Developmental Psychology
2009, Vol. 45, No. 2, 419–430

0012-1649/09/$12.00 DOI: 10.1037/a0014072

Buffers and Risks in Temperament and Family for Early Adolescent Psychopathology: Generic, Conditional, or Domain-Specific Effects? The TRAILS Study

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This study examined the possible risk-buffering and risk-enhancing role of family characteristics on the association between temperament and early adolescent externalizing and internalizing problems, adjusted for familial vulnerability for psychopathology and early childhood problem behavior. Furthermore, it explored whether these effects were specific or conditional for either internalizing or externalizing problems or more generic for psychopathology. Data on temperament (frustration and fearfulness) and family characteristics (overprotection, rejection, emotional warmth, and socioeconomic status) came from a large longitudinal Dutch population sample of early adolescents (n = 2,149; M age = 13.55 years; 51.2% girls). Hypotheses on the direction and the specificity of the effects were derived from a goal-framing approach. The findings indicate that family characteristics can either buffer or enhance the temperamental risk in the development of psychopathology. Analyses on the direction of these effects resulted in a descriptive classification of domain-specific, conditional, and generic factors that promote or protect the development of psychopathology. Implications of the results are discussed, and directions for future research are given.

Keywords: adolescence, domain-specific effects, externalizing problems, internalizing problems, risk-buffering effects

Psychopathology of children and early adolescents is of key interest in clinical and developmental psychology, as it involves problems in many domains such as the self, family, peer group, and later social adjustment (Parker & Asher, 1987; Stormshak, Bierman, Bruschi, Dodge, & Cole, 1999). Numerous studies have examined possible predictors of psychopathology in which child temperament and characteristics of the family as socializing environment have been found to be influential (e.g., Frick & Morris, 2004; Loeber & Stouthamer-Loeber, 1986). Although it has been acknowledged that (problem) behavior is the result of the interplay between a person and its socializing environment (cf. Belsky, 1997; Rutter et al., 1997; Scarr & McCartney, 1983), knowledge

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This research is part of the TRacking Adolescents' Individual Lives Survey (TRAILS). Participating centers of TRAILS include various departments of the University Medical Center Groningen and the University of Groningen, the Erasmus University Medical Center, the University of Utrecht, the Radboud Medical Center Nijmegen, and the Trimbos Institute, all in the Netherlands. Principal investigators are Johan Ormel (University Medical Center Groningen) and Frank C. Verhulst (Erasmus University Medical Center). TRAILS has been financially supported by various grants from the Netherlands Organization for Scientific Research (NWO; Medical Research Council Program Grant GB-MW 940-38-011; ZonMw Brainpower Grant 100-001-004; ZonMw Risk Behavior and Dependence Grant 60-60600-97-118; ZonMw Culture and Health Grant 261-98-710; Social Sciences Council Medium-Sized Investment Grant GB-MaGW 480-01-006 and Project Grants GB-MaGW 457-03-018 and GB-MaGW 452-04-314; NWO Large-Sized Investment Grant 175.010.2003.005); the Sophia Foundation for Medical Research (Projects 301 and 393), the Dutch Ministry of Justice, and the participating universities. We are grateful to all adolescents and their parents and teachers who participated in this research and to everyone who worked on this project and made it possible.

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on this topic is limited in general and, in particular, directed at young children and cross-sectional data (e.g., Belsky, Hsieh, & Crnic, 1998; Morris et al., 2002; Paterson & Sanson, 1999). In addition, most of the previous studies on temperament, family, and psychopathology have focused only on externalizing problems (Bates, Pettit, Dodge, & Ridge, 1998; Paterson & Sanson, 1999).

When studying psychopathology, a distinction can be made between problems resulting from aggressive and rule-breaking behavior, which brings the child into conflict with others (externalizing problems), and problems that result from internal distress, which is reflected in depressive symptoms and anxiety (internalizing problems). It is important to distinguish between these two constructs, because they are likely the result of different antecedents. However, although there is an extensive body of research on predictors of psychopathology, little is known about the specificity of predictors. This gap in the literature asks for studies that examine which factors contribute to or protect against externalizing or internalizing problems specifically and which factors are associated with psychopathology in general.

In the present study we focused on early adolescents. The first aim of this study was to examine the possible risk-buffering and risk-enhancing role of family characteristics on the relation between child temperament and future psychopathology. To overcome some of the shortcomings of previous studies, we used data from a longitudinal design in which temperament and family characteristics were assessed in preadolescence and psychopathology was measured in early adolescence (2.5 years later). Using a goal-framing approach, we were able to formulate testable hypotheses on whether effects were risk enhancing or protective for developing psychopathology, as well as on the specificity of these effects.

The second aim of this article, then, was to order temperamental and family factors into a classification of risks and protective factors that yield domain-specific, conditional, or generic effects. This idea originated from articles by Oldehinkel, Hartman, De Winter, Veenstra, and Ormel (2004) and Ormel et al. (2005), who analyzed general and domain-specific effects of familial vulnerability and temperament on internalizing and externalizing problems in the same sample that we use here. We extend their research with gender, family factors, and temperament-by-family interactions and with the distinction between risk and protective effects. We define domain-specific effects as predictors related to either externalizing or internalizing problems. Conditional effects are defined as predictors that are differently related to externalizing and internalizing problems. Generic effects are defined as factors that relate to psychopathology in general (i.e., to internalizing and externalizing problems).

Theory and Hypotheses

What factors pose risk and what factors act protectively with regard to internalizing and externalizing problems? An interesting approach for answering such a question is goal-framing theory (Lindenberg, 2001, 2006). Recent research on adolescents confirms the importance of goal-related processes for tracking social influence (e.g., Dijkstra, Lindenberg, & Veenstra, 2007). In the goal-framing approach, focal goals are hypothesized to influence what people attend to, what knowledge is being activated, how people evaluate things, and how people process information. People are keenly aware of aspects in the situation that (potentially) help and aspects that hinder or threaten to hinder their goal pursuit, and they positively evaluate (like) the former and negatively evaluate (dislike) the latter. The more important the goals, the stronger these cognitive and motivational effects are likely to be.

Thus, when fundamental needs become focal goals and when the goal pursuit is thwarted, the approach is likely to lead to strong negativity effects and pathology in both behavior and emotion regulation (Baumeister & Leary, 1995; Deci & Ryan, 2000). An interaction between a certain temperament and social circumstance may entail that, for a particular pathology, the negative influence on goal realization of one (a risk factor) is buffered by the positive influence on goal realization of the other (a protective factor). This is the basic theory that we use to generate the more detailed expectations about various temperaments, social environments, and their interactions with regard to internalizing and externalizing problems.

What fundamental needs are there, and which ones are particularly focal during adolescence? Deci and Ryan's self-determination theory (Deci & Ryan, 2000) places two needs at the center stage with regard to the generation of well-being and pathology: autonomy and relatedness (or the need to belong, as Baumeister & Leary, 1995, call it). Research based on this theory provides good support for the universality and the basicness of these two needs (see, e.g., Chirkov, Ryan, Kim, & Kaplan, 2003, for autonomy and Baumeister & Leary, 1995; Nieboer, Lindenberg, Boomsma, & Van Bruggen, 2005, for belonging). Moreover, especially in adolescence, these basic needs are generally unsettled and important but difficult to reach (Allen et al., 2006; Patrick, Knee, Canevello, & Lonsbary, 2007). Adolescents' autonomy is often contested between adolescents on the one hand and parents on the other (see Agnew, 2003; Hasebe, Nucci, & Nucci, 2004), and their sense of belonging is equally important and precarious (Jarvinen & Nicholls, 1996). For this reason, it is likely that in adolescence satisfaction of these needs is chronically focal as goals. That makes problems in the realization of these two goals prime suspects for the development of pathology and aids in the realization of these goals as protective factors. On this basis, in the present study we elaborate the workings of temperament and social environment in relation to their effects on the need for satisfaction of autonomy and belonging. Difficulties in pursuing these two basic needs also govern our selection of temperaments and social environments that should be considered.

Within the dispositional factors, temperament can be seen as a set of relatively stable characteristics of the child (Eisenberg, Fabes, Guthrie, & Reiser, 2000) that can make it more or less vulnerable for the development of psychopathology. Formulated differently, a certain temperament can facilitate or create difficulties in goal pursuit. Here, we have focused on two temperament aspects—frustration and fearfulness—because they have direct links to goal pursuit in general and have been found to be strongly predictive of psychopathology (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Frick & Morris, 2004). Although we do not measure goals directly, we can reason why and how they are involved in the effects of particularly these two temperaments on either internalizing or externalizing problems.

Because autonomy and belongingness are such important goals, especially in adolescence, children who are easily frustrated and react with aggression will see their efforts to achieve autonomy

and belongingness often thwarted. In turn, the repeated failure to satisfy these basic needs can create a particularly high level of frustration and aggression, such that it can be seen as a problem at the pathological level. Frustration then would be a domain-specific risk factor for externalizing problems. The same reasoning goes for fearfulness, only with withdrawal instead of aggression. That is, for fearful children repeated failure to satisfy the two basic needs can create particularly high levels of withdrawal. Withdrawal and fearfulness, in turn, contribute to unsuccessful efforts to satisfy the basic needs, which then lead to even more passive behavior. Therefore, we expect fearfulness to yield domain-specific risk effects for internalizing problems (in line with Caspi et al., 1995; Rothbart & Bates, 1998).

Whereas the two problematic temperaments give direction to the problems they engender (internalizing or externalizing behavior), we argue that family factors influence the degree to which the problematic temperaments will thwart goal achievement and thus lead to problem behavior. In short, they act as possible moderators for the associations between frustration and externalizing problems and between fearfulness and internalizing problems (cf. Belsky, 1997; Bronfenbrenner, 1986). In the present study we focus on four family factors that may interfere with or contribute to the pursuit of autonomy and/or belongingness: overprotection, rejection, emotional warmth, and socioeconomic status (SES). Although former research has linked parenting dimensions such as overprotection and rejection to both internalizing and externalizing problems, these same family factors may yield domain-specific risk effects when we take the temperament of the child into account. In addition, the dispositional risk to develop psychopathology may not only be enhanced but also buffered by factors within the family (e.g., Leve, Kim, & Pears, 2005; Morris et al., 2002; Oldehinkel, Veenstra, Ormel, De Winter, & Verhulst, 2006; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004; Veenstra, Lindenberg, Oldehinkel, De Winter, & Ormel, 2006). Therefore, it is more interesting and realistic to focus on the interplay between temperament and these family effects rather than on their main effects.

Within the family context, the most proximal factor for interference with the pursuit of autonomy is parental overprotection. Overprotection is characterized by fearfulness and anxiety for the child's safety and intrusive behavior by parents. This parental behavior hinders adolescents from achieving a sense of autonomy. Reactions to parental overprotection can be both withdrawal (internalizing) and rebelliousness or aggressiveness (externalizing) (Loeber & Stouthamer-Loeber, 1986; Pedersen, 2000; Rothbaum & Weisz, 1994). Overprotection is therefore hypothesized to be a risk factor for both internalizing and externalizing problems (generic risk factor). However, the combination with a frustrated or fearful temperament would form a risk that is specific for externalizing or internalizing problems, respectively, because of the hypothesized domain-specific effects of temperament. Therefore, we expect an interaction between overprotection and frustration (domain-specific risk enhancer for externalizing problems) and between overprotection and fearfulness (domain-specific risk enhancer for internalizing problems).

Rejection, in contrast to overprotection, is likely to interfere with the goal for belongingness, as this parental behavior is characterized by hostility, punishment, and derogation. Like overprotection, parental rejection is commonly found to be a risk factor for psychopathology (Lengua, 2006; see Loeber & Stouthamer-Loeber, 1986, for a review). Again, reactions to parental rejection can be both withdrawal (internalizing) and rebelliousness or aggressiveness (externalizing) (Loeber & Stouthamer-Loeber, 1986; Pedersen, 2000; Rothbaum & Weisz, 1994) and are therefore hypothesized to be a risk factor for both internalizing and externalizing problems (generic risk factors). However, on the basis of temperamental effects on goal pursuit as discussed above, we could expect domain-specific effects expressed in interactions between frustration and rejection (domain-specific risk enhancer for externalizing problems) as well as between fearfulness and rejection (domain-specific risk enhancer for internalizing problems).

Next to risk (risk-enhancing) effects, the family context can also have protective effects on developing psychopathology in terms of facilitating achievement of autonomy and belongingness: Giving children special attention, praising for approved behavior, showing unconditional love, and being supportive foster the pursuit of belongingness. Emotional warmth, which captures these characteristics, is proven to be protective for psychopathology in general (e.g., Paterson & Sanson, 1999; Rothbaum & Weisz, 1994). We thus hypothesize that emotional warmth is related to both internalizing and externalizing problems (generic-protective factor). Because difficulties in goal pursuit owing to temperament would be buffered by family factors that are supportive for achieving autonomy and belongingness, emotional warmth should buffer for negative effects of frustration and fearfulness. We thus expect negative interactions between frustration and emotional warmth (domain-specific buffer for externalizing problems) and between fearfulness and emotional warmth (domain-specific buffer for internalizing problems).

Although parenting behaviors are the most studied characteristics of the family environment, Pinderhughes, Dodge, Bates, Pettit, and Zelli (2000) showed that SES is also important to consider. SES can actually be seen as a proxy for possible and available parenting strategies (Mistry, Vandewater, Huston, & McLoyd, 2002). That is, parents from a high SES are likely to have a larger menu of strategies for dealing with problem behavior than just harsh punishment, such as talking things over with the child and involving the child in possible consequences of disobedience (Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). This view on SES is supported by research showing that the relation between SES and psychopathology is mediated by parenting characteristics such as supervision and time demands placed on parents (Costello, Compton, Keeler, & Angold, 2003). Moreover, a high SES captures a positive family environment more than just positive parenting behaviors. That is, in high SES families there is more money, knowledge, skills, and means to achieve goals. Growing up in a high SES family is therefore hypothesized to foster the pursuit of both belongingness and autonomy. Moreover, several studies have negatively linked SES to psychopathology (Costello et al., 2003; Keiley, Bates, Dodge, & Pettit, 2000; Mistry et al., 2002). So we hypothesize that SES is a generic-protective factor. However, if temperamental characteristics of the child are taken into account, SES could have domain-specific protective effects. We expect interactions between frustration and SES (domain-specific buffer for externalizing problems) and between fearfulness and SES (domain-specific buffer for internalizing problems).

The Present Study

The hypotheses on temperament, family, and their interactions derived from a goal-framing approach (see Figure 1) were tested in the TRacking Adolescents' Individual Lives Survey (TRAILS), a Dutch population-based sample of early adolescents. We controlled for familial vulnerability for psychopathology as possible confounder for the relation between temperament and family characteristics on the one hand and early adolescent psychopathology on the other. In addition, we controlled for early childhood problem behavior to rule out that parenting is a consequence rather than a cause of psychopathology. For explorative reasons we also included gender and interactions with gender in the models. Because boys are more likely than girls to engage in externalizing behaviors (Broidy et al., 2003), whereas girls are more likely than boys to have internalizing problems (Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003; Twenge & Nolen-Hoeksema, 2002), we expect gender to yield a conditional effect on psychopathology.

Method

Sample

This study is part of TRAILS, an ongoing prospective cohort study based on a sample representative of the Dutch population, investigating the development of mental health from preadolescence into adulthood. The present study uses data from the first (T1) and the second (T2) assessment wave of TRAILS, which ran from March 2001 to July 2002 and from September 2003 to December 2004, respectively.

Of all children approached for enrollment in the study, 76.0% participated, resulting in a sample size of 2,230 (i.e., both the child and the parent agreed to participate). The mean age of the children at T1 was 11.09 years ($SD = 0.55$); 50.8% were girls; 10.3% were children who had at least one parent born in a non-Western country; and 32.6% had parents with a low educational level (elementary education or lower tracks of secondary education). We did not find any nonresponse bias in our study for the estimation of the prevalence rates of psychopathology and the association between sociodemographic variables and mental health indicators. Of the 2,230 first-wave (T1) participants, 96.4% ($n = 2{,}149$) participated in the second wave (T2). At T2 the mean age of the children was 13.55 years ($SD = 0.54$), and 51.2% were girls.

A detailed description of the study design, sampling procedures, data collection, and measures of the TRAILS study can be found in De Winter et al. (2005).

Measures

Psychopathology. Externalizing and internalizing problems were assessed at T2 by the Dutch version of the Child Behavior Checklist and the self-report version of this questionnaire, the Youth Self-Report (Achenbach, 1991a, 1991b; Verhulst & Achenbach, 1995). It contains a list of 112 behavioral and emotional problems, which parents can rate as 0 = *not true*, 1 = *somewhat or sometimes true*, or 2 = *very or often true in the past six months*. Test–retest reliabilities of the Child Behavior Checklist and the Youth Self-Report have been found to be good. We constructed the scale Externalizing Problems from items corresponding to Aggressive Behavior and Rule-Breaking Behavior. The scale Internalizing Problems was constructed from the items corresponding to Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints (cf. Achenbach, 1991a). Consistent with other reports (e.g., Achenbach, McConaughy, & Howell, 1987; Veenstra et al., 2006; Verhulst & Van der Ende, 1992), the agreement between parent-reported and child-reported problems was only moderate (rs = .41 and .39 for externalizing and internalizing problems, respectively). However, problem behavior that is rated as present by both parent and child is assumed to be more severe (more generalized) than problems rated by only one informant. On this assumption, we used the mean of the standardized parent and child scores as measures of externalizing and internalizing problems in this study.

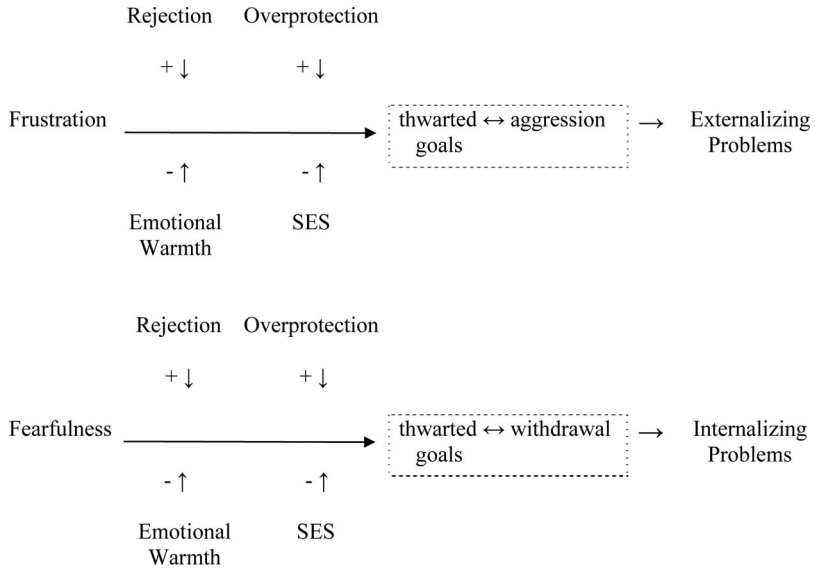

Figure 1. Overview of hypotheses to be tested. SES = socioeconomic status.

Temperament. Temperament was assessed at T1 by the parent version of the Early Adolescent Temperament Questionnaire-Revised (Ellis, 2002; Putnam, Ellis, & Rothbart, 2001), a 62-item questionnaire based on the temperament model developed by Rothbart and colleagues (Putnam et al., 2001). Fearfulness (five items; $\alpha = .63$) denotes worrying and unpleasant affect related to the anticipation of distress. Frustration is the negative affect related to goal blocking or an interruption of ongoing tasks (five items; $\alpha = .74$).

Perceived parenting. To assess the perception of actual parental rearing by children and early adolescents at T1, we used the Egna Minnen Beträffande Uppfostran (My Memories of Upbringing) for Children (EMBU-C; Markus, Lindhout, Boer, Hoogendijk, & Arrindell, 2003). The original EMBU-C contained 81 items. Markus, Lindhout, Boer, Hoogendijk, and Arrindell (2003) developed a shorter version, which we used. The EMBU-C contains the factors Overprotection, Rejection, and Emotional Warmth. The scale for Overprotection contained 12 items with an internal consistency of .70 for fathers and .71 for mothers. Overprotection is characterized by fearfulness and anxiety for the child's safety, guilt engendering, and intrusiveness ("Do you feel that your parents are extremely anxious that something will happen to you?"). The scale for Rejection contained 12 items with an internal consistency of .84 for fathers and .83 for mothers. Rejection is characterized by hostility, punishment (physical or not, abusive or not), derogation, and blaming of subject ("Do your parents sometimes punish you even though you haven't done anything wrong?"). The scale for Emotional Warmth contained 18 items with an internal consistency of .91 for both fathers and mothers. Emotional Warmth is characterized by giving special attention, praising for approved behavior, unconditional love, and being supportive and affectionately demonstrative ("Do your parents make it obvious that they love you?"). Children could rate the EMBU-C as 1 = *no, never*, 2 = *yes, sometimes*, 3 = *yes, often*, or 4 = *yes, almost always*. The answers for both parents were highly correlated (rs = .81 for Overprotection, .67 for Rejection, and .79 for Emotional Warmth), so we felt it was justified to combine them. The test–retest stability of a shortened version of the EMBU-C over a 2-month period has been found to be satisfactory ($r = .78$ or higher; Muris, Meesters, & van Brakel, 2003). Markus et al. (2003) have reported on the validity of the EMBU-C.

SES. At T1, SES was constructed according to the educational level of both parents, occupational level of both parents, and family income level. Educational level of parents was categorized in five categories. Occupational level was based on the International Standard Classification of Occupations (Ganzeboom & Treiman, 1996). Finally, family income level was requested, with low family income defined as a monthly net family income of less than €1,135 per month, which approximately amounts to a welfare payment. SES was measured as the average of the five items (standardized). The SES scale captures 61.2 percent of the variance in the five items and has an internal consistency of .84. Missing values (e.g., when there is only one parent in the family) did not affect the association of this scale with other variables.

Familial vulnerability for psychopathology. Parental psychopathology with respect to depression, anxiety, substance abuse, antisocial behavior, and psychoses was measured at T1 by means of the Brief TRAILS Family History Interview, administered at the parent interview. Each syndrome was introduced by a vignette describing its main symptoms and followed by a series of questions to assess lifetime occurrence, professional treatment, and medication use. The scores for substance abuse and antisocial behavior were used to construct a Familial Vulnerability Index for Externalizing Disorder. The scores for depression and anxiety were used to construct a Familial Vulnerability Index for Internalizing Disorder. For each syndrome, each parent was assigned to one of the categories 0 = *(probably) not*, 1 = *(probably) yes*, and 2 = *yes and treatment/medication*. For antisocial behavior, this last category was 2 = *yes and police involvement*. Subsequently, familial loadings were calculated according to the scores for both parents, for the domains of externalizing and internalizing disorders separately (see Ormel et al., 2005).

Preschool behavior. Preschool behavior was assessed retrospectively by parents at T1, with the questionnaire "How was your child as a preschooler? (age 4–5)." The questionnaire contains a list of 17 behavioral, emotional, and motor items, which parents can rate on a 5-point scale in relation to the peers of their child: 1 = *a lot less than average*, 2 = *less than average*, 3 = *average*, 4 = *more than average*, and 5 = *a lot more than average*. Four items made up the factor Aggressive (e.g., disobedience, bossiness; $\alpha = .70$) and 7 items made up the factor Anxious (e.g., anxiousness, shyness; $\alpha = .79$). Factor analysis (Promax rotation) has revealed that these behaviors made up separate factors (Emond, Ormel, Veenstra, & Oldehinkel, 2007).

Analyses

Gender differences in psychopathology, temperament, and family environment were examined by means of t tests. Associations between all variables involved in the present study were tested by means of Pearson correlations, for boys and girls separately. Main and interaction effects of gender, temperament, parenting, and SES on adolescent psychopathology, adjusted for familial vulnerability for psychopathology and early childhood problem behavior, were tested by multiple linear regression analyses.

The regression models (with all predictors standardized to $M = 0$ and $SD = 1$) were computed for externalizing and internalizing problems separately. To ensure sufficient power for the interaction effects, we wanted to keep the number of interactions fairly small and hence performed separate analyses for overprotection, rejection, emotional warmth, and SES. Subsequently, interactions that were significant in the separate analyses were included in a model encompassing all variables (simultaneous model).

A p value equal to or smaller than .05 was considered statistically significant. Because we performed many statistical tests, the results may suffer from capitalization on chance: One would expect some 5% of the associations examined to be significant merely on the basis of chance. Hence, a statistically significant result in this context does not have the same weight as significant results in an experimental design.

To provide an impression of the size of the effects and to facilitate the interpretation of the interaction effects, we wrote out multiple equations using simple slope analysis (cf. Aiken & West, 1991), with low and high levels of the predictors indicating one standard deviation below and above the mean, respectively, while holding all other variables to their sample means. In addition, we provided effect sizes for separate effects (standardized betas) and for block of effects (Cohen's f^2).

Results

Descriptive Analyses

Means and standard deviations of predictors and outcome variables are reported in Table 1, for girls and boys separately. Because the psychopathology variables reflect the mean of standardized parent and child scores, the means of these variables are close to zero. The same is true for SES. The other means need to be interpreted in the light of the theoretical possible range of the variables (1–5 for temperament variables, 1–4 for parenting variables). All variables, except for SES and familial vulnerability for psychopathology, showed significant gender differences. Compared with girls, boys showed more problem behavior as a preschooler, engaged more in externalizing problems, had higher levels of frustration, and perceived more overprotection and rejection by their parents. In addition, compared with boys, girls had higher levels of internalizing problems, were characterized by higher levels of fearfulness, and experienced more emotional warmth from their parents.

Table 2 contains the correlations between the variables involved in the present study, above the diagonal for girls and below the diagonal for boys. Temperament and parenting variables were associated little to moderately with one another and with future externalizing and internalizing problems. There were some significant gender differences in the correlations, in that the associations between familial vulnerability and externalizing problems (z difference = 3.11), emotional warmth and internalizing problems (z difference = 2.09), and SES and rejection (z difference = 2.33) were stronger for girls than for boys ($p < .05$).

Regression Analyses

Table 3 contains the unstandardized regression coefficients and standard errors for the control, temperament, and family variables in the prediction of externalizing and internalizing problems at T2. To test possible risk-buffering and risk-enhancing effects, we included temperament-by-family interactions in the regression analyses. We reported the results of the simultaneous models, encompassing all variables and their significant interactions. The results are discussed below. In discussing the interaction effects, we took the relevant main effects into account by reporting on the simple slopes for children one standard deviation below and above the mean on the predictors involved in the interaction term (cf. Aiken & West, 1991).

Externalizing problems. After controlling for internalizing problems to rule out comorbidity and to be able to get at the specificity of the effects, early childhood aggression, and familial vulnerability for psychopathology, we can see from Table 3 that there was a main effect of gender, indicating that boys had higher levels of externalizing problems than girls. No gender interactions emerged, so all the relations we found with externalizing problems were the same for boys and girls. Fearfulness was negatively related to future externalizing problems, whereas Frustration was positively related to externalizing problems. As expected, Overprotection and Rejection were risk factors, whereas Emotional Warmth and SES protected against externalizing problems. These main effects of temperament and parenting explained 5% of the variance in externalizing problems over and above the control variables.

Table 3 further shows that there were four significant temperament-by-family interactions for the prediction of early adolescent externalizing problems. This model with interaction effects was significantly better than the model without these interactions, $F(4, 1842) = 6.02$, $p < .001$. The effect size Cohen's f^2 for the block of interactions is .02, which is considered small (Cohen, 1988). The overall effect size Cohen's f^2 was .62 for this final model, which is considered large.

In line with our hypotheses, we found interactions between Frustration and family factors. The Frustration-by-Rejection interaction means that the risk effect of Frustration on externalizing

Table 1
Means and Standard Deviations of Psychopathology, Preschool Behavior, Temperament, Family, and Familial Vulnerability for Psychopathology

	Girls			Boys			Difference		
Variable	*M*	*SD*	*n*	*M*	*SD*	*n*	*t*	*df*[a]	*p*
Externalizing problems[b]	−0.04	0.85	1,088	0.07	0.89	1,039	−2.76	2125	<.01
Internalizing problems[b]	0.19	0.91	1,088	−0.18	0.77	1,039	10.08	2096	<.01
Preschool aggression	2.48	0.64	1,037	2.64	0.65	1,002	−5.46	2037	<.01
Preschool anxiousness	2.60	0.62	1,038	2.65	0.62	1,002	−1.95	2038	<.01
Temperament									
Frustration	2.74	0.64	1,012	2.84	0.68	971	−3.35	1961	<.01
Fearfulness	2.49	0.75	1,012	2.35	0.70	970	4.32	1980	<.01
Family									
Overprotection	1.84	0.37	1,123	1.88	0.39	1,083	−2.81	2204	<.01
Rejection	1.45	0.29	1,123	1.51	0.33	1,083	−5.01	2154	<.01
Emotional warmth	3.26	0.49	1,124	3.16	0.51	1,083	4.81	2205	<.01
Socioeconimic status	−0.03	0.78	1,115	−0.07	0.82	1,073	1.39	2186	.16
Familial vulnerability									
Externalizing problems	0.14	0.42	1,107	0.14	0.42	1,058	−0.11	2163	.91
Internalizing problems	0.56	0.79	1,113	0.55	0.79	1,070	0.52	2181	.61

[a] Degrees of freedom deviant from $n_{girls} + n_{boys} - 2$ reflect test statistics adjusted for unequal variances. [b] Mean of standardized parent and self-report second (T2) assessment wave scores.

Table 2
Correlations Between Psychopathology, Preschool Behavior, Temperament, Family, and Familial Vulnerability for Psychopathology, for Girls and Boys

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. T2 externalizing problems	—	.51**	.29**	.03	.33**	.10**	.19**	.28**	−.17**	−.16**	.21**	.13**
2. T2 internalizing problems	.48**	—	.04	.12**	.23**	.18**	.18**	.27**	−.16**	−.11**	.10**	.19**
3. Preschool aggression	.31**	.05	—	.32**	.31**	.06	.04	.17**	−.09**	.06	.09**	.00
4. Preschool anxiousness	.04	.26**	.29**	—	.17**	.13**	−.03	.07**	−.08**	.09**	.03	.06**
5. Frustration	.38**	.29**	.32**	.23**	—	.31**	.07	.18**	−.11**	−.06	.07	.11**
6. Fearfulness	.16**	.25**	.10**	.22**	.34**	—	.10**	.06	.02	−.05	.07	.11**
7. Overprotection	.15**	.17**	.00	−.03	.09**	.10**	—	.46**	.13**	−.10**	.08**	.04
8. Rejection	.23**	.20**	.14**	.05	.16**	.10**	.41**	—	−.33**	−.10**	−.01	.00
9. Emotional warmth	−.14**	−.07	−.08**	.00	−.09**	−.02	.25**	−.31**	—	.17**	−.01	−.02
10. Socioeconomic status	−.12**	−.06	−.03	.13**	−.06	−.11**	−.07	.00	.13**	—	−.21**	−.09**
11. Familial vulnerability externalizing	.08**	.05	.00	−.04	.06	.06	.02	.00	−.04	−.21**	—	.23**
12. Familial vulnerability internalizing	.10**	.19**	.03	.12**	.13**	.17**	−.03	.01	−.02	−.09**	.27**	—

Note. Girls' correlations appear above the diagonal and boys' correlations below the diagonal. T2 = second assessment wave.
** $p < .01$.

problems was enhanced by perceived parental Rejection. That is, the risk effect of Frustration to develop externalizing problems was already there, although parental Rejection was low, $b = 0.12$, $t(1855) = 4.44$, $p < .01$, but this risk effect was even greater when parental Rejection was high, $b = 0.20$, $t(1855) = 8.33$, $p < .01$.

The Frustration-by-Emotional Warmth interaction means that Frustration predicted significantly externalizing problems in early adolescence, but this effect was buffered by perceived Emotional Warmth. That is, the risk effect of Frustration for children high on parental Emotional Warmth, $b = 0.12$, $t(1855) = 4.80$, $p < .01$, was smaller than for those perceiving little parental Emotional Warmth in their parents, $b = 0.20$, $t(1855) = 7.69$, $p < .01$.

The Frustration-by-SES interaction means that Frustration predicted significantly externalizing problems in early adolescence, but this effect was buffered by SES. That is, the risk effect of Frustration for children living in high SES families, $b = 0.12$,

Table 3
Regression Analyses for Externalizing Problems and Internalizing Problems in Early Adolescence (Simultaneous Models)

	T2 externalizing problems			T2 internalizing problems		
	Main effects	Full model		Main effects	Full model	
Predictor	*b* (*SE*)	*b* (*SE*)	β	*b* (*SE*)	*b* (*SE*)	β
Control variables						
Preschool problem behavior[a]	0.18** (0.02)	0.18** (0.02)	.21	0.11** (0.02)	0.11** (0.02)	.13
Familial vulnerability[a]	0.07** (0.02)	0.07** (0.02)	.08	0.10** (0.02)	0.10** (0.02)	.12
T2 externalizing problems				0.40** (0.02)	0.40** (0.02)	.39
T2 internalizing problems	0.39** (0.02)	0.39** (0.02)	.39			
Gender (boys)	0.15** (0.03)	0.16** (0.03)	.09	−0.42** (0.03)	−0.42** (0.03)	−.25
Main effects						
Frustration	0.15** (0.02)	0.16** (0.02)	.19	0.02 (0.02)	0.02 (0.02)	
Fearfulness	−0.04* (0.02)	−0.04* (0.02)	−.05	0.08** (0.02)	0.09** (0.02)	.10
Overprotection	0.05** (0.02)	0.05** (0.02)	.06	0.07** (0.02)	0.06** (0.02)	.07
Rejection	0.06** (0.02)	0.05** (0.02)	.06	0.06** (0.02)	0.11** (0.03)	.12
Emotional warmth	−0.04* (0.02)	−0.04* (0.02)	−.04	−0.03 (0.02)	−0.02 (0.02)	
SES	−0.06** (0.02)	−0.07** (0.02)	−.08	−0.01 (0.02)	−0.01 (0.02)	
Interaction effects						
Frustration × Rejection		0.04* (0.02)	.04			
Frustration × Emotional Warmth		−0.04* (0.02)	−.05			
Frustration × SES		−0.04** (0.02)	−.05		0.05** (0.02)	.06
Fear × Rejection					0.03† (0.02)	.03
Fear × Emotional Warmth		0.04* (0.02)	.05			
Fear × SES					−0.04* (0.02)	−.05
Gender × Rejection					−0.08* (0.03)	−.07
Adjusted R^2	.37	.38		.33	.34	

Note. T2 = second assessment wave; SES = socioeconomic status.
[a] Preschool aggression and familial vulnerability for externalizing problems in the prediction of externalizing problems. Preschool anxiousness and familial vulnerability for internalizing problems in the prediction of internalizing problems.
* $p < .05$. ** $p < .01$. † $p < .10$.

$t(1855) = 5.22$, $p < .01$, was smaller than for those living in low SES families, $b = 0.20$, $t(1855) = 8.00$, $p < .01$.

Against our hypotheses, we found no interaction between Frustration and Overprotection. Strangely, we did find an interaction between Fearfulness and Emotional Warmth, which was not that straightforward in interpretation. It turned out that Fearfulness was not related to externalizing problems when Emotional Warmth was high: simple slope $b = 0.00$. In contrast, the "protective" effect of Fearfulness was enhanced when Emotional Warmth was low, $b = -0.08$, $t(1855) = -3.33$, $p < .01$. Thus, Fearfulness was related to externalizing problems only when parental Emotional Warmth was low.

Internalizing problems. Table 3 shows that after controlling for externalizing problems to get at the specificity of the effects, early childhood anxiousness, and familial vulnerability for psychopathology, boys were less likely than girls to have internalizing problems. As expected, Frustration was unrelated, whereas Fearfulness was positively related, to internalizing problems. Overprotection and Rejection had significant risk effects. The significant gender-by-Rejection interaction shows that girls were already more likely than boys to develop internalizing problems and that Rejection predicted significantly more internalizing problems for girls, $b = 0.11$, $t(1855) = 3.70$, $p < .01$, but not for boys, $b = 0.03$, $t(1855) = 1.03$, $p = .30$. Surprisingly, there were no protective main effects of Emotional Warmth and SES. The main effects of temperament and parenting explained 3% of the variance in internalizing problems over and above the control variables.

From Table 3 we can see that there were three significant temperament-by-family interactions for the prediction of early adolescent internalizing problems. This model with interaction effects was significantly better than the model without these interactions, $F(4, 1842) = 4.66$, $p < .001$. The effect size Cohen's f^2 for the block of interactions is .02, which is considered small (Cohen, 1988). The overall effect size Cohen's f^2 was .52 for this final model, which is considered large.

In line with our hypotheses we found interactions between Fearfulness and family factors. The Fearfulness-by-Rejection interaction means that the risk effect of Fearfulness was enhanced by perceived parental Rejection. Although the interaction effect was only marginally significant, the simple slopes (Aiken & West, 1991) of Fearfulness were highly significant. That is, being fearful yielded a risk for internalizing problems, although parental Rejection was low, $b = 0.06$, $t(1855) = 2.40$, $p < .05$, but this risk effect of Fearfulness was even greater when parental Rejection was high, $b = 0.12$, $t(1855) = 4.80$, $p < .01$.

The Fearfulness-by-SES interaction means that the risk effect of Fearfulness on internalizing problems was buffered by SES. That is, the risk effect of Fearfulness for children living in high SES families, $b = 0.05$, $t(1855) = 2.08$, $p < .05$, was smaller than for those living in low SES families, $b = 0.13$, $t(1855) = 5.20$, $p < .01$.

Against our hypotheses, no interactions were found between Fearfulness and Overprotection or Emotional Warmth. Surprisingly, we found a Frustration-by-SES interaction, meaning that Frustration was related only to early adolescent internalizing problems for children living in high SES families. In other words, the effect of Frustration was low and nonsignificant for children in low SES families, $b = -0.03$, $t(1855) = -1.15$, $p = .26$, but Frustration yielded a risk for internalizing problems in high SES families, $b = 0.07$, $t(1855) = 2.80$, $p < .01$.

Specificity of the predictors. Table 4 is based on the regression coefficients in Table 3 and shows the effects grouped in domain-specific, conditional, and generic risks and protective factors. In line with our hypotheses (see Figure 1), we found that Frustration could be labeled a domain-specific risk factor for externalizing problems. Fearfulness, however, appeared to be protective for externalizing problems while stimulating internalizing problems. Thus, Fearfulness is a conditional factor for psychopathology.

Next, we expected the family factors to yield generic main effects. This was the case only for Overprotection and Rejection. In contrast, Emotional Warmth and SES acted as domain-specific protective factors for externalizing problems.

Finally, interactions between temperament and family were expected to yield domain-specific effects, and, indeed, Rejection enhanced, whereas Emotional Warmth buffered, the effect of Frustration on externalizing problems. In addition, Rejection enhanced, whereas SES buffered, the effect of Fearfulness on internalizing problems. However, SES also buffered for the risk effect of Frustration on externalizing problems, whereas it enhanced the effect of Frustration on internalizing problems. Thus, this interaction yields a conditional effect. For gender the conditional effect was the other way around. As expected, being a boy placed one at

Table 4
Summary of Effects: Domain-Specific, Conditional, and Generic Effects for Externalizing Problems and Internalizing Problems

Specificity	Risk/risk enhancer	Protective/buffer
Domain-specific externalizing	Frustration	Emotional warmth
	Rejection given frustration	SES
		Emotional warmth given Frustration
Domain-specific internalizing	Rejection given fearfulness	SES given fearfulness
	Rejection given girl	
Conditional externalizing	Gender (being a boy)	Fearfulness
		SES given frustration
Conditional internalizing	Fearfulness	Gender (being a boy)
	SES given frustration	
Generic	Overprotection	
	Rejection	

Note. SES = socioeconomic status.

risk for developing externalizing problems while protecting for the development of internalizing problems.

Discussion

The findings of the current study underline the interplay between temperament and characteristics of the social environment in understanding, preventing, and intervening in the development of psychopathology. Our expectations about the relationship between temperament and the family environment are summarized in Figure 1. First, we found that family factors can have risk-buffering and risk-enhancing effects for a problematic temperament and the development of psychopathology. We extended previous research on this topic by examining both externalizing and internalizing problems while controlling for each other, for familial vulnerability, and for former problem behavior. Second, we wanted to order gender, temperament, and family factors in a descriptive way that may prove useful for future research. The resulting categorization of the effects of gender, temperament, and family and their interactions in domain-specific, conditional, and generic risks and protective factors shows that it is highly relevant to distinguish between predictors of externalizing problems and predictors of internalizing problems.

Using a goal-framing approach, we generated hypotheses on the direction and specificity of the effects of temperament and family factors. We argued that via a vicious circle of thwarted goals (autonomy and belongingness) and the resulting aggressiveness, frustration would lead to externalizing problems, and that via thwarted goals (autonomy and belongingness) and the resulting withdrawal, fearfulness would lead to internalizing problems. Results were consistent with our hypothesis on the domain-specific effect of frustration. For fearfulness, however, this study showed that its effect is conditional rather than domain specific. That is, in addition to findings of other studies that fearfulness is a risk factor specifically for internalizing problems (Caspi et al., 1995; Eisenberg et al., 2000; Ormel et al., 2005; Rothbart & Bates, 1998), the present study showed a small but significant protective effect for externalizing problems. This might be due to the fact that we analyzed pure measures of externalizing and internalizing problems, that is, after controlling for comorbidity of problems to get at the specificity of the effects. Fearfulness means worrying and unpleasant affect related to the anticipation of distress, and as we hypothesized, this behavior is likely to contribute to withdrawal but unlikely to contribute to aggressiveness. It now turns out that fearfulness can even protect against externalizing problems.

Next we hypothesized that family factors could either buffer or enhance the temperamental risk effects on psychopathology. In line with results of other studies, we found indeed that children react differently to the same family factors, depending on their temperament (Belsky et al., 1998; Kochanska, Aksan, & Joy, 2007; Paterson & Sanson, 1999; Thomas & Chess, 1977; Van Leeuwen et al., 2004; Wills, Sandy, Yaeger, & Shinar, 2001). We expected interactions between fearfulness and family factors to be domain specific for internalizing problems because of the hypothesized domain-specific main effect of fearfulness. In line with this expectation, the present study showed that parental rejection enhanced the risk effect of fearfulness, whereas SES buffered against this effect. In addition, on the basis of the domain-specific effect of frustration, we expected that interactions between frustration and family factors would be domain specific as well. In line with this expectation, results showed that parental rejection enhanced, whereas emotional warmth and SES buffered, the effect of frustration on externalizing problems.

The temperament-by-family interactions we found for externalizing problems were in line with the cross-sectional results of Veenstra et al. (2006), partially on the same data. In that study it was also found that effects of frustration were buffered by SES and emotional warmth and enhanced by parental rejection. The results of the current study imply that these temperament-by-family interactions are strong predictors of externalizing behavior, as they were associated not only concurrently but also longitudinally. Apparently, children with a frustrated temperament are sensitive to family factors that either buffer (SES and emotional warmth) or enhance (rejection) the risk to develop externalizing problems. This fits with our theoretical explanation for frustration to yield a domain-specific risk.

We found two temperament-by-family interactions that went against our expectations. First, as expected, SES appeared to act as a strong protective factor and buffer (for children high on frustration) in the development of externalizing problems. However, the buffering effect of SES on frustration yielded a conditional instead of domain-specific effect, because this interaction was also (though reversely) related to internalizing problems. Although, as expected, there was no main effect of frustration on internalizing problems, the interaction means that under conditions of high SES, frustration is related to internalizing behavior. One might speculate that what is going on here is that parents from high SES families use more psychological than physical strategies for dealing with problematic behaviors in their children (Pinderhughes et al., 2000). This could lead to an increased emphasis of psychological problems when frustration leads to aggressive behavior of the child, shifting the burden to internalizing problems.

Although studies on temperament-by-family interactions and psychopathology have consistently ignored the possible effects of SES (see Veenstra et al., 2006, for an exception), the findings of the current study show that SES is an important factor to consider within the family environment in addition to parenting styles. Future studies would do well to explore the effects of SES on the development of psychopathology more thoroughly, such as whether the three indicators that make up the factor SES—education, occupation, and family income—have the same predictive value for externalizing problems.

Second, in contrast to our expectations, we found an interaction between fearfulness and emotional warmth for externalizing problems. It appeared that fearfulness was relatively protective for externalizing problems only when parental emotional warmth was low and not when children perceived high emotional warmth in their parents. It might be the case that those children who are extremely fearful get little emotional warmth because they are so withdrawn and refrain from externalizing behavior for the same reason. This might be an interesting effect to study in future research.

Surprisingly, despite its main effects on both internalizing and externalizing problems, we found no risk-enhancing effects of parental overprotection. We argued that overprotection is most directly related to the need for autonomy, because parents who are overprotective are characterized by intrusive behavior and anxiety for the child's safety. This parental behavior would hinder a child's

development of a sense of autonomy and independence. The need for autonomy is especially salient in adolescence because of other major changes such as biological maturation. But despite their children's biological maturation, parents still set rules and exert control over them. Antisocial behavior in this period is often seen as adolescents' strategy to deal with this so-called maturity gap (Agnew, 2003; Moffitt, 1993). However, the present study was conducted with early adolescents (M age = 13.55 years), and therefore the need for autonomy may not be as strong as it is with older adolescents. In short, in a sample of older adolescents, overprotection may well have a risk-enhancing effect. Again, future research might clarify this issue.

The current study has major strengths compared with previous research in this area. First, we examined both temperament and family factors, with the focus on temperament-by-family interactions. Moreover, we extended the family factors by taking into account not only parenting dimensions, such as in most previous temperament-by-environment studies (e.g., parental control; Kochanska, 1997), but also SES. In addition, by distinguishing between purely externalizing and purely internalizing problems (i.e., controlling for the co-occurrence of problems), we were able to examine which predictors yielded domain-specific or conditional effects and which predictors related to psychopathology in general. Finally, we were fortunate to conduct this study within a large group of young adolescents, a somewhat understudied age group in the area of temperament-by-family interactions and psychopathology. Owing to TRAILS, we will be able to replicate and extend the current study in this group of adolescents during their transition into adulthood.

Next to these strengths, several limitations should be mentioned. First, our data were based on questionnaires. It can be argued that observational measures capture more reliable, objective information, but in this large group of participants (n = 2,149) it was practically impossible to gather observational data. Moreover, we believe that it is important to have experienced or perceived temperament and parenting instead of purely objective measures. For instance, parental rejection will have a negative effect on children's outcomes, especially when these children experience rejection by their parents. Second, predictors and outcomes were partly based on the same informants, namely, the parent and the child. This could have led to shared method variance. However, the risk of inflated associations is less present in the current study compared with studies that use data from only one informant and one wave. Third, although we used data from a longitudinal design, we did not control for psychopathology (or externalizing and internalizing problems) measured at Time 1 (or the first wave). We made this choice because the time span between the first and second wave was relatively short with regard to the development of psychopathology. Consequently, the psychopathology measures of the two waves are highly correlated with little variance left to explain. Instead, we used data on early childhood behavior problems as control variables. These data predate the parenting measures by a long time and thus strengthened our assumption that in the present study parenting is a cause rather than a consequence of child behavior. Finally, we used a goal-framing approach to generate testable hypotheses and to explain our results, although we did not measure the underlying mechanism concerning goal pursuit directly. Other studies, however, have provided clear evidence for the link between (thwarted) goal pursuit regarding fundamental needs (for autonomy and belongingness) and the development of psychopathology (e.g., Assor, Roth, & Deci, 2004; Baumeister, DeWall, Ciarocco, & Twenge, 2005; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; Twenge, Baumeister, Tice, & Stucke, 2001).

To conclude, the current study shows that to understand and subsequently prevent maladaptive behavior, it is important to take into account the interplay between persons and their socializing environment. Because the social environment outside the family context becomes increasingly important for adolescents (e.g., Buehler, 2006; Vitaro, Brendgen, & Wanner, 2005), future research may extend the socializing environment to factors outside the family context, such as peers, school, and neighborhood. In addition, the present study shows that factors such as fearfulness may protect against developing externalizing problems while promoting the development of internalizing problems, implying that results of studies on psychopathology should be interpreted with great caution. Therefore, it would be highly recommendable for future research to examine the specificity of predictors. Although the current study shows that predictors of externalizing and internalizing problems differ and consequently that the focus should be on domain-specific risks and buffers, many children show a mixture of externalizing and internalizing problems (Zoccolillo, 1992). Therefore, general risks and buffers of psychopathology are important to detect as well. Finally, for a deeper understanding of the mechanism involved in buffering and risk enhancing, it may be important to investigate more directly the possibly inhibiting or reinforcing effects of both temperament and socializing environment on a child's ability to pursue certain goals (see Van der Zee & Perugini, 2006).

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Received March 23, 2007
Revision received August 13, 2008
Accepted September 16, 2008 ■