

## Difficult Temperament Predicts Self-Esteem in Adolescence

KATI HEINONEN, KATRI RÄIKKÖNEN, PERTTI KESKIVAARA  
and LIISA KELTIKANGAS-JÄRVINEN\*

Department of Psychology, University of Helsinki, Helsinki, Finland

### Abstract

*A six-year longitudinal study investigated the impact of maternal hostile child-rearing attitudes, role dissatisfaction, and maternal perceptions of adolescent temperamental difficultness on self-esteem in late adolescence, after controlling for the initial self-esteem measured in early adolescence. Adolescents ( $n = 313$ ), derived from the Cardiovascular Risk in Young Finns study, rated their self-esteem at the study entry at age 12, and six years later at age 18. Maternal reports of child-rearing attitudes, of role satisfaction, and of the temperament of the adolescent were obtained at the study entry and three years later. Mother's perceptions of adolescent's temperament as difficult at ages 12 and 15 predicted adolescent's self-reported self-esteem in late adolescence, whereas earlier self-esteem did not predict later perceptions of temperament or parenting. We found no evidence that maternal perceptions of parenting indirectly, or after controlling for the initial level, predicted adolescent's self-reported self-esteem. Copyright © 2002 John Wiley & Sons, Ltd.*

### INTRODUCTION

Adolescence has been targeted as a developmentally consequential period for self-esteem. Self-esteem, conceptualized as evaluative judgements about self (Coopersmith, 1967; DuBois, Felner, Brand, Phillips, & Lease, 1996), or as overall feelings of worth or value as a person (Harter, 1993; Rosenberg, 1979), has shown to be one of the central factors affecting psychological and social adjustment and well-being (Dumont & Provost, 1999; Dekovic & Meeus, 1997; Hammond & Romney, 1995; Scheier, Botvin, Griffin, & Diaz, 2000; Willcox & Sattler, 1996). Although self-esteem has shown to have substantial rank-order stability across time (Alsaker & Olweus, 1992; Block & Robins, 1993; O'Malley & Bachman, 1983), there are considerable variations in developmental trajectories as well

\*Correspondence to: Professor Liisa Keltikangas-Järvinen, Department of Psychology, PO Box 13, FIN-00014 University of Helsinki, Finland. E-mail: liisa.keltikangas-jarvinen@helsinki.fi

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(Block & Robins, 1993; Deihl, Vicary, & Deike, 1997; Hirsch & DuBois, 1991). In particular, self-esteem may change during adolescence because the period is characterized by several novel events and experiences, such as pubertal development, increases in cognitive abilities, and transition to middle school, that challenge individuals' views of themselves (cf. Caspi & Roberts, 1999; Twenge & Campbell, 2001). In fact, longitudinal studies have shown that adolescence is an important stage for the development of self-esteem (see e.g. Block & Robins, 1993; McCarthy & Hoge, 1982; see Twenge & Campbell, 2001, for meta-analysis): The rank-order stability of self-esteem tends to increase from adolescence onwards (Alsaker & Olweus, 1992) and the mean level decreases slightly during transition from elementary school to junior high and then rises again (Twenge & Campbell, 2001). However, relatively little empirical information exists on environmental and temperamental predictors of changes in self-esteem during adolescence. Thus, this study focuses on maternal child-rearing attitudes, maternal role satisfaction, and perceived difficult temperament as predictors of self-esteem in adolescence.

Theoretically and empirically, parenting has shown to be one of the most important factors affecting the development of self-esteem. Early symbolic interactionism theory (see Cooley, 1902; Mead, 1934) has pointed out that the primary source for the development of self-esteem is the evaluations received from significant others. These evaluations are suggested to shape individuals' own self-perceptions. Additionally, attachment (Bowlby, 1982) theory emphasizes the importance of mother-child interaction for self-development: children who experience parents as emotionally available, loving, and supportive are suggested to view themselves as valuable, loveable, and competent. Shek (1998) has shown that adolescents' or parents' perceptions of low levels of conflict with the father predicted increase in self-esteem over one year, but that conflicts with the mother did not predict change in self-esteem. Further, adolescents' perceptions of paternal but not maternal favourable parenting characteristics predicted increase in self-esteem over one year (Shek, 1999). Fenzel (2000) has shown that social support from parents measured just before children went to middle school did not predict change in self-esteem during the transition. Finally, Deihl et al. (1997) demonstrated that students who had consistently high levels of self-esteem between the 7th and 10th grades reported retrospectively more satisfactory relationships with their parents than the group of students with a low level of self-esteem during the same period; students whose level of self-esteem increased slightly from the 7th to the 10th grades fell between these two groups.

Parenting is, however, not independent of contextual factors (e.g. role satisfaction) or within-the-child characteristics (e.g. temperament); neither are contextual factors or within-the-child characteristics independent of parenting (see model of parenting: Belsky, 1984; Belsky, Steinberg, & Draper, 1991). Indeed, it has been shown that maternal role dissatisfaction (e.g. as a mother, as a spouse, or at work; Katainen et al., 1999; Lerner & Galambos, 1985; McLoyd et al., 1994) and temperamental difficultness of the child (Katainen et al., 1997, 1999; Lee & Bates, 1985; Lerner & Galambos, 1985; Räikkönen & Keltikangas-Järvinen, 1992; van den Boom & Hoeksma, 1994) are associated with more negative parenting. Parental negativity may, in turn, increase maternal role dissatisfaction (see Belsky et al., 1991) and perceptions of the child as difficult (Bezircanian & Cohen, 1992; Engfer, 1986; Lee & Bates, 1985; Lerner & Galambos, 1985; Räikkönen & Keltikangas-Järvinen, 1992). Also, role dissatisfaction is linked with perceptions of the child's temperament as difficult (Katainen et al., 1999; Lerner & Galambos, 1985). Finally, in addition to parenting, maternal role satisfaction (Matteson, 1974) and child's

temperament (Klein, 1992, 1995; Windle et al., 1986) are also suggested to be among the factors that are directly associated with the child's/adolescent's self-esteem. Thus, it is possible that parenting, role satisfaction, and temperament may have a joint impact on the development of self-esteem. However, to our knowledge there are no previous studies that have examined the direct and indirect effects of maternal child-rearing, maternal role satisfaction, and child temperament on self-esteem during the adolescent years.

Moreover, recent studies suggest that a bi-directional relationship may exist between self-esteem and parenting. It has been shown that high self-esteem promoted perceived parental acceptance over six months (Ohannessian, Lerner, Lerner, & von Eye, 1998) and favourable parenting characteristics over one year (Shek, 1999), and decreased the frequency of parent and adolescent reports of mother-adolescent conflicts over one year (Shek, 1998). Consequently, it has been suggested that the potential bi-directional nature of the associations be included in any hypothetical model (Ohannessian et al., 1998; Shek, 1998). However, to our knowledge there are no longitudinal studies that have tested the potential bi-directional relations of maternal child-rearing, maternal role satisfaction, or child temperament, and self-esteem.

Finally, previous studies suggest that variables underlying development of self-esteem may differ between the genders. Block and Robins (1993) have shown that the rank-order stability of self-esteem is considerably lower for men than for women, that men's self-esteem is more dependent on independent achievements, and that women's self-esteem is more dependent on important others (see also Josephs, Markus, & Tafarodi, 1992; Thorne & Michalieu, 1996). Furthermore, it has been suggested that differences in socialization practices broaden the range of experience for boys and restrict it for girls (Block, 1983; Block & Robins, 1993), and thus permit more diversity in the developmental patterns of self-esteem for boys than for girls (Block & Robins, 1993).

## **Overview of the present study**

The current study examined whether maternal hostile child-rearing attitudes (i.e. the mother's emotional rejection of the child, her intolerance of the child's behaviour, and her disciplinary style: Schaefer, 1959; see also Holden & Edwards, 1989), maternal role satisfaction (i.e. satisfaction as a mother and as a spouse and at work), and maternal perceptions of adolescent difficult temperament (i.e. high in activity and in negative emotionality, and low in social cooperation: see Goldsmith et al., 1987), predict self-esteem in late adolescence at age 18, after controlling for self-esteem in early adolescence at age 12, in a population-based sample of young Finns (Åkerblom et al., 1991); we also tested whether self-esteem predicts maternal perceptions. A previous article (Heinonen, Räikkönen, & Keltikangas-Järvinen, submitted), based on the young Finns sample (Åkerblom et al., 1991), tested whether maternal child-rearing attitudes, role dissatisfaction, and maternal perceptions of the child's difficult temperament measured in childhood predict self-esteem in adolescence across six years. It was shown that in a group of six- and nine-year-old children maternal perceptions of the child's temperament as difficult predicted maternal hostile child-rearing attitudes three years later, attitudes that, in turn, predicted lower self-esteem three years later in adolescence. The age of the sample, i.e. 6 and 9, precluded ratings of self-esteem at the study entry, and, consequently, precluded studying changes in self-esteem across time.

In the current study, adolescents self-rated their self-esteem at ages 12 and 18; maternal perceptions were available from exams when the adolescent was aged 12 and 15. The

study design, thus, allowed us to approach the study question by using a methodology described by Neyer and Asendorpf (2001; see also Asendorpf & Wilpers, 1998). Direct and indirect effects of maternal perceptions on self-esteem, and effects of self-esteem on maternal perceptions, were tested in the context of models involving statistical controls for initial values of self-esteem, for the initial values of the maternal perceptions, and for all correlations between the study variables at the baseline and at the three-year follow-up.

## METHOD

### Research participants

The participants were derived from the Cardiovascular Risk in Young Finns study (CRYF), which is an ongoing prospective study originally focusing on the development of biological and behavioural risk factors of coronary heart disease from childhood to adulthood. In the baseline (1980) of the CRYF study, a stratified random sample of 3596 children and adolescents from six different age cohorts were selected from the population register of Finland. All participants have been invited to take part in the follow-ups held every three to five years to date. The project was approved by the institutional review boards. Complete details of the CRYF study protocol can be found elsewhere (Åkerblom et al., 1991).

The focus of the current study was on the developmental period from early to late adolescence. Thus, participants from whom data on self-reported self-esteem were available at baseline, at the age of 12, and six years later, at the age of 18, and from whom data on maternal perceptions were available at baseline and three years later were selected from the original sample. Of the 615 (girls  $n = 329$ , boys  $n = 286$ ) 12-year-old adolescents participating in study at baseline, 313 ( $n = 173$  girls,  $n = 140$  boys) returned for the three- and six-year follow-ups and had data available simultaneously in all study variables. The adolescents participating in all three data collections and adolescents participating in the study baseline only did not differ from one another in any of the study variables ( $p > 0.05$ ).

### Measures

#### *Mother's hostile child-rearing attitudes*

Three scales derived from the Operation Family Study (Makkonen et al., 1981) were adopted to assess the mother's child-rearing attitudes. The first scale, comprising four items, tapped the emotional significance of the child (e.g. 'The child is not emotionally significant to me', 'I do not enjoy being with the child'), the second scale including three items focused on the mother's tolerance toward the child (e.g. 'The child makes me nervous', 'The child is a burden to me'), and the third scale, consisting of two items, concerned the disciplinary style of the mother (e.g. 'disciplinary actions are regularly needed with the child'). Items were answered with a five-point scale from 1 (totally disagree) to 5 (totally agree), except the disciplinary style questions at the baseline, when the scale was 1 (no) to 2 (yes). The component constellation closely resembles the constellation named 'a hostile child-rearing attitude' (Schaefer, 1959; see also Holden & Edwards, 1989; Räikkönen & Keltikangas-Järvinen, 1992). According to Schaefer (1959), hostile child-rearing attitudes consist of three elements: the mother's emotional rejection of her child, her feelings that the child is a burden, and her strict disciplinary style. The reliability estimates of internal consistency for the individual dimensions have been shown

to range from 0.54 to 0.91 (Katainen et al., 1997; Räikkönen & Keltikangas-Järvinen, 1992). More detailed information regarding the questionnaire is available in the article by Räikkönen and Keltikangas-Järvinen (1992). (For validity and three-year rank-order stability of the hostile child-rearing attitudes construct, see the results section; see also Räikkönen, Katainen, & Keltikangas-Järvinen, 2000.)

#### *Mother's role satisfaction*

The mother's role satisfaction was assessed using scales derived from the Operation Family Study (Makkonen et al., 1981). These items addressed the mother's satisfaction with herself as a mother, and as a spouse, and with her role at work, evaluated on a scale ranging from 1 (totally agree) to 5 (totally disagree) (e.g. 'I am satisfied with myself as a mother'). The one-item nature of the scale prohibited internal consistency testing. For validity and three-year rank-order stability of the mother's role satisfaction construct, see the results section (see also Katainen et al., 1999).

#### *Childhood temperament*

Activity, cooperation, and negative emotionality in childhood were assessed by the mothers using scales derived from the Health Examination Survey (Wells, 1980). Activity was assessed on a four-point scale ranging from 4 (always extremely active and energetic, even restless) to 1 (always calm and controlled). Cooperation was evaluated on a three-point scale ranging from 3 (continuous problems in cooperating with peers) to 1 (always very cooperative and responsive to others). Negative emotionality of the child was evaluated using three items ('Other children's parents often complain about the child's behaviour', 'The child often fights', and 'The child uses too many swear words') on a two-point scale (statement doesn't fit the child—the statement fits the child) at the baseline and on a five-point scale ranging from 1 (totally disagree) to 5 (totally agree) at the first follow-up. Together, these dimensions refer to a constellation of perceived child difficultness or perceived difficult temperament (see Goldsmith et al., 1987). The one-item nature of the activity and cooperativity scale prohibited tests of internal consistency. The reliability of negative emotionality has previously been shown to be acceptably high, ranging from 0.63 to 0.81 (see Katainen et al., 1997; Katainen, Räikkönen, & Keltikangas-Järvinen, 1998). (For validity and three-year rank-order stability of the perceived child difficultness construct, see the results section; see also Räikkönen et al., 2000.)

#### *Self-esteem*

A shortened version of the Coopersmith Self-Esteem Inventory (Coopersmith, 1967; Keltikangas-Järvinen, 1990, 1992) was used. The total score of the shortened version consisted of 20 items (e.g. 'I often feel ashamed of myself' (reverse scored), 'I often get discouraged in school' (reverse scored), 'I'm popular with kids of my own age', 'I'm easy to like', and 'My parents and I have a lot of fun together'). Self-esteem was evaluated on a three-point scale at the study baseline and on a five-point scale at the six-year follow-up, ranging from 'totally disagree' to 'totally agree' at both data collections. Cronbach alpha reliabilities for both gender groups were > 0.72 and > 0.87 at baseline and at the six-year follow-up respectively.

#### **Statistical analysis**

Confirmatory factor analyses (CFAs) and structural equation modelling (SEM) were used to test associations between self-esteem, maternal hostile child-rearing attitudes, maternal role dissatisfaction, and maternal perceptions of the difficult temperament of the child

(models are specified below in the Results section). All analyses were performed using LISREL 8.30 (Jöreskog & Sörbom, 1993). We applied standard model fitting procedures and the maximum likelihood estimation method and evaluated the goodness of fit of the models using chi-square statistics ( $\chi^2/\text{df} < 2$ ; Bollen, 1989; Loehlin, 1987), comparative fit (CFI) and non-normed fit (NNFI) indices ( $\sim 0.90$ ), and root mean square error of approximation (RMSEA: Steiger, 1990) ( $< 0.05$  indicates close fit and from 0.05 to 0.08 adequate fit; Browne & Cudeck, 1993). A multi-sample procedure (see Jöreskog & Sörbom, 1993) was used to test whether identical models fitted the girls' and boys' data; i.e., both samples were analysed concurrently and their parameters were set equal.

## RESULTS

Table 1 presents variable means, mean level changes, effect sizes,<sup>1</sup> and rank-order stabilities across the three- and six-year study intervals separately for girls and for boys. Over the three year interval the level of daughter's and son's emotional significance to the mother decreased and the mothers of boys became more tolerant of their son's behavior, mothers of girls felt decreasingly satisfied as a spouse and mothers of boys felt decreasingly satisfied with work, and mothers perceived their sons as increasingly co-operative and decreasingly active. Different scaling of self-esteem, negative emotionality and disciplinary style at the study entry and at the follow-up precluded meaningful tests of mean level change. All rank-order stabilities over three (maternal child-rearing, role satisfaction, and child's temperament) and six years (self-esteem) were significant ( $p < 0.01$ ).

*t*-Tests of gender differences of the study variables at the baseline, at the three-year follow-up, and at the six-year follow-up showed that, at the baseline, at the age of 12, mothers perceived their sons, relative to daughters, as significantly more negatively emotional ( $t = -3.72$ ,  $p < 0.001$ ,  $d^1 = -0.41$ ), more active ( $t = -2.52$ ,  $p < 0.05$ ,  $d = -0.28$ ), and less cooperative ( $t = -3.50$ ,  $p < 0.001$ ,  $d = -0.39$ ), and were less tolerant of their behaviour ( $t = -2.82$ ,  $p < 0.01$ ,  $d = -0.32$ ). At the six-year follow-up, at the age of 18, boys rated their self-esteem as significantly lower than did girls ( $t = 2.03$ ,  $p < 0.05$ ,  $d = 0.23$ ). There were no other significant gender differences.

### Measurement models

The measurement models consisted of three *a priori* formulated latent factors: mother's hostile child-rearing attitudes, mother's role satisfaction, and perceived difficult temperament of the child (cf. Katainen et al., 1999; Räikkönen et al., 2000). Based on inspection of the modification indices, we allowed two error covariances among boys and one error covariance among girls between conceptually similar variables. After this specification the same model fitted for both girls and for boys data well ( $\chi^2/\text{df} = 1.42$ , CFI = 0.91, NNFI = 0.90, RMSEA = 0.052, for the combined model of girls and boys). Moreover, all factor loadings were significant (Table 2). Correlations indicative of stability of the latent factors over three years ranged from 0.55 to 0.89 ( $p > 0.001$ ). Concurrent correlations between the latent factors ranged from 0.21 ( $p < 0.05$ ) to 0.80 ( $p < 0.001$ ).

The self-esteem construct was specified by setting the loading of the sum score of self-esteem variables at baseline and at follow-up to one, with an error term of zero.

<sup>1</sup>In this article we use Cohen's *d* as a measure of effect size for mean difference. For independent comparisons,  $d = (M_1 - M_2)/SD$ ; for dependent comparisons,  $d = ([M_1 - M_2]/SD_D)\sqrt{2}$ , where  $SD_D$  refers to the standard deviation of difference scores (Cohen, 1988).

Table 1. Characteristics, mean level changes, effect sizes and rank-order stabilities of the study variables

Variable	Baseline <i>M</i> (SD)	3-year follow-up <i>M</i> (SD)	6-year follow-up <i>M</i> (SD)	Mean-level change		Rank-order stability Pearson's <i>r</i>
				<i>t</i> -value	Cohen's <i>d</i>	
<i>Mother's hostile child-rearing attitudes</i>						
Child's low emotional significance						
Total	6.18 (2.02)	6.71 (2.62)		-3.56***	-0.28	0.38**
Girls	6.09 (1.95)	6.95 (2.92)		-2.83**	-0.30	0.21**
Boys	6.29 (2.10)	6.41 (2.16)		-2.16*	-0.26	0.58**
Mother's low tolerance						
Total	5.99 (1.86)	5.69 (1.98)		2.68**	0.21	0.47**
Girls	5.72 (1.72)	5.55 (1.82)		0.63	0.07	0.46**
Boys	6.31 (1.98)	5.85 (2.16)		3.19**	0.38	0.47**
Strict disciplinary style <sup>a</sup>						
Total	2.10 (0.33)	3.03 (1.54)				0.31**
Girls	2.08 (0.32)	2.98 (1.48)				0.37**
Boys	2.12 (0.34)	3.09 (1.62)				0.24**
<i>Mother's low role satisfaction</i>						
Satisfaction as a mother						
Total	1.82 (0.78)	1.89 (0.76)		-1.57	-0.13	0.44**
Girls	1.82 (0.78)	1.92 (0.79)		-1.14	-0.12	0.34**
Boys	1.82 (0.78)	1.85 (0.73)		-1.09	-0.13	0.56**
Satisfaction as a spouse						
Total	1.93 (0.80)	2.10 (0.88)		-3.45**	-0.28	0.49**
Girls	1.92 (0.82)	2.10 (0.86)		-3.11**	-0.33	0.46**
Boys	1.95 (0.77)	2.10 (0.91)		-1.57	-0.19	0.56**
Satisfaction with work						
Total	1.89 (0.78)	2.07 (0.82)		-3.57***	-0.29	0.36**
Girls	1.89 (0.73)	2.11 (0.81)		-1.75	-0.19	0.40**
Boys	1.90 (0.82)	2.04 (0.84)		-3.29**	-0.39	0.33**

*Continues*

Table 1. Continued

Variable	Baseline <i>M</i> ( <i>SD</i> )	3-year follow-up <i>M</i> ( <i>SD</i> )	6-year follow-up <i>M</i> ( <i>SD</i> )	Mean-level change		Rank-order stability Pearson's <i>r</i>
				<i>t</i> -value	Cohen's <i>d</i>	
<i>Perceived difficult temperament of the child</i>						
Low cooperativeness						
Total	1.58 (0.72)	1.43 (0.63)		3.61***	0.29	0.36**
Girls	1.46 (0.65)	1.44 (0.62)		1.25	0.13	0.34**
Boys	1.74 (0.78)	1.40 (0.64)		3.91***	0.46	0.36**
Activity						
Total	1.98 (0.55)	1.86 (0.63)		3.45**	0.28	0.52**
Girls	1.91 (0.51)	1.89 (0.67)		1.42	0.15	0.43**
Boys	2.06 (0.59)	1.83 (0.58)		3.53**	0.42	0.60**
Negative emotionality <sup>a</sup>						
Total	3.16 (0.36)	4.45 (1.66)				0.34**
Girls	3.09 (0.27)	4.30 (1.55)				0.27**
Boys	3.24 (0.43)	4.63 (1.77)				0.39**
<b>Self-esteem<sup>a</sup></b>						
Total	51.63 (5.22)		72.49 (10.34)			0.35**
Girls	51.66 (5.26)		73.55 (10.71)			0.38**
Boys	51.59 (5.18)		71.18 (9.73)			0.32**

<sup>a</sup>Scales of the measure differ between baseline and follow-up.



Table 2. CFA standardized factor loadings for maternal hostile child-rearing, maternal role satisfaction, and maternal perceptions of child's difficult temperament (the baseline value/three-year follow-up value)

Variables	Hostile child-rearing attitudes	Maternal role satisfaction	Perceived difficult temperament of the child
Child's low emotional significance	0.52/0.56		
Mother's low tolerance	0.75/0.61		
Strict disciplinary style	0.30/0.49		
Satisfaction as a mother		0.82/0.91	
Satisfaction as a spouse		0.68/0.64	
Satisfaction with work		0.56/0.43	
Cooperativeness			0.50/0.39
Activity			0.51/0.46
Negative emotionality			0.44/0.50

All factor loading were significant,  $p < 0.01$ .

### Associations between hostile child-rearing attitudes, role satisfaction, and perceived difficult temperament and self-esteem

First, we tested whether the mother's hostile child-rearing attitudes, the mother's role satisfaction, or the mother's perceptions of difficult temperament of the child measured at the study entry, when the adolescent was 12 years of age, predicted adolescent's self-reported self-esteem six years later at age 18, after controlling for the initial self-reported self-esteem and for the correlation between self-esteem and perceived difficult temperament measured at the study entry at age 12. Thus, we included paths from child-rearing measured at the study entry to the later self-esteem, controlling for initial values of self-esteem, as well as for concurrent correlations between child-rearing and self-esteem at the study entry (cf. Neyer & Asendorpf, 2001). Next, we replaced the child-rearing construct with the role satisfaction construct, and finally with the temperament construct, and re-ran the model. The same models fitted both for girls and for boys. The results showed that mother's hostile child-rearing attitudes and perceived difficult temperament of the adolescent predicted adolescent's lower self-reported self-esteem in late adolescence, after controlling for the initial self-reported self-esteem in early adolescence ( $\beta > 0.23$ ,  $p < 0.01$ ;  $\chi^2/df < 1.52$ , CFI  $> 0.90$ , NNFI  $> 0.89$ , RMSEA  $< 0.058$ ,  $R^2 > 0.18$ , for the combined models of girls and boys). Maternal role satisfaction was not significantly associated with adolescent's self-reported self-esteem.

Second, we tested an *a priori* saturated model, which included (i) paths from the maternal perceptions measured at the study entry, when the adolescent was aged 12, to adolescent's self-reported self-esteem measured at the follow-up exam in late adolescence at age 18; (ii) paths from the maternal perceptions at the follow-up exam, when the adolescent was aged 15, to adolescent's self-reported self-esteem measured in the follow-up exam in late adolescence at age 18; (iii) paths between the dissimilar maternal perceptions from the study entry to the follow-up, e.g. from hostile child-rearing attitudes measured at the study entry to perceived difficult temperament measured at the follow-up; (iv) paths from self-esteem measured at the study entry to maternal perceptions measured at the follow-up. The model controlled for *initial values* of self-esteem, for *initial values* of the maternal perceptions, and for *all correlations* between the study variables at the baseline and at the three-year follow-up (cf. Neyer & Asendorpf, 2001). The saturated model did not show acceptable fit. Thus, we omitted the non-significant paths one by one.

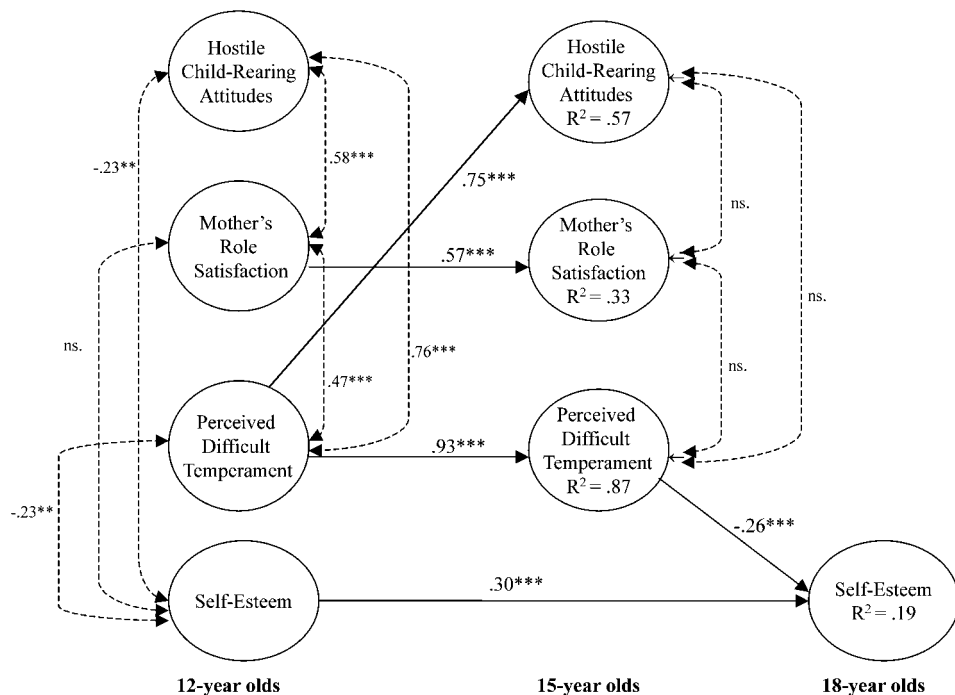


Figure 1. Final structural model for girls/boys. Standardized values are given for the path coefficient. All the coefficients in the figure are statistically significant. \* $p < 0.05$ , \*\* $p < 0.01$  and \*\*\* $p < 0.001$ . First-order factor loadings of latent factors are almost identical with the loadings presented in Table 2 and for the clarification of the figure are not presented.

The indirect effect of perceived difficult temperament at the age of 12 to self-esteem at the age of 18 via perceived difficult temperament at the age of 15 was  $\beta = -0.24$ ,  $p < 0.01$ .

The hostile child-rearing attitudes are stable when measured individually ( $\beta = 0.58$ ,  $p < 0.01$ ); however, the stability becomes secondary in this model.

The re-specified model exhibited acceptable fit<sup>2</sup> ( $\chi^2/df = 1.37$ , CFI = 0.91, NNFI = 0.90, RMSEA = 0.049,  $R^2 = 0.19$ , for the combined model of girls and boys). The re-specified model showed that mothers' perceptions of adolescents' temperament as difficult at ages 12 and 15, predicted adolescent's self-reported self-esteem, measured in late adolescence at age 18, after controlling for adolescent's self-reported self-esteem measured at the study entry at age 12 (Figure 1). We found no evidence that maternal perceptions, indirectly or after controlling for their initial level, predicted adolescent's self-reported self-esteem. Neither were there any significant relations from self-esteem to maternal perceptions, suggesting the associations between maternal perceptions and self-esteem are not bi-directional.

## DISCUSSION

The present six-year longitudinal study was undertaken to investigate the impact of maternal child-rearing attitudes, role satisfaction, and perceived difficult temperament on adolescents' self-reported self-esteem measured in late adolescence at age 18, after controlling for adolescents' self-reported self-esteem in early adolescence at age 12. The

<sup>2</sup>Final model included among girls and boys four error covariances between conceptually similar variables.

study participants were followed from early to late adolescence, a period during which self-evaluations have been suggested to be challenged (cf. Caspi & Roberts, 1999; Twenge & Campbell, 2001) and still changeable (see e.g. Block & Robins, 1993; Deihl et al., 1997; Hirsch & DuBois, 1991; McCarthy & Hoge, 1982). It was shown that maternal perceptions of the adolescent's temperamental difficultness at age 12 and 15 predicted adolescent's self-reported self-esteem measured at age 18, controlling for the self-reported self-esteem measured at age 12. When the effects of maternal perceptions on self-esteem were evaluated in three separate models, both perceived difficult temperament as well as maternal hostile child-rearing attitudes predicted adolescent's self-reported self-esteem in late adolescence, controlling for the early adolescent self-esteem. However, indirect effects of maternal perceptions, or maternal effects at the follow-up that controlled for their values at the study entry did not predict self-esteem in late adolescence. Neither did we find evidence of bi-directional effects between maternal perceptions and adolescent self-esteem: maternal perceptions predicted the adolescent's self-reported self-esteem, not vice versa.

The current results can be interpreted from different theoretical perspectives. In addition to the theoretical perspectives of symbolic interactionism (Cooley, 1902; Mead, 1934) or attachment (Bowlby, 1982), the personality–environment transaction may provide a fruitful perspective to interpret the findings. A significant proportion of the population variance in self-esteem is due to genetic factors, which, in turn, is probably manifested or acts via temperamental characteristics (Kendler, Gardner, & Prescott, 1998). Moreover, the finding that the rank-order stability of maternal perceptions of adolescent's temperamental difficultness was high, and our results that mothers' perceptions of the adolescents' temperament as difficult at ages 12 and 15 did indeed predict adolescent's self-reported self-esteem, may support the suggestion that the effect of a stable personality trait is constant and may accumulate over time (cf. Neyer & Asendorpf, 2001). Further, it has been suggested that heritability of most traits may increase across adolescence because genetic effects presented early in life help to create larger phenotypic differences across time (Plomin, DeFries, McClearn, & Rutter, 1997; cf. Plomin, DeFries, & Loehlin, 1977; Scarr & McCartney, 1983, for proactive personality–environment transaction).

In addition to directing the selection or creation of the environment (i.e. the proactive transaction), personality may transact also in other ways with the environment in predicting self-esteem (see Caspi & Roberts, 1999). Personality has an effect on how the environment is experienced, interpreted, and reacted to (i.e. the reactive transaction; cf. Caspi & Roberts, 1999). It is possible that children and adolescents with characteristic temperaments, such as negative emotionality and low sociability, interpret and experience life events in a more negative way (cf. social-information processing, Crick & Dodge, 1994), and, thus, may over time internalize more negative self-evaluations.

Furthermore, individuals with different personality structures evoke distinctive responses from others (i.e. the evocative transaction). In line with this suggestion, it was shown that perceived difficult temperament predicted hostile child-rearing attitudes. Although the hostile child-rearing attitude constellation did predict self-esteem in late adolescence when the maternal perceptions were tested separately, hostile child-rearing attitudes did not significantly predict self-esteem in the final model in the presence of the other maternal perceptions. This result may reflect the fact that even though adolescents still evoke parental responses that are in line with their temperamental characteristics, the contextual family factors (e.g. maternal child-rearing and role satisfaction) may become less relevant in adolescence when compared with childhood (Pekrun, 1990). However, it is

also acknowledged that during adolescence self-representations become generally more consolidated and less sensitive to environmental influences (see Block & Robins, 1993; Thorne & Michaelieu, 1996).

Contrary to our expectations, maternal hostile child-rearing attitudes or role satisfaction did not contribute to maternal perceptions of the difficult temperament of the child. It has been suggested that adolescents are influenced less by their mothers than are children, because the child–mother relationship is more asymmetrical (Backman, 1988). Hence, maternal perceptions of adolescents' difficult temperament may not be as sensitive to family-related contextual factors in adolescence as they are in childhood.

In the current study, there were no gender differences in the predictors of self-esteem from early to late adolescence. Contradictory to our findings, it has been suggested (Block & Robins, 1993; Josephs et al., 1992; Thorne & Michalieu, 1996) that women's self-esteem is more dependent on connectedness with and appraisal of important others than that of men's. During adolescence, the relevance of a peer group increases (see e.g. Kirchler, Palmonari, & Pombeni, 1993) and might become a more significant source of social feedback than feedback given by parents. This may explain the lack of findings on gender differences concerning the importance of feedback received from significant others on self-esteem.

Moreover, our findings also suggest that the relation between maternal perceptions and adolescent self-esteem is not bi-directional, but maternal perceptions are antecedent for the development of low self-esteem. It has previously been shown that the adolescents' perceptions of their parents' parenting characteristics (Shek, 1999; Ohannessian et al., 1998), and parental or adolescent reports of conflicts with adolescents (Shek, 1998) are bi-directionally related to adolescent self-esteem. Lack of findings of bi-directionality in the current study may be explained by the source of the reports of parenting. Adolescents' self-esteem may direct her/his perceptions of parental affection and behaviour (cf. Shek, 1999; Ohannessian et al., 1998) or predict specific parent–adolescent dealings such as conflicts (Shek, 1998), but not the mother's more global perceptions of parenting, her role dissatisfaction, or the perceptions of the temperament of the adolescent.

According to Harter (1986; see also Harter, 1998), change in self-esteem occurs only if the antecedents of self-esteem change. However, we found that maternal perceptions from early to middle adolescence across three years did not predict self-esteem from early to late adolescence across six years. This may reflect the approach we used in the measurement of self-esteem. We used the total score of self-esteem, which might be less affected by the temporary changes in situations than are any sub-dimensions of self-esteem (cf. Marsh & Yeung, 1998).

However, using the total score of the self-esteem measurement was reasonable in the current study based on earlier findings in the current dataset of Finnish children and adolescents (Keltikangas-Järvinen, 1992). The total score of the shortened version of the Coopersmith self-esteem inventory has been previously demonstrated to be more stable and valid than the sub-dimensions (Keltikangas-Järvinen, 1992). Moreover, the sub-dimensions have been shown to overlap strongly in adolescence, and the construct of the inventory has not been shown to be clear or stable before early adulthood (Keltikangas-Järvinen, 1992).

### Limitations and future directions

Limitations of this study warrant consideration. The non-standardized childhood measures used in this study to evaluate the mother's child-rearing attitudes, her role dissatisfaction,

and perceived difficult temperament of the child are not the best currently available. Measurement limitation stems partly from the fact that the baseline of this study was conducted over 20 years ago. However, the confirmatory factor analyses do provide some evidence of the construct validity of the childhood measures (see also Katainen et al., 1999; Räikkönen et al., 2000). Further, we have recently demonstrated that maternal perceptions of difficult temperament predict self-rated difficult temperament over 17 years (Pesonen, Räikkönen, Keskivaara, & Keltikangas-Järvinen, in press). Moreover, maternal subjective evaluations have been shown to be relatively stable (see also e.g. Katainen et al., 1997, 1998; Räikkönen et al., 2000).

In addition, when evaluating the results, the fact that early and middle adolescent measurements were based on the mother's evaluations only has to be kept in mind. The mother's evaluations may have been affected by subjective bias or measurement error. However, maternal evaluations have also earlier been shown to predict self-reported personality and psychological and physiological well-being in earlier reports using the current dataset (e.g. Katainen et al., 1999; Pesonen et al., in press; Ravaja, Katainen, & Keltikangas-Järvinen, 2001; Räikkönen et al., 2000), which strengthen the validity of these measures. Furthermore, regarding the maternal reports of child's temperament there is evidence of objective as well as subjective components of a mother's evaluation (Mebert, 1991). Furthermore, Bates (1983) has suggested that both the mother's subjective perceptions and the objective within-the-child temperament factors affect later developmental outcomes. Finally, parental and observer ratings have shown to be correlated (Matheny, Wilson, & Thoben, 1987). However, a need for studies that use multiple measurements and informants of temperament and parenting characteristics certainly exists.

Our results were in line with the traditional environmentalism view that environment or earlier personality characteristics have an impact on self-esteem, and not vice versa. However, generalization of the results with different reporters or developmental periods should be made with caution. It is possible that self-esteem is more effective in the formation of social, environmental factors when the relationship is relatively equal, such as in the case of peer or sibling relationships. Moreover, it is also possible that after adolescence, when self-esteem becomes more stable (see e.g. Alsaker & Olweus, 1992), the direction of causality between self-esteem and social environment changes.

Finally, owing to differences in the measurement scales of self-esteem at the baseline (three-point scale) and the follow-up (five-point scale), we were able to study rank-order stability only (see Caspi & Roberts, 1999, for different approaches to studying change) and consequently predict self-esteem in late adolescence after controlling the initial self-esteem measured in early adolescence, from the maternal child-rearing attitudes, maternal role satisfaction, and maternal perception of the adolescent temperament constructs. Moreover, because of the scaling differences in self-esteem, conclusions with regard to homotypic stability in self-esteem are restricted.

In conclusion, although the current study gives new information on developmental paths of self-esteem during adolescence, a need exists for additional studies that take into account transactional/reciprocal processes between temperament, environment, and self-esteem. Moreover, besides parenting, other environmental factors, e.g. peer and sibling support, should also be included in studies of adolescent self-esteem. Finally, future research on the development of self-esteem may benefit from combining different perspectives of studying change (see Caspi & Roberts, 1999): these include approaches that focus both on rank-order and mean-level change, and that combine both the

individual differences in developmental paths of self-esteem and general trajectories of its development.

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