0.35	1.45	0.34
Child rates father	1.33	0.26	1.30	0.29	1.37	0.34	1.40	0.38
Mother rates father	1.40	0.29	1.45	0.28	1.45	0.31	1.41	0.28
Father rates mother	1.46	0.29	1.46	0.26	1.47	0.25	1.48	0.25
Monitoring								
Child rates mother	3.35	0.51	3.29	0.58	3.20	0.60	3.10	0.62
Child rates father	3.25	0.71	3.06	0.76	2.83	0.79	2.72	0.80
Mother rates mother	3.66	0.37	3.63	0.42	3.58	0.46	3.49	0.54
Mother rates father	3.48	0.52	3.25	0.74	3.12	0.79	3.06	0.79
Father rates father	3.44	0.47	3.46	0.49	3.38	0.54	3.27	0.59
Father rates mother	3.69	0.38	3.62	0.43	3.47	0.51	3.35	0.60
Involvement in education								
Child rates mother	3.51	0.55	3.29	0.60	2.61	0.71	2.52	0.75
Child rates father	3.11	0.87	2.89	0.86	2.63	0.82	2.17	0.85
Mother rates mother	3.35	0.62	3.20	0.61	3.01	0.61	2.75	0.64
Father rates father	3.16	0.68	3.13	0.65	3.00	0.61	2.76	0.66
Parental relationship								
Mother's rating	3.50	0.61	3.46	0.68	3.38	0.78	3.35	0.71
Father's rating	3.63	0.49	3.59	0.57	3.57	0.59	3.49	0.63
Family values of mother	3.46	0.41	3.56	0.37	3.48	0.40	3.44	0.42
Family values of father	3.39	0.40	3.57	0.37	3.48	0.38	3.54	0.39
Depression of mother	1.75	0.46	1.76	0.44	1.69	0.43	1.66	0.39
Depression of father	1.63	0.38	1.65	0.37	1.61	0.37	1.59	0.33
Economic hardship								
Mother rates subscale A	2.51	0.77	2.65	0.79	2.50	0.75	2.34	0.73
Mother rates subscale B	2.59	0.83	2.73	0.77	2.64	0.75	2.52	0.78
Mother rates subscale C	1.23	0.23	1.30	0.23	1.26	0.23	1.21	0.22
Father rates subscale A	2.32	0.73	2.59	0.76	2.36	0.74	2.24	0.68
Father rates subscale B	2.46	0.76	2.62	0.80	2.54	0.75	2.44	0.76

Variable (indicator)	Age 10 years		Age 12 years		Age 14 years		Age 16 years	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Father rates subscale C	1.19	0.21	1.27	0.24	1.22	0.24	1.18	0.22
Presence of father	0.78	0.42	0.79	0.40	0.80	0.40	0.79	0.41

Note. Response scales ranged from 1 to 2 for Subscale C (Economic Hardship) and from 1 to 4 for all other measures. Presence of Father was a dichotomous variable (0 = *no*; 1 = *yes*). Dash indicates that variable was not assessed at a given wave. SDQ = Self-Description Questionnaire; RSE = Rosenberg Self-Esteem Scale; Subscale A = Can't Make Ends Meet; Subscale B = Unmet Material Needs; Subscale C = Financial Cutbacks.

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Table 2

Reliability of Study Variables

Variable (Indicator)	Number of items	Coefficient omega			
		Age 10	Age 12	Age 14	Age 16
Self-esteem					
SDQ	6	.80	.82	.83	.88
RSE	10	—	.85	.90	.90
Warmth					
Child rates mother	18	.90	.94	.94	.95
Child rates father	18	.93	.95	.95	.96
Mother rates father	18	.93	.95	.95	.95
Father rates mother	18	.91	.91	.93	.93
Hostility					
Child rates mother	17	.82	.86	.91	.90
Child rates father	17	.84	.90	.91	.93
Mother rates father	17	.87	.84	.87	.85
Father rates mother	17	.86	.84	.80	.85
Monitoring					
Child rates mother	14	.89	.93	.94	.95
Child rates father	14	.95	.96	.96	.97
Mother rates mother	14	.87	.90	.92	.95
Mother rates father	14	.94	.96	.96	.96
Father rates father	14	.88	.91	.94	.94
Father rates mother	14	.92	.92	.94	.95
Involvement in education					
Child rates mother	4	.70	.75	.79	.83
Child rates father	4	.93 ^a	.87	.88	.88
Mother rates mother	4	.73	.70	.74	.72
Father rates father	4	.77	.77	.74	.76
Parental relationship					
Mother's rating	5	.95	.95	.96	.95
Father's rating	5	.92	.96	.95	.95
Family values of mother	5	.85	.80	.86	.90
Family values of father	5	.87	.84	.84	.87
Depression of mother	10	.85	.83	.85	.83
Depression of father	10	.80	.79	.81	.78
Economic hardship					
Mother rates subscale A	2	.87	.86	.86	.89
Mother rates subscale B	6	.94	.93	.94	.96
Mother rates subscale C	9	.79	.74	.78	.78
Father rates subscale A	2	.85	.83	.87	.87
Father rates subscale B	6	.94	.95	.94	.95

Variable (Indicator)	Number of items	Coefficient omega			
		Age 10	Age 12	Age 14	Age 16
Father rates subscale C	9	.77	.79	.82	.82
Presence of father	1	—	—	—	—

Note. Dash indicates that variable was not assessed at a given wave (RSE) or that coefficient omega is not applicable for single item measures (presence of father). SDQ = Self-Description Questionnaire; RSE = Rosenberg Self-Esteem Scale; Subscale A = Can't Make Ends Meet; Subscale B = Unmet Material Needs; Subscale C = Financial Cutbacks.

^aIn this case, the model for computing coefficient omega with the psych package in R did not converge. Therefore, omega was computed as described in Widaman et al. (2011).

Table 3

Fit of Cross-Lagged Panel Models of the Relation Between Self-Esteem and Family Environment Variables

Family environment variable	χ^2	<i>df</i>	CFI	TLI	RMSEA [90% CI]
Parenting behaviors					
Warmth	413.7*	244	.97	.97	.032 [.027, .037]
Hostility	427.6*	244	.96	.95	.033 [.028, .039]
Monitoring	1273.2*	458	.90	.88	.051 [.048, .055]
Involvement in education	347.1*	244	.98	.97	.025 [.019, .031]
Parental characteristics					
Parental relationship	126.0	111	1.00	.99	.014 [.000, .025]
Family values of mother	256.5*	181	.99	.98	.025 [.017, .032]
Family values of father	252.6*	181	.98	.98	.024 [.017, .031]
Depression of mother	304.1*	181	.98	.97	.032 [.025, .038]
Depression of father	350.6*	191	.96	.95	.035 [.029, .041]
Economic hardship	725.6*	466	.97	.96	.029 [.025, .033]
Presence of father	109.9*	70	.99	.99	.029 [.018, .039]

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; CI = confidence interval.

*
 $p < .05$

Table 4

Standardized Estimates from Cross-Lagged Panel Models (CLPM) and Random Intercepts Cross-Lagged Panel Models (RI-CLPM) of Self-Esteem and Family Environment

Family environment Variable (X)	CLPM			RI-CLPM		
	Cross-lagged effects			Cross-lagged effects		
	$r_{X,SE}$	X→SE	SE→X	$r_{X,SE}$	X→SE	SE→X
Parenting behaviors						
Warmth	.47*	.15*	.03	—	—	—
Hostility	-.46*	-.01	.07	-.12	-.11	.07
Monitoring	.50*	.10*	.01	—	—	—
Involvement in education	.48*	.05	-.04	—	—	—
Parental characteristics						
Parental relationship	.16*	.05	.05	.18	.06	.06
Family values of mother	.26*	.00	.06*	.22	-.01	.07
Family values of father	-.04	.04	.07*	-.17	.10	.20*
Depression of mother	-.10	-.09*	-.02	-.14	-.16*	-.02
Depression of father	-.11	.00	-.02	-.09	-.02	-.01
Economic hardship	-.25*	-.06*	-.01	-.14	-.18	-.14
Presence of father	—	.07*	—	—	—	—

Note. For the CLPM, $r_{X,SE}$ is the correlation between the latent constructs at Time 1. For the RI-CLPM, $r_{X,SE}$ is the correlation between the random intercepts. Cross-lagged effects were averaged across intervals. Dash for CLPM indicates that coefficient was not included in the model (see Footnote 4 for explanation). Dash for RI-CLPM indicates that model did not converge or did not converge properly (see Results section for explanation). Unstandardized estimates, standard errors, and exact p -values are reported in Supplemental Table S5 (CLPM) and Supplemental Table S6 (RI-CLPM). SE = self-esteem.

* $p < .05$

Table 5

Total Effect, Overall Direct Effect, and Overall Indirect Effect of Parental Characteristic at Time 1 on Self-Esteem at Time 4 (Cross-Lagged Panel Models)

Parental characteristic	Total effect			Overall direct effect			Overall indirect effect		
	Std. Est.	Unstd. Est. [95% CI]	Std. Est.	Unstd. Est. [95% CI]	Std. Est.	Unstd. Est. [95% CI]	Std. Est.	Unstd. Est. [95% CI]	
With parental warmth as mediator									
Depression of mother	-.085*	-.061 [-.103, -.022]	-.080*	-.057 [-.096, -.025]	-.005	-.003 [-.019, .008]			
Economic hardship	-.102*	-.074 [-.135, -.021]	-.082*	-.059 [-.117, -.013]	-.020*	-.014 [-.032, -.003]			
Presence of father	.019	.018 [-.068, .105]	.013	.012 [-.063, .094]	.006	.005 [-.012, .026]			
With parental monitoring as mediator									
Depression of mother	-.090*	-.065 [-.105, -.028]	-.082*	-.059 [-.100, -.024]	-.008	-.006 [-.019, .002]			
Economic hardship	-.089*	-.065 [-.127, -.012]	-.073*	-.053 [-.113, -.004]	-.015*	-.011 [-.028, -.002]			
Presence of father	.053	.051 [-.055, .138]	.033	.031 [-.074, .130]	.020*	.019 [.001, .054]			

Note. The significance of the estimates was tested using the bootstrapped bias-corrected 95% CI. Std. Est. = standardized estimate;

Unstd. Est = unstandardized estimate; CI = confidence interval.

* $p < .05$

Table 6

Fit of Random Intercepts Cross-Lagged Panel Models of the Relation Between Self-Esteem and Family Environment Variables

Family environment variable	χ^2	<i>df</i>	CFI	TLI	RMSEA [90% CI]
Parenting behaviors					
Warmth	—	—	—	—	—
Hostility	418.5*	241	.97	.95	.033 [.028, .038]
Monitoring	—	—	—	—	—
Involvement in education	—	—	—	—	—
Parental characteristics					
Parental relationship	115.6	108	1.00	1.00	.010 [.000, .023]
Family values of mother	225.3*	178	.99	.99	.020 [.010, .027]
Family values of father	219.9*	178	.99	.99	.019 [.008, .026]
Depression of mother	239.8*	178	.99	.98	.023 [.015, .030]
Depression of father	302.2*	188	.97	.96	.030 [.024, .036]
Economic hardship	712.4*	463	.97	.96	.028 [.024, .032]
Presence of father	—	—	—	—	—

Note. Dash indicates that model did not converge or did not converge properly (see Results section for explanation). CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root-mean-square error of approximation; CI = confidence interval.

* $p < .05$