



Published in final edited form as:

Soc Dev. 2010 ; 19(3): 577–600. doi:10.1111/j.1467-9507.2009.00550.x.

Relations of Temperament to Maladjustment and Ego Resiliency in At-Risk Children

Nancy Eisenberg, Rg Haugen, Tracy L. Spinrad, Claire Hofer, Laurie Chassin, Qing Zhou, Anne Kupfer, Cynthia L. Smith, Carlos Valiente, and Jeffrey Liew

Nancy Eisenberg, Department of Psychology, Arizona State University; Rg Hagen, Division of Psychology in Education, Arizona State University; Tracy L. Spinrad, Department of Family and Human Development, Arizona State University; Claire Hofer, Department of Psychology, Arizona State University; Laurie Chassin, Department of Psychology, Arizona State University; Qing Zhou, Department of Psychology, Arizona State University; Arizona State University; Anne Kupfer, Department of Psychology, Arizona State University; Cynthia L. Smith, Arizona State University; Carlos Valiente, Department of Family and Human Development, Arizona State University; Jeffrey Liew, Department of Psychology, Arizona State University

Keywords

adjustment; temperament; children of alcoholics; emotion regulation; substance use/abuse

The relations of control/regulation-related temperamentally based dispositions (effortful control [EC], impulsivity, and approach/avoidance) to externalizing problems and personality ego resiliency were examined in a sample of 467 children (M age = 7.46 years), some of whom were children of alcoholics (COAs). In addition, we examined if the relations of temperamental regulation/control to maladjustment/ego resiliency were moderated by COA status or sex of the child. In general, regulated, controlled temperament was negatively related to externalizing problems and EC was positively related to ego resiliency. Relations between a problematic temperament and externalizing problems were stronger and sometimes only found for COAs, especially male COAs. Ego resiliency was positively related to high father-reported approach for boys who were not sons of alcoholics. In addition, COA status was related to high impulsivity, approach behavior, and externalizing problems and low EC.

Individual differences in temperamental regulation and behavioral reactivity (e.g., impulsivity) have been found to relate to maladjustment (Rothbart & Bates, 2006) and to ego resiliency (e.g., Eisenberg et al., 2004). In the present study, we examined the relations of temperamental impulsivity, effortful control (EC), and approach behavior to externalizing problems and ego resiliency in a sample including numerous children at risk (i.e., children of alcoholics, COAs). COA children appear to be especially at risk for both problematic temperament and maladjustment; indeed, it has been argued that temperamental risk is a major factor in the increased maladjustment of COAs (see below). Because temperamental vulnerability may be an especially important predictor of adjustment in COAs, we examined if COA status moderated relations of temperamental regulation and behavioral reactivity to maladjustment (i.e., externalizing problems) and ego resiliency, as well as differences in COAs and non-COAs in mean levels of temperament, maladjustment, and ego resiliency. Undercontrolled and

Correspondence concerning this article should be addressed to Nancy Eisenberg, Psychology, Arizona State University, Tempe, AZ 85287-1104.

Cynthia L. Smith is now at the Department of Human Development, Virginia Polytechnic Institute and State University. Qing Zhou is at the Department of Psychology, University of California, Berkeley. Jeffrey Liew is now at the School of Education, Texas A & M.

reactive behaviors were expected to be stronger predictors of maladjustment and perhaps ego resiliency for COAs and non-COAs due to the former's genetic and environment risks.

Temperamental Regulation and Reactivity and Their Relations to Adjustment

Temperament includes both regulatory and reactive components (Rothbart & Bates, 2006). The regulatory component of temperament is effortful control (EC), defined as “efficiency of executive attention—including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors” (Rothbart & Bates, 2006, p. 129). Executive attention, part of executive control, is seen as the core of the temperamental construct of effortful control (EC). EC appears to be largely influenced by the functioning of the anterior cingulate gyrus and related areas of the prefrontal cortex (Fan, Fossella, Sommer, Wu, & Posner, 2003; Posner & Rothbart, 2007) and has been found to be partly genetically influenced (e.g., Goldsmith, Buss, & Lemery, 1997; Yamagata et al., 2005).

Aspects of temperamental reactivity include impulsivity (i.e., speed to response initiation) and approach (amount of excitement and positive anticipation for expected pleasurable activities). Impulsivity is believed to contribute to children's lack of control. It loads on the extraversion/surgency factor of temperament (Rothbart et al., 2001) and is a separate latent construct than EC (Eisenberg et al., 2004). Impulsivity is believed to be based on reactive approach systems such as Gray's Behavioral Activation System (BAS; which involves sensitivity to cues of reward or cessation of punishment; Pickering & Gray, 1999), which is viewed as largely subcortically centered (with connections to cortical regions). Similarly, approach tendencies (approach/positive anticipation) tend to load on the surgency temperament factor with impulsivity (Rothbart et al., 2001) and likely involve BAS responding.

Both low EC and high impulsivity have been fairly consistently positively related to externalizing problems (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Kochanska & Knaack, 2003; Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004; Martel et al., in press; Muris & Ollendick, 2005; Spinrad et al., 2007). There are fewer findings on temperamental approach, although it has been linked to aggression (e.g., Lemery et al., 2002), as has surgency (of which approach is a part) (e.g., Rothbart et al., 1994). However, logically, one might expect positive anticipation/approach to be less associated with externalizing problems than low EC, and there is initial evidence for this assumption (Lemery et al., 2002).

In addition, both EC and impulsivity have been positively related to children's ego resiliency (Cumberland-Li, Eisenberg, & Reiser, 2004; Eisenberg et al., 2002; Eisenberg et al., 2004), defined by Block and Block (1980) as, “the dynamic capacity of an individual to modify his/her modal level of ego-control, in either direction, as a function of the demand characteristics of the environmental context” (p. 48). According to Block and Block (1980), high ego resiliency involves resourceful adaptation to changing circumstances and flexible use of problem-solving strategies; low resilience involves little adaptive flexibility, an inability to respond to changing circumstances, the tendency to persevere or become disorganized when dealing with change or stress, and difficulty recouping after traumatic experiences. Thus, ego resiliency reflects positive adjustment rather than vulnerability to negative emotionality. In fact, it has been related to relatively high social competence (e.g., Cumberland-Li et al., 2004; Spinrad et al., 2006) and adjusted behavior (Eisenberg et al., 2000; Juffer et al., 2004). EC has been positively related to ego resiliency, perhaps because children high in EC are, by definition, able to modulate their level of control and, thus, have the ability to respond in a flexible manner (Eisenberg, Spinrad, & Morris, 2002). Impulsivity relates positively to ego resiliency in early childhood and the relation becomes more U-shaped quadratic with age in the elementary school years, perhaps because overcontrol, as reflected in low impulsivity and

behavior inhibition, undermines resiliency (Eisenberg et al., 2002; compare with Martel et al., in press, who found no relation when averaging across ages).

Children of Alcoholics (COAs)

COAs are a population believed to be at risk for problems in their socioemotional development (Tarter et al., 1999) due to genetics (e.g., Malone, Taylor, Marmorstein, McGue, & Iacono, 2004), the quality of parenting COAs receive (e.g., Eiden, Chavez, & Leonard, 1999; El-Sheikh & Buckhalt, 2003; O'Connor & Paley, 2006), and/or a suboptimal prenatal environment if the mother drank during pregnancy (O'Connor & Paley, 2006). Consistent with this view, a common finding in the empirical literature is that children of alcoholics are prone to dispositional characteristics likely to undermine adjustment. Researchers have found that COAs tend to be high in negative emotionality, impulsivity, and activity level, and low in regulation (Chassin, Flora, & King, 2004; Colder & Chassin, 1997; Edwards, Leonard, & Eiden, 2001). These problems with temperament probably are due to both genetic risk (genes associated with alcoholism have been identified; Zucker, 2006) and to suboptimal parenting (Eiden, Edwards, & Leonard, 2004). In addition, investigators often have found that COAs are prone to externalizing problems (Barnow, Schuckit, Lucht, John, & Freyberger, 2002; Edwards et al., 2001; Loukas, Zucker, Fitzgerald, & Krull, 2003).

It is likely that the suboptimal temperament due to the genetic risk of COAs is partly responsible for the association of COA status to problems with adjustment. Deficits in executive functioning and temperamentally based self-regulation and impulsivity, including the abilities to focus attention, integrate information, and inhibit behavior, have been linked, empirically and conceptually, to many of the problems associated with alcohol disorders and substance use, more generally (see Hull & Slone, 2004; Tarter et al., 2003). In addition, problems in executive functioning have been found to be higher in COAs than in non-COAs (Giancola & Moss, 1998; Poon, Ellis, Fitzgerald, & Zucker, 2000; Tarter et al., 2003) and are viewed as partly mediating the effects of parental alcoholism on COAs' externalizing problems (Loukas, Fitzgerald, Zucker, & von Eye, 2001).

It has been argued that there is an "undercontrolled" pathway to problems with alcohol use (Sher, 1991) and that biological factors predispose children to early emotional and behavioral dysregulation, which in turn fosters externalizing problems (with or without internalizing problems), including early onset of alcohol problems (e.g., Tarter et al., 1999). Similarly, Iacono, Carson, Taylor, Elkins, and McGue (1999) argued that behavioral disinhibition is related to genetics and to psychophysiological anomalies that lead to alcohol and substance abuse. It is likely that both low levels of temperamental regulation and high levels of reactivity are implicated in this undercontrolled pathway.

However, relevant findings are limited and are not entirely consistent or straightforward. For example, Nigg et al. (2004) found that boys between age 3 and 14 were especially prone to problems with executive functioning if at least one of their parents was alcoholic but neither parent had an antisocial personality disorder; boys with alcoholic and antisocial parents scored low on measures of delay of gratification (which may have reflected impulsivity toward rewards as much as EC) but not executive functioning. Nigg et al. (2006) found no relation between parental alcoholism and two behavioral measures of executive functioning (including response inhibition). In a study of COAs at 18 to 36 months of age, Eiden et al. (2004) found that sons, but not daughters, of alcoholics were lower than control children in a behavioral index of self-regulation, whereas they found no difference in parent-reported attentional control.

It frequently has been suggested that sons of alcoholics, especially alcoholic fathers, are at greater risk than daughters for problems with maladjustment (e.g., Carbonneau et al., 1998;

Eiden et al., 2004; Loukas et al., 2003). Consistent with the possibility of sex differences in mean levels of dispositional characteristics, Eiden et al. (2004) found that at ages 2 and 3 years, sons of alcoholics exhibited problems with EC whereas daughters did not, although COA daughters, compared to non-COAs, were marginally high in activity level at age 2. In addition, Eiden, Leonard, and Morrisey (2001) found that young sons of parents with alcohol problems exhibited higher rates of noncompliance than non-COAs sons, whereas for daughters, higher severity of maternal alcohol problem was related with higher compliance (even after controlling for the immediate effect of mothers' behavior during interactions). Thus, male COAs may be at higher risk than female COAs for an unregulated temperament and maladjustment.

Despite considerable work on COAs temperament, here are notable gaps in our knowledge. With some exceptions, most studies of COAs have involved adolescent or adult participants (e.g., Chassin et al., 2004) or have included only boys and/or children of substance abusers (e.g., Carbonneau et al., 1998; Jansen Fitzgerald, Ham, & Zucker., 1995; Tarter et al., 2003). Moreover, few, if any, investigators have examined the relations of parental alcoholism to relational aggression (i.e., "harming others through purposeful manipulation of damage of their peer relationships"; Crick & Grotpeter, 1995, p. 711). There is evidence that girls are as high or perhaps slightly higher in relational aggression whereas boys are higher in other externalizing problems (Dodge, Coie, & Lynam, 2006); thus, relational aggression may be more related to COA status for girls than is physical aggression. Moreover, in studies of COAs, measures of temperament or maladjustment sometimes have been obtained only from parents or the children (see West & Prinz, 1987) and seldom from nonparental adult reporters (e.g., teachers).

COA Status as a Moderator of Relations of Temperament to Externalizing Problems and Ego Resiliency

As already discussed above, there is support for the view that COAs are at risk for problematic temperament and maladjustment, although the data are not highly consistent. A different question is whether the relations between temperament and maladjustment are similar for at-risk children such as COAs and other children. Although ideally a moderator (e.g., alcohol status of parents) is not related to a dependent variable (e.g., problem behaviors), moderation often is found examining under these circumstances. This is especially likely to be true when the relation between the moderator and the outcome variable is not highly consistent.

As already discussed, externalizing problems frequently have been linked to aspects of temperament that seem to reflect low EC or high impulsivity, and less often linked to approach/positive anticipation. It is likely some relations between temperament and externalizing behavior sometimes are moderated by children's at-risk status.

For example, COAs likely have fewer regulatory capacities, social skills, or perhaps environmental supports and controls (e.g., parental monitoring) to buffer them from the negative effects of higher levels of temperamental reactivity. The effects of low EC are probably more problematic for children also high in reactivity (Eisenberg et al., 2000) and negative parenting in COA families could exacerbate temperamental risk. Consistent with the notion of moderation by risk status, Mervielde et al. (2005) examined if the relations between dispositional characteristics and maladjustment differed for clinic-referred and non-clinical children. They found a difference in the strength, but not the form, of some of the relations.

Few investigators have, to our knowledge, examined this issue with COAs or other at-risk groups. Carle and Chassin (2004) examined if COA status moderated the relations between children's competence and their internalizing symptomatology. They found no difference in

the pattern or strength of the relations. Nonetheless, they did not focus on EC or impulsivity, and it is possible that regulatory processes that one would expect to be compromised in COAs are better predictors of maladjustment and ego resilience for COAs than for non-COA children.

In one of the most relevant studies, Wong et al. (1999) examined the relations between temperament and maladjustment in high- and low-risk groups. Families were classified as high-risk if both parents had current alcoholism or a parent had current alcoholism and antisocial personality disorder. They found a stronger relation between children's risky temperament at age 3–5 (defined as high activity level and reactivity and low attention span) and externalizing problems 3 years later for high-risk than low-risk children. The difference between the groups for attention span, based on correlations, was not significantly different, although the correlation was somewhat stronger for the high-risk group. Wong et al. argued that negative parenting mediated the relation between children's risky temperament and externalizing problems.

The Present Study

The children in this study were part of a multi-generational study of COAs. They were the children of individuals studied in adolescence who, at the time of the present study, were parents themselves (Chassin, Barrera, Bech, & Kossak-Fuller, 1992); in addition, children of some of the original group's siblings were included. We used multiple reporters to assess externalizing problems, ego resiliency, and EC, impulsivity, and approach tendencies.

We addressed four general questions. First, we examined relations of EC, impulsivity, and approach to externalizing problems and ego resiliency. Although relations of low EC and high impulsivity with overt externalizing problems have been well established, relations of temperamentally based control-related characteristics with relational aggression, and relations of approach/anticipation with externalizing problems, have been examined less frequently. We predicted that relational aggression, which is likely often instrumental or proactive in nature, would be less consistently linked with temperament than many other externalizing behaviors (which may involve more impulsivity and negative emotionality). Moreover, because approach/anticipation likely reflects BAS responding (BAS; Pickering & Gray, 1999), we expected it to predict externalizing problems. Based on the research reviewed above, we expected ego resiliency to relate to high EC and perhaps high impulsivity. Because high ego resiliency likely involves a tendency toward optimism and positive emotionality, we also expected it to be related with temperamental approach/anticipation (although we know of no research on this issue).

Second, we examined if COA status was related to low EC and high levels of impulsivity and approach (surgent) tendencies, as well as externalizing problems and low ego resiliency. Based on the literature we reviewed and relations of early onset alcoholism with externalizing problems, impulsivity, and low regulation (Eiden et al., 2004; see Tarter et al., 1999; Zucker, 2006), we expected these associations. However, COA status has infrequently been examined in relation to relational aggression, ego resiliency, and approach tendencies and we were least confident regarding the prediction for ego resiliency.

The third, most novel issue examined in the present study was whether the relations between temperament and maladjustment or resiliency were stronger for COAs than for non-COAs. If some COAs are relatively likely to exhibit maladaptive dispositional characteristics (e.g., low EC, high impulsivity, and high approach) in childhood due in part to genetics and/or prenatal and caregiving experiences associated with parental alcoholism, the relation between such characteristics and maladjustment may be especially evident for COAs. Such a finding would be consistent with Mervielde et al.'s (2005) data in which relations between children's dispositional characteristics and maladjustment were stronger for an at-risk (i.e., clinic-

referred) group. We were unsure what to predict in this regard for ego resiliency. Because COAs may have fewer personal and family resources than non-COAs to compensate for problems in regulation, we might expect deficits in EC to be especially detrimental to ego resiliency for COAs. However, given the positive relation of impulsivity to ego resiliency found for typical samples of school children (Eisenberg et al., 2002), it seemed possible that impulsivity and approach/anticipation would relate positively to resiliency for a normative group of children who probably were not at the extremes of reactivity, whereas this pattern might be nonexistent, or even reversed, for COAs because of their risk for excessive impulsivity. For the latter children, impulsivity and approach may result in greater problems with adaptation because they lack dispositional or environmental strengths to temper the consequences of such behavior or because the approach behavior is part of a larger pattern of maladaptive temperament/behavior in at-risk but not at-risk children.

Finally, as already noted, sons of alcoholics may be at greater risk than daughters for maladjustment (Carbonneau et al., 1998; Eiden et al., 2004; Loukas et al., 2003). If COA status has a more debilitating effect for sons, be it due to genetic factors, greater exposure to suboptimal parenting, or a combination, we might also expect measures of EC, impulsivity, and approach to be especially related to COA boys' maladjustment and ego resiliency.

Method

Participants

The participants in this study were part of a longitudinal study. The initial study included a sample of at-risk adolescents (generation 2, G2) who had at least one parent (generation 1, G1) with an alcoholism diagnosis, and a comparison group of adolescents in which neither parent was diagnosed as alcoholic. The current study is a follow-up of the original study, approximately 15 years later. For the current study, the participants at G2 included not only the original adolescents, but also siblings of the G2 participants who did not take part in the initial study and were between the ages of 24 and 32 at this assessment. The current study also included children of the current G2 participants (G3) who were age 5 to 13 years.

The original G2 at-risk group was recruited by contacting and interviewing parents who were identified from court records of arrests for driving under the influence, health maintenance records, and community telephone screening (to screen for eligible families). During the interview, it was determined if any of the custodial parents, whom also had to be biological parents, met the diagnostic criteria for alcoholism. If the criteria were met, the parents and their children were invited to participate in the study. A control group was recruited using reverse telephone directories to locate families from the same neighborhood as the at-risk group. These families were interviewed to ensure that neither of the control group G1 parents met the criteria for alcoholism. The control group was selected so that it matched the at-risk group on ethnicity, family structure, the target adolescent's (G2) age, and socioeconomic status as determined by property values. Further details of the initial study's sample recruitment and demographics can be found in Chassin et al. (1992, 1999, 2004). To our knowledge, there were 578 eligible G3 children. When we compared the 471 participating children with the attrited children, they did not differ in parental substance disorder or psychopathology or ethnicity.

Original participants who agreed to participate in the follow-up study were interviewed in their homes. In addition, families were requested to participate in a laboratory visit, usually within a few weeks after the home visit, and questionnaires were sent to teachers. The recruitment process resulted in the collection of data from at least one reporter or laboratory task for 471 G3 children, but four (2 of each sex) had only laboratory measures and were not used in this study. For the 467 children (242 boys and 225 girls; M age = 7.48 years), numbers with alcoholic parents were as follows: both parents alcoholic (7); neither alcoholic (240); mother alcoholic,

father non-alcoholic (13); father alcoholic, mother non-alcoholic (112); mother alcoholic, father diagnosis missing (27); father alcoholic, mother diagnosis missing (16); and mother and father diagnoses missing (52). The 52 G3 participants who were missing both mother and father alcohol diagnosis were not included in the current analyses. The 415 G3 children in the current study came from 183 G1 families; numbers of families with one, two, three, four, and five or more children were 79, 53, 26, 8, and 17. The reporters included 358 G2 mothers, 261 G2 fathers, and 282 teachers. Data were obtained from all reporters for 154 G3 participants; 94 had mother and teacher reports; 61 had mother and father reports; 23 had father and teacher reports; 49 had only mother reports; 23 had only father reports; and 11 had only teacher reports. Over 95% of mothers and fathers reported that the mothers did not drink during their pregnancies, but such self-reports are not highly reliable.

Given that all grandparents (G1) were either Caucasian or Hispanic, the ethnicity of the G3 children was largely of these backgrounds. Ethnicity was primarily determined by parents' reports of child ethnicity obtained when the families came to the laboratory. For the families that did not come to the laboratory or did not provide the child's ethnicity in the laboratory, G3 ethnicity was determined through parent-reported (G2) ethnicity. Forty-five percent of the children in the current study were determined to be Caucasian, 35% were Hispanic, 1% were African American, 1% were American Indian, 3% were categorized as "other," less than 1% was Asian/Pacific Islander and 14% had one parent that was Caucasian while the other parent's ethnicity was missing.

Of the mothers and fathers for whom information on education was available (92.5% and 85.5%, respectively), 10% and 15%, respectively, had less than a high school diploma, 31% and 36% had a high school diploma or equivalent, 38% and 31% had some college education, 12% and 8% earned a 2-year college degree, 7% and 9% had a college degree, and 3% and 3% had post bachelor education. Family income was only reported for the participants who had contact with the laboratory ($N = 277$; $M = \$42,922$, $SD = \$22,068$).

Measures

Alcoholism Diagnosis

Grandparent (G1) diagnosis: The grandparents' diagnosis came from the initial evaluation. For grandparents who were interviewed, DSM-III (Diagnostic and Statistical Manual of Mental Disorders, 3rd ed.; American Psychiatric Association, 1980) alcoholism diagnoses (abuse or dependence) were obtained using a computerized version of the Diagnostic Interview Schedule (Version 3; DIS; Robins, Helzer, Croughan, & Ratcliff, 1981). For grandparents who were not interviewed, alcoholism diagnoses were made using spouses' reports on the Family History Research Diagnostic Criteria (FH-RDC, Endicott, Anderson, & Spitzer, 1978; Chassin, Barrera, Bech, & Kossak-Fuller, 1992). Of the 183 G1 families in the current study, 96 had at least one grandparent who had an alcohol diagnosis and 87 were from the control group (neither grandparent had an alcohol diagnosis).

Parent (G2) diagnosis: At the follow-up home visit, a computerized version of the DIS (C-DIS-III-R, Robins & Helzer, 1991) was used to determine whether parents met DSM-III-R (American Psychiatric Association, 1987) criteria for a diagnosis of lifetime alcohol abuse and dependence. G2 family alcoholism was used to categorize families into two groups: (1) those in which at least one parent received an alcoholism diagnosis (112 G2 families, 175 G3 children); (2) those in which neither parent received an alcohol diagnosis (156 G2 families; 240 G3 children). If both parents were missing an alcoholism diagnosis or one parent was diagnosed as nonalcoholic and the other parent was missing an alcoholism diagnosis, the family was labeled as missing in regard to family diagnosis (36 G2 families; 52 G3 children).

Temperamental (Dispositional) Regulation/Control, Impulsivity, and Behavioral Reactivity—Children's dispositional effortful control (EC), impulsivity, and approach/anticipation were assessed with mothers', fathers', and teachers' reports on the Child Behavior Questionnaire (CBQ; Rothbart et al., 1994; Rothbart, Ahadi, Hershey, & Fisher, 2001), initially designed for use with children age 3 to 7 or 8 years old. Based on work in other research (e.g., Eisenberg et al., 2004), some items were reworded slightly to be appropriate for reports about aged 5–12 years. Parents and teachers were asked to rate how true (1 = *extremely untrue of this [my] child*; 7 = *extremely true of this child*) each item was for the target child. The current study included CBQ items that reflected five temperament subscales: 1) *attention focusing* – 10 items designed to measure children's tendency to maintain attentional focus upon task-related processes (e.g., “Will move from one task to another without completing any of them”); alphas for mothers, fathers, and teachers in this sample = .81, .76, and .91 respectively; 2) *attention shifting* – 8 items assessing the ability to voluntarily shift attention from one activity to another (e.g., “Can easily shift from one activity to another”); alphas for mothers, fathers, and teachers = .70, .70, and .85 respectively; 3) *inhibitory control* – 12 items assessing the capacity to plan and to suppress inappropriate approach responses under instructions or in novel or uncertain situations (e.g., “Is able to resist laughing or smiling when it isn't appropriate”); alphas = .81, .83, and .90); 4) *impulsivity* – 12 items for mothers and fathers and 11 items for teachers assessing children's speed of response initiation (e.g., “Often rushes into new situations”); alphas = .67, .74, and .82); and 5) *approach/anticipation* (henceforth called *approach*) – 12 items for mothers and fathers (but not teachers) assessing the amount of excitement and positive anticipation for expected pleasurable activities children exhibit (e.g., “Becomes very excited before an outing (e.g. picnic, party)”); alphas for mothers and fathers = .68 and .72 respectively). As in other studies (e.g., Eisenberg et al., 2004), an EC composite was created by averaging attention focusing, attention shifting, and inhibitory control within reporter (the range of relations [betas] among the subscales for mothers, fathers, and teachers = .40 to .69, .45 to .75, and .60 to .95, $ps < .001$, respectively).

To reduce the number of analyses and make the interpretation of the results easier, composite scores were computed for the studies measures by averaging the individual reports (mother, father, and teacher) if the measures were at least modestly and significantly related. Mixed model analyses were used to determine the strength of the relationship among reporters (see below; not controlling for age or sex). Because the relations among reporters for the impulsivity and EC measures were highly significant (the range of betas among the two subscales for mothers, fathers, and teachers = .30 to .51 and .21 to .57, respectively, $ps < .001$), composites were used in any subsequent analyses when appropriate (averaging all reports available). Mothers' and fathers' reports of approach were not highly related ($p = .26$) and thus not combined in any of the analyses.

Children's Externalizing Problems and Ego Resilience

Externalizing problems: Externalizing problems were assessed with scales designed to tap psychopathic traits, externalizing problem behavior, and relational aggression. Seventeen items from the Psychopathy Screening Device (PSD; O'Brien & Frick, 1996) were used to assess psychopathic tendencies, including impulsive/conduct problems and callousness/unemotionality (e.g., “this child blames others for mistakes”). Mothers, fathers, and teachers were asked to rate items on a 3-point scale (0 = *not at all true of this child*; 2 = *definitely true of this child*; alphas = .74, .71, and .84, respectively).

Mothers, fathers, and teachers also rated children's externalizing behaviors (1 = *never*; 4 = *often*) on the 24-item Lochman et al. (1995) Child Behavior Checklist (CBC). This scale assesses covert problem behaviors (e.g. lying, stealing), overt problem behaviors (e.g. bullying, fighting), and authority conflicts (e.g. disobedience; alphas = .92, .91, and .95, respectively).

A 7-item scale developed by Crick (1996) was used to assess children's relational aggression. Mothers, fathers, and teachers rated (1 = *this is never true of this child*; 5 = *this is always true of this child*) the extent to which children hurt others through purposeful manipulation or damage to their relationships (e.g., "This child spreads rumors or gossips about some peers"); alphas = .84, .83, and .93, respectively).

Because mothers', fathers', and teachers' reports of psychopathic traits and problem behaviors were significantly related (β s = .42, .37, and .44, respectively, $ps < .001$), and both scales represent forms of externalizing behaviors, the two scales were standardized and averaged to reduce the number of analyses. Relational aggression was not aggregated with these scales because it was not expected to be as highly related with temperament and might relate differently than the other measures of externalizing, especially for girls.

Ego resilience: Parents and teachers rated (1 = *most descriptive of this child*; 9 = *least descriptive of this child*) children's ego resilience on 8 items from a questionnaire including items from the Block Q-Sort (Block & Block, 1980). Using clinicians' ratings obtained from the Blocks, Eisenberg, Fabes, Guthrie, and Murphy (1996) selected items rated by the clinicians as most clearly reflecting ego resilience; then items that reflected social skills or overt emotion (based on the consensus of 3 experts) were dropped. Later, a purer version of the scale was constructed based on 10 experts' ratings as to how much they reflected pure resilience, defined as flexible, adaptable behavior (regardless of valence of the item; 1 = *not at all descriptive of resiliency* to 9 = *most descriptive of resiliency*; Cumberland-Li et al., 2004). The eight items with the highest ratings were used in this study (e.g., "Can bounce back or recover after a stressful or bad experience"; alphas for the mothers, fathers, and teachers = .67, .72, and .85, respectively).

As was done with the temperamental regulation/control, impulsivity, and behavioral reactivity measures; externalizing problems, relational aggression, and resiliency composite scores were created for each measure by computing the mean of the individual reports if the reports were related. All reports of externalizing problems and resiliency were highly related (the range of betas among the three subscales for mothers, fathers, and teachers = .30 to .45 for externalizing and .15 to .34 for resiliency, $ps < .01$) and thus were combined. Mothers' and fathers' reports of relational aggression were also related ($B = .13$), $p < .05$, and were combined in later analyses to increase the reliability of the construct (Rushton, Brainerd, & Pressley, 1983). However, because teachers' report of relational aggression was not significantly related to father reports of relational aggression ($B = .09$), the teacher report was not combined with mother and father reports in any of the following analyses.

Procedures

Home interviews were conducted and included assessments to determine G2 parental alcoholism status and questionnaires to assess their children's temperamental characteristics, ego resilience, and adjustment. If G2 parents provided consent, a teacher familiar with the child was mailed questionnaires and asked to return them in a prepaid and preaddressed envelope. Families and teachers were paid for their participation.

Results

A mixed models design was used to analyze relations between variables because a number of families had multiple children participating in the study ($M = 2.27$ G3 participants per G1 families). Mixed models control for the lack of independence between error terms from the same reporter by allowing error coefficients to vary randomly (Bryk & Raudenbush, 1992). A two-level model was used, nesting data from each child within each grandparent family. This allowed the effects between children to be examined while controlling for the child effects

within families. Due to the lack of sufficient variability at the parent level when nested at the grandparent level ($M = 1.46$ G2 participants per G1 families), three levels were not used (the models would not run correctly). Unstandardized estimates are reported throughout.

Descriptive Analyses: Relations with Children's Age and Sex

Means and standard deviations for the individual measures are presented in Table 1. Mixed models were computed examining the relations between age and sex (as fixed effects in the same model) and children's dispositional characteristics and maladjustment; age was examined to see if it should be controlled in analyses. Parents' reports of approach and the adult-reported impulsivity and resiliency were negatively related to age (see Table 2) so it was covaried in the remaining analyses. In addition, girls were viewed by adults as higher in EC and relational aggression (teacher-reported) and lower in impulsivity and externalizing problems than boys.

Relations of Familial Alcohol Status to Children's Temperament and (Mal)adjustment

To examine differences in the variables in relation to parent alcohol status, the alcohol status of the parent was coded as having at least one alcoholic parent or not (children for whom the alcohol status of one parent was unknown or nonalcoholic, and the other parent's status was unknown were dropped from these analyses). Mixed model analyses were computed in which children's temperament or (mal)adjustment was predicted from parents' alcohol status, which was a fixed effect in the models, as well as the control variables of children's age and sex (family was a random factor). Parental alcohol status was related to high adult-reported impulsivity, externalizing, and father- (but not mother-) reported approach and low EC, F_s (343.46; 339.48; 200.82; 343.46) = 12.97, 4.11, 6.78, and 6.00, $ps < .01, .05, .01, \text{ and } .02$, B_s = .24, .17, .21, and $-.18$. None of the measures of relational aggression or resiliency was significantly related to parental alcohol status. In additional analyses, we examined interactions of sex and parent alcohol status in predicting the studies measures (i.e., temperament or maladjustment). None of the eight analyses was significant.

Relations of Temperament with Maladjustment and Ego Resiliency Independent of COA Status

In initial analyses, relations of temperament (impulsivity, EC, and approach) to maladjustment and ego resiliency were examined. A measure of a given dispositional characteristic and age and sex as control variables were entered in the mixed models as fixed effects predicting a given measure of maladjustment (see Table 3). Most significant findings (8 of 16 analyses) were significant at $p < .01$ and one more was significant at $p < .05$.

Child externalizing problems (not including relational aggression) were related to three of the four measures of temperament; it was positively related to adult-reported impulsivity, and mothers', but not fathers', reports of approach, and negatively related to EC. Mother-father composite of relational aggression was positively related to impulsivity and father- reported approach and negatively with EC. Teacher-reported relational aggression was positively related to impulsivity and negatively related to EC. Resiliency was positively related to only EC.

Predicting (Mal)adjustment from the Interactions of COA Status and Sex with Temperament

Next we examined whether COA status, sex, and children's temperament interacted to predict children's maladjustment. First, the relation between the three-way interaction of temperament, sex, and parental alcohol status, and children's (mal)adjustment was examined. Using mixed model analyses, interaction terms were created by multiplying measures of child temperament, child sex, and parental alcohol status after the continuous predictor variables were centered (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003). Reports of child temperament,

sex, COA status, the interaction terms, as well as the control variable of age, were entered as fixed effects predicting a given index of adult-reported child adjustment; family was treated as a random effect. Separate analyses were computed for each aspect of temperament; we were interested in the relations of each with problem behaviors and, due to correlations among aspects of temperament, some relations of temperament to maladjustment would not be discerned due to overlapping, non-unique prediction by each component of temperament. Data from each child were nested at the grandparent level, which was treated as a random factor. If a three-way interaction was not significant, the relation of the two-way interaction of temperament and parental alcohol status with adjustment was examined using the same procedure except the three-way interaction term of temperament, sex, and COA status was not included in each of the analyses. When an interaction was significant in the mixed models, the interaction term was examined using procedures from Aiken and West (1991) and Cohen et al. (2003). The simple effects of the three-way interactions were examined through the two-way interactions of sex by temperament and COA status by temperament included in the three-way mixed model analyses. However, the two-way interactions are only interpretable in relation to the groups that were coded as a zero in an analysis, girls and non-alcoholics in the current analysis. In order to examine all possible combinations, the analyses were rerun after recoding boys and alcoholics to be equal to zero. The slope of a significant three-way temperament-adjustment relation for a specific group was determined by coding the sex and COA status of the group of interest as zero.

Externalizing behaviors (not relational)—The three-way interaction examining the relation between externalizing problems and impulsivity (but not EC) was significant (see Table 4). Neither the originally coded alcohol status nor sex interactions with impulsivity resulted in significant relations with externalizing behaviors. The analysis using the recoded sex and COA status variables (examining 2-way interactions) resulted in significant findings for both the COA status by impulsivity and sex by impulsivity interactions. The relation between impulsivity and externalizing problems was significantly different for boys of alcoholics when compared to boys of non-alcoholics and was due to a stronger positive association between impulsivity and externalizing behaviors for the boy-COA group than for the boy-non-COA group. The significant sex by impulsivity interaction indicated the relation between impulsivity and externalizing problems that there was a stronger positive association between impulsivity and externalizing behaviors for the boy-COA group than for the girl-COA group.

The results from the models examining the relations between mother- or father-reported approach and adult-reported externalizing problems indicated a positive relation with the father-, but not mother-, reported approach. The COA status by approach interaction, which compared the male COA group to the male non-COA group, was due to an association between approach and externalizing behaviors for the COA boys, but not the non-COA boys. The sex by approach interaction, which compared the boy and girl COAs, was also due to an association between approach and externalizing behaviors for the boy-COAs only.

The models in which three-way interactions were not significant were further explored using mixed model analyses to determine the two-way interaction effects of COA-status and temperament on children's adjustment. These analyses did not include a three-way interaction. The two-way analyses indicated a negative relation between the adult-reported EC and externalizing behaviors was due to a stronger association for the COA group than for the non-COA group (albeit significant for both groups; see Table 4).

Relational aggression—None of the three- or two-way analyses for the relation between relational aggression and children's temperament was significant when using the composite scores of temperament. However, it seemed important and logical to examine this relation

within the school context because teachers were especially likely to be aware of relational aggression and it might relate to EC, impulsivity, or approach behaviors at school. Thus, the relations were further explored using within the school context (using teachers' reports only). There were significant interactions of COA status with both impulsivity and EC. The relations of high impulsivity or low EC with relational aggression were stronger for COAs than non-COAs, albeit significant for both (see Table 4).

Ego resiliency—The mixed model 3-way analyses indicated the adult-reported resiliency was not significantly predicted by interactions of impulsivity or EC with sex or COA status. However, according to a significant 2-way interaction, the relation between adult-reported resiliency and mother-reported approach was negative for the COA group and positive for the non-COA group (although neither simple effect was significant).

In addition, there were several significant interactions for the relation of ego resiliency with father-reported approach. The significant COA status X approach interaction in the initial 3-way interaction analysis, which compared the boy-COA group to the boy-non-COA group, was due to a positive association between approach and resiliency for the boy-non-COA group but not the female non-COAs (based on simple effects). Significant sex X approach and COA status X approach interactions resulted after the sex and COA status measures were recoded in the 3-way analysis so that boys and alcoholics were assigned a value of zero. The sex X approach interaction, which compared COA boys with COA girls, was due to a negative association between approach and resiliency for boys only. The significant COA status X approach interaction, which compared the male COAs and non-COAs, was due to a positive association between approach and resiliency for the non-COA boys and a negative association for the COA boys.

Discussion

Several interesting findings were obtained in this study. First we discuss findings for the total sample, then findings that are relevant to parental alcoholism.

Relations of Temperament to Maladjustment/Ego Resilience for the Total Sample

Consistent with prior research (Rothbart & Bates, 2006), low EC and impulsivity were fairly consistently related to measures of acting out externalizing problems/psychopathic tendencies. The relations for impulsivity might be partly due to the measure of psychopathic tendencies tapping impulsive behavior (in 2 of 20 items) Moreover, similar relations were found, albeit less consistently, for relational aggression. Relational aggression may often represent a proactive mode of aggression—aggression that is more likely goal-oriented and not driven as much by emotion as reactive aggression (e.g., Dodge, Lochman, Harnish, Bates, & Petit, 1997; Miller & Lynam, 2006) and, thus, less linked to temperamental emotional reactivity and its regulation. Nonetheless, the fact that relational aggression was related to the temperamental variables suggests that this type of aggression, like physical aggression and other externalizing problems, has a dispositional basis.

Ego resiliency tended to be positively related to EC. This finding for EC is consistent with initial findings in other samples (e.g., Eisenberg et al., 2002), although none of the samples was as diverse as this one. Children who can effortfully modulate their attention and behavior would be expected to be able to regulate themselves when necessary, but to be flexible and spontaneous when appropriate to the situation. Unexpectedly, ego resiliency was unrelated to impulsivity and approach behavior, perhaps because these characteristics have a different functional significance in children who are prone to relatively high levels of impulsivity and approach (recall that COAs in this sample were higher in impulsivity and father-reported approach) and in children who are at lesser risk (for whom some approach behavior and

moderate impulsivity may be a strength). This idea received partial support from the analyses examining COA status as a moderator of relations between ego resiliency and temperament.

Relations of COA Status or Externalizing Problems and Ego Resiliency

As in some other studies (e.g., Colder & Chassin, 1997; Eiden et al., 2004), COA status was related to children's temperamental characteristics in the expected directions. COAs, in comparison to non-COAs, were reported to be higher in impulsivity and father-reported approach/anticipation and lower in adult-reported EC. This pattern of findings is also consistent with the expected and obtained association between COA status and externalizing problems. Because the children were, on average, 7 ½ years old, it is possible that the differences between the groups in maladjustment become more marked with age. Not only might the effects of control-related dispositions compound over time (especially if the gap in EC also increases with age), but also the difference in COAs and non-COAs may become more evident as aggressive behavior drops in frequency for most school children (Dodge et al., 2006).

COA Status as a Moderator of the Relation between Temperament and (Mal)adjustment

Of perhaps most interest, COA status moderated some of the relations between children's temperament and (mal)adjustment; however, this was sometimes especially true for sons. For example, the relation between impulsivity and externalizing problems was stronger for COA boys than non-COA boys or COA girls (albeit these relations were also significant). Similarly, father-reported approach was related to externalizing problems for COA boys but not non-COA boys or COA girls. In addition, however, the relation between EC and externalizing problems was stronger for the COA than non-COA group (albeit significant for both), regardless of sex. Moreover, in the school context, the relation between relational aggression and impulsivity and low EC was stronger for COAs than non-COAs. Thus, consistent with the work of Mervielde et al. (2005), temperamental factors were especially likely to predict adjustment problems for at-risk children.

The fact that COA status moderated the relations of temperament indicates that problematic temperament in COAs is an especially good predictor of risk for problem behavior. This finding supports Tarter et al. (1999) and Zucker's (2006) argument that temperament may mediate the relation between genetic risk for alcoholism and behavioral problems in childhood and adolescence. It also suggests that COA children who are impulsive and have problems with self-regulation may benefit from interventions designed to foster self-regulatory skills (e.g., Riggs, Greenberg, Kusche, & Pentz, 2006) or to enhance parenting practices that might exacerbate COAs' problematic temperamental tendencies.

In contrast to externalizing problems, when COA status moderated the relations of temperament to ego resiliency, the findings were sometimes for non-COAs, and again especially boys, and the pattern of findings was reversed for COAs and non-COAs. Moreover, moderation was found only for approach/anticipation, not for EC (which was positively related to ego resiliency more generally) or impulsivity. Approach/anticipation was positively related to ego resiliency for non-COA boys but not COA boys or non-COA girls. Conversely, the relation between ego resiliency and approach/anticipation was negative for COA boys but not COA girls. In addition, according to a significant 2-way interaction, ego resiliency was negatively related to mother-reported approach for the COA group and positively related for the non-COA group, although neither of the simple effects within COA group obtained statistical significance. Thus, in non-COA boys, approach tendencies, including positive affect and enthusiasm, might have fostered the ability to adapt, explore, and to be flexible and spontaneous rather than overly inhibited whereas for male COAs it may have been part of a pattern of less adaptive temperament. Such an interpretation is consistent with the positive relation between ego resiliency and both social competence and impulsivity in the early school

years (Eisenberg et al., 2000, 2002). Moreover, the assumption that approach tendencies are associated with some positive outcomes for normal children is consistent with the finding that inhibited children (who are low in approach and positive affect) are constrained in their behavior and prone to negative affect (see Kagan & Fox, 2006).

It is not clear why the same pattern of relations did not hold for girls; girls and boys did not differ in their approach/anticipation or ego resiliency (either in the total sample or within COAs or non-COAs). Perhaps girls' greater effortful control reduced the magnitude of relations of approach tendencies to girls' abilities to deal with and rebound from stress. In addition, the finding for COAs boys but not girls may be consistent with the larger pattern of results suggesting that problematic temperament is a greater risk factor for COA boys than girls.

The moderated relations between approach/anticipation and both ego resiliency and externalizing problems were for only fathers' reports of approach; moreover, father- (but not mother-) reported approach was related to COA versus non-COA status. Perhaps fathers, due to their tendencies to engage in relatively active activities with sons (Parke, 2002), are especially likely to be aware of boys' approach tendencies. Fathers' reports of their sons' functioning usually were related to mothers' and teachers' reports of temperament or adjustment, suggesting that these reports were not merely a reflection of fathers' own personalities and biased perceptions. The fact that mother-reported approach, like father-reported approach, was positively related to externalizing problems and/or impulsivity for the total sample also suggests that mothers' general view of approach was similar to fathers. Nonetheless, fathers may have considered somewhat different behaviors than did mothers when judging boys' approach/anticipation. Clearly, approach/anticipation, an understudied aspect of temperament, merits more attention in future research.

There are a variety of possible reasons for the general pattern of stronger relations between temperament and externalizing problems or ego resiliency for COA boys than girls. Examination of the data indicated that this pattern generally was not due to greater variability in measures for boys. Perhaps boys' behavior is particularly likely to be affected by parental alcoholism, especially paternal alcoholism, due to both heredity and socialization. Although there is not consensus if males have a higher genetic risk for alcoholism (see Zucker, 2006), some argue that sons of COAs are especially at risk (see Sher, 1991). Moreover, most of the alcoholic parents in our sample were fathers. Assuming that fathers are more important models and socializers for sons than daughters (see Eiden et al., 2004), dysfunctional behavior by alcoholic fathers may exacerbate the genetic, temperamental risk in COA sons. In future work, it would be useful to compare the relations between temperament and externalizing problems or ego resiliency in a sample in which equal numbers of alcoholic parents were mothers and fathers and to assess the quality of parenting behavior as a mediator (see Wong et al., 1999).

Moderated relations of temperament with relational aggression were found only using data from the school context (using teachers' reports): Impulsivity and low effortful control were associated with relational aggression for both COAs and non-COAs, but more so for the former. The lack of a sex difference in this relation may be because girls as well as boys are prone to this type of aggression (Dodge et al., 2006). Again, this pattern of findings supports the view that problematic temperament is an important risk factor predicting aggression in COAs and is predictive for female as well as male COAs if types of externalizing problems common to girls are considered. It is possible that no moderated relations between temperament and relational aggression were found using parental reports because children's behavior differs somewhat across the home and school context and, importantly, teachers have more opportunities to observe children's relational aggression with peers.

Strengths and Limitations

Our findings provide support for relations between temperament and (mal)adjustment in children, and for the argument that at-risk status—in this case, COA status—can moderate the strength of these relations. In addition, we found COAs differed from non-COAs on several aspects of temperament reflecting EC or surgency/impulsivity. In general, the limited number of moderated relations may be due to the fact that some aspects of temperament also mediate the relation of COA risk to problem behaviors, especially externalizing problems (which tend to be more consistently related to COA status). Strengths of the study include the multi-reporter approach, the inclusion of girls and boys, and the relatively diverse sample (in terms of numbers of Hispanic children). Shortcomings of the study include the concurrent and correlational nature of the data (which limits inferences about causality), the lack of inclusion of some other ethnic groups, the relatively wide age range of children, and the use of only adult-report measures of the constructs. Nonetheless, the pattern of findings has implications for those designing interventions for COAs and for researchers interested in factors that moderate the relations of temperamental risk to adjustment.

Acknowledgments

This research was supported by a grant from the National Institute of Drug Abuse (DA05227; Laurie Chassin, Principle Investigator, Nancy Eisenberg, co-investigator). We would like to thank Oi-Man Kwok for his assistance with the data analyses for this paper.

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed.. American Psychiatric Association; Washington, DC: 1980.
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed.. American Psychiatric Association; Washington, DC: 1987. revised
- Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Sage; Thousand Oaks, CA: 1991.
- Barnow S, Schuckit MA, Lucht M, John U, Freyberger H-J. The importance of a positive family history of alcoholism, parental rejection and emotional warmth, behavioral problems and peer substance use for alcohol problems in teenager: A path analysis. *Journal of Studies in Alcohol* 2002;63:305–315.
- Block, J.; Block, JH. The role of ego-control and ego-resiliency in the organization of behavior. In: Collins, WA., editor. Development of cognition, affect, and social relations, *The Minnesota Symposia on Child Psychology*. 9Ed.. Vol. Vol. 13. Erlbaum; Hillsdale, NJ: 1980. p. 39-101.
- Bryk, AS.; Raudenbush, SW. Hierarchical linear models: Applications and data analysis methods. Sage; Newbury Park: 1992.
- Carbonneau R, Tremblay RE, Vitaro F, Dobkin PL, Saucier JF, Phil RO. Paternal alcoholism, paternal absence and the development of problem behaviors in boys from age six to twelve years. *Journal of Studies in Alcohol* 1998;59:387–398.
- Carle AC, Chassin L. Resilience in a community sample of children of alcoholics: Its prevalence and relation to internalizing symptomatology and positive affect. *Journal of Applied Developmental Psychology* 2004;25:577–595.
- Caspi A, Henry B, McGee RO, Moffitt TE, Silva PA. Temperamental origins of child and adolescent behavior problems: From age three to age fifteen. *Child Development* 1995;66:55–68. [PubMed: 7497829]
- Chassin L, Barrera M, Bech K, Kossak-Fuller J. Recruiting a community sample of adolescent children of alcoholics: A comparison of three subject sources. *Journal of Studies on Alcohol* 1992;553:316–320. [PubMed: 1619925]
- Chassin L, Flora DB, King KM. Trajectories of alcohol and drug use and dependence from adolescence to adulthood: The effects of familial alcoholism and personality. *Journal of Abnormal Psychology* 2004;113:483–498. [PubMed: 15535782]

- Chassin L, Pitts SC, DeLucia C, Todd M. A longitudinal study of children of alcoholics: Predicting young adult substance use disorders, anxiety, and depression. *Journal of Abnormal Psychology* 1999;108:106–119. [PubMed: 10066997]
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. 3rd ed.. Lawrence Erlbaum Associates; Mahwah, NJ: 2003.
- Colder CR, Chassin L. Affectivity and impulsivity: Temperament risk for adolescent alcohol involvement. *Journal of Addictive Behaviors* 1997;11:83–97.
- Crick NR. The role of overt aggression, relational aggression and prosocial behavior in the prediction of children's future social adjustment. *Child Development* 1996;67:2317–2327. [PubMed: 9022243]
- Crick NR, Grotpeter JK. Relational aggression, gender, and social-psychological adjustment. *Child Development* 1995;66:993–1002.
- Cumberland-Li A, Eisenberg N, Reiser M. Relations of young children's agreeableness and resiliency to effortful control. *Social Development* 2004;13:193–212.
- Dodge, KA.; Coie, JD.; Lynam, D. Aggression and antisocial behavior in youth. In: Eisenberg, N.; Damon, W.; Lerner, RL., editors. *Handbook of child psychology*. 6th ed.. Vol. Vol. 3. Wiley; New York: 2006. p. 719-788. Social, emotional, and personality development
- Dodge KA, Lochman JE, Harnish JD, Bates JE, Petit GS. Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology* 1997;106:37–51. [PubMed: 9103716]
- Edwards EP, Leonard KE, Edien RD. Temperament and behavioral problems among infants in alcoholic families. *Infant Mental Health Journal* 2001;22:374–392. [PubMed: 19436770]
- Eiden RD, Chavez F, Leonard KE. Parent-infant interactions among families with alcoholic fathers. *Development and Psychopathology* 1999;11:745–762. [PubMed: 10624724]
- Eiden RD, Edwards EP, Leonard KE. Predictors of effortful control among children of alcoholic and nonalcoholic fathers. *Journal of Studies on Alcohol* 2004;63:309–319. [PubMed: 15222587]
- Eiden RD, Leonard KE, Morrisey S. Paternal alcoholism and toddler noncompliance. *Alcoholism: Clinical and Experimental Research* 2001;25:1621–1633.
- Eisenberg N, Fabes RA, Guthrie IK, Murphy BC. The relations of regulation and emotionality to problem behavior in elementary school children. *Development and Psychopathology* 1996;8:141–162.
- Eisenberg N, Fabes RA, Guthrie IK, Reiser M. Dispositional emotionality and regulation: Their role in predicting quality of social functioning. *Journal of Personality and Social Psychology* 2000;78:136–157. [PubMed: 10653511]
- Eisenberg N, Spinrad TL, Fabes RA, Reiser M, Cumberland SA, Valiente C, et al. The relations of effortful control and impulsivity to children. *Child Development* 2004;75:25–46. [PubMed: 15015673]
- Eisenberg N, Spinrad TL, Morris AS. Regulation, resiliency, and quality of social functioning. *Self and Identity* 2002;1:121–128.
- El-Sheikh M, Buckhalt JA. Parental problem drinking and children's adjustment: Attachment and family functioning as moderators and mediators of risk. *Journal of Family Psychology* 2003;17:510–520. [PubMed: 14640801]
- Endicott, J.; Anderson, N.; Spitzer, RL. *Family History-Research Diagnostic Criteria (FH_RDC)*. National Institute of Mental Health; Washington, DC: 1978.
- Fan, J.; Fossella, J.; Sommer, T.; Wu, Y.; Posner, MI. Mapping the genetic variation of executive attention onto brain activity. *Proceedings of the National Academy of Science*; 2003. p. 7406-7411.
- Giancola, PR.; Moss, HB. Executive cognitive functioning in alcohol use disorders. In: Galanter, editor. *Recent developments in alcoholism*. Vol. Vol. 14. Plenum Press; New York: 1998. p. 227-251. The consequences of alcoholism: Medical neuropsychiatric economic cross-cultural
- Goldsmith HH, Buss KA, Lemery KS. Toddler and childhood temperament: Expanded content, stronger genetic evidence, new evidence for the importance of environment. *Developmental Psychology* 1997;33:891–905. [PubMed: 9383612]
- Hull, JG.; Slone, LB. Alcohol and self-regulation. In: Baumeister, RF.; Vohs, KD., editors. *Handbook of self-regulation: Research, theory, and applications*. Guilford Press; New York: 2004. p. 259-282.

- Iacono WG, Carlson SR, Taylor J, Elkins IJ, McGue M. Behavioral disinhibition and the development of substance-use disorders: Findings from the Minnesota Twin Family Study. *Development and Psychopathology* 1999;11:869–900. [PubMed: 10624730]
- Jacobson SW, Chiodo LM, Sokol RJ, Jacobson JL. Validity of maternal report of prenatal alcohol, cocaine, and smoking in relation to neurobehavioral outcomes. *Pediatrics* 2002;111:443–444.
- Jansen RE, Fitzgerald HE, Ham HP, Zucker RA. Pathways into risk: Temperament and behavior problems in three- to five-year-old sons of alcoholics. *Alcoholism: Clinical and Experimental Research* 1995;19:501–509.
- Juffer F, Stams G-JJM, van IJzendoorn MH. Adopted children's problem behavior is significantly related to their ego resiliency, ego control, and sociometric status. *Journal of Child Psychology and Psychiatry* 2004;45:697–706. [PubMed: 15056302]
- Kagan, J.; Fox, NA. Biology, culture, and temperamental biases. In: Eisenberg, N.; Damon, W.; Lerner, RL., editors. *Handbook of child psychology*. 6th ed.. Vol. Vol. 3. Wiley; New York: 2006. p. 167-225. Social, emotional, and personality development
- Kochanska G, Knaack A. Effortful control as a personality characteristic of young children: Antecedents, correlates, and consequences. *Journal of Personality* 2003;71:1087–1112. [PubMed: 14633059]
- Lemery KS, Essex M, Smider N. Revealing the relationship between temperament and behavior problem symptoms by eliminating measurement confounding: Expert ratings and factor analyses. *Child Development* 2002;73:867–882. [PubMed: 12038557]
- Lochman JE, Conduct Problems Prevention Research Group. Screening of child behavior problems for prevention programs at school entry. *Journal of Consulting and Clinical Psychology* 1995;63:549–559. [PubMed: 7673532]
- Loukas A, Fitzgerald HE, Zucker RA, von Eye A. Parental alcoholism and co-occurring antisocial behavior: Prospective relationships to externalizing behavior problems in their young sons. *Journal of Abnormal Child Psychology* 2001;29:91–106. [PubMed: 11321632]
- Loukas A, Zucker RA, Fitzgerald HE, Krull JL. Developmental trajectories of disruptive behavior problems among sons of alcoholics: Effects of parent psychopathology, family conflict, and child undercontrol. *Journal of Abnormal Psychology* 2003;112:119–131. [PubMed: 12653420]
- Malone SM, Taylor J, Marmorstein NR, McGue M, Iacono WG. Genetic and environmental influences on antisocial behavior and alcohol dependence from adolescence to early adulthood. *Development and Psychopathology* 2004;16:943–966. [PubMed: 15704822]
- Martel MM, Pierce L, Nigg JT, Jester JM, Admans K, Puttler LI, Buu A, Fitzgerald H, Zucker RA. Temperament pathways to childhood disruptive behavior and adolescent substance abuse: Testing a cascade model. *Journal of Abnormal Child Psychology*. in press.
- Mervielde I, De Clercq B, De Fruyt F, Van Leeuwen K. Temperament, personality, and developmental psychopathology as childhood antecedents of personality disorders. *Journal of Personality Disorders* 2005;19:171–201. [PubMed: 15899715]
- Miller JD, Lynam DR. Reactive and proactive aggression: Similarities and differences. *Personality and Individual Differences* 2006;41:1469–1480.
- Muris P, Ollendick TH. The role of temperament in the etiology of child psychopathology. *Clinical Child and Family Psychology Review* 2005;8:271–289. [PubMed: 16362256]
- Nigg JT, Glass JM, Wong MM, Poon E, Jester JM, Fitzgerald, et al. Neuropsychological executive functioning in children at elevated risk for alcoholism: Findings in early adolescence. *Journal of Abnormal Psychology* 2004;113:302–314. [PubMed: 15122950]
- Nigg JT, Wong MM, Martel MM, Jester JM, Puttler LI, Glass JM, et al. Poor response inhibition as a predictor of problem drinking and illicit drug use in adolescents at Risk for alcoholism and other substance use disorders. *Journal of the American Academy of Child and Adolescent Psychiatry* 2006;45
- O'Connor MJ, Paley B. The relationship of prenatal alcohol exposure and the postnatal environment to child depressive symptoms. *Journal of Pediatric Psychology* 2006;31:50–64. [PubMed: 15802607]
- Oldehinkel AJ, Hartman C, De Winter AF, Veenstra R, Ormel J. Temperament profiles associated with internalizing and externalizing problems in preadolescence. *Development and Psychopathology* 2004;16:421–440. [PubMed: 15487604]

- Parke, RD. Fathers and families. In: Bornstein, MH., editor. *Handbook of parenting: Vol. 3. Being and becoming a parent*. 2nd ed.. Lawrence Erlbaum Associates; Mahwah, NJ: 2002. p. 27-73.
- Pickering, AD.; Gray, JA. The neuroscience of personality. In: Pervin, L.; John, O., editors. *Handbook of personality*. Guilford; San Francisco: 1999. p. 277-299.
- Poon E, Ellis DA, Fitzgerald HE, Zucker RA. Intellectual, cognitive, and academic performance among sons of alcoholics during the early school years; Differences related to subtypes of familial alcoholism. *Alcoholism: Clinical and Experimental Research* 2000;24:1020–1027.
- Posner MI, Rothbart MK. Research on attention networks as a model for the integration of psychological science. *Annual Review of Psychology* 2007;58:1–23.
- Riggs NR, Greenberg MT, Kusche CA, Pentz MA. The mediational role of neurocognition in the behavioral outcomes of a social-emotional prevention program in elementary school students: Effects of the PATHS curriculum. *Prevention Science* 2006;7:91–102. [PubMed: 16572300]
- Robins LN, Helzer JE, Croughan JL, Ratcliff KS. National Institute of Mental Health diagnostic interview schedule: Its history, characteristics, and validity. *Archives of General Psychiatry* 1981;38:281–389. [PubMed: 7212958]
- Robins, L.; Helzer, J. *The Computerized Diagnostic Interview Schedule Version III-R. The C-DIS Management Group*; St. Louis, MO: 1991.
- Rothbart MK, Ahadi S, Hershey KL. Temperament and social behavior in childhood. *Merrill-Palmer Quarterly* 1994;40:21–39.
- Rothbart MK, Ahadi SA, Hershey K, Fisher P. Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development* 2001;72:1287–1604. [PubMed: 11699671]
- Rothbart, MK.; Bates, JE. Temperament. In: Eisenberg, N.; Damon, W.; Lerner, RM., editors. *Handbook of Child Psychology. Vol. 3. Social, emotional, personality development*. Wiley; New York: 2006. p. 99-166.
- Rushton JP, Brainerd CJ, Pressley M. Behavioral development and construct validity: The principle of aggregation. *Psychological Bulletin* 1983;94:18–38.
- Sher, KJ. *Children of alcoholics: A critical appraisal of theory and research*. University of Chicago Press; Chicago: 1991.
- Spinrad T, Spinrad L, Eisenberg N, Cumberland A, Fabes RA, Valiente C, Shepard SA, Reiser M, Losoya SH, Guthrie IK. The relations of temperamentally based control processes to children's social competence: A longitudinal study. *Emotion* 2006;6:498–510. [PubMed: 16938090]
- Strandberg-Larsen K, Andersen AM, Olsen J, Nielsen NR, Gronbaek M. Do women give the same information on binge drinking during pregnancy when asked repeatedly? *European Journal of Clinical Nutrition* 2006;60:1294–1298. [PubMed: 16721393]
- Tarter RE, Kirisci L, Mezzich A, Cornelius JR, Pajer K, Vanyukov M, et al. Neurobehavioral disinhibition in childhood predicts early age at onset of substance use disorder. *American Journal of Psychiatry* 2003;160:1078–1085. [PubMed: 12777265]
- Tarter RE, Vanyukov M, Giancola P, Dawes M, Blackson T, Mezzich A, et al. Etiology of early age onset substance use disorder: A maturational perspective. *Development and Psychopathology* 1999;657–683. [PubMed: 10624720]
- West MO, Prinz RJ. Parental alcoholism and childhood psychology. *Psychological Bulletin* 1987;102:204–218. [PubMed: 3310059]
- Wong MM, Zucker RA, Puttler LI, Fitzgerald HE. Heterogeneity of risk aggregation for alcohol problems between early and middle childhood: Nesting structure variations. *Development and Psychopathology* 1999;11:727–744. [PubMed: 10624723]
- Yamagata S, Takahashi Y, Kijima N, Maekawa H, Ono Y, Ando J. Genetic and environmental etiology of effortful control. *Twin Research and Human Genetics* 2005;8:300–306. [PubMed: 16176712]
- Zucker, RA. Alcohol use and the alcohol use disorders: A developmental-biopsychosocial systems formulation covering the life course. In: Cicchetti, D.; Cohen, DJ., editors. *Developmental psychopathology*. 2nd ed.. Vol. Vol. 3. Wiley; New York: 2006. p. 620-656. Risk, disorder, and adaptation

Table 1

Means and Standard Deviations for the Major Variables by COA Group

Reporter	Measure	Variables <i>n</i>	Total		Alcohol		Control	
			Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)	Mean (<i>SD</i>)		
Mother	Impulsivity	358	4.52 (.71)	4.64 (.70)	4.43 (.70)			
	Effortful Control	358	4.41 (.76)	4.33 (.80)	4.47 (.72)			
	Approach	358	5.29 (.61)	5.35 (.66)	5.25 (.57)			
	Psychopathy	358	1.61 (.26)	1.65 (.28)	1.58 (.23)			
	Externalizing	358	2.04 (.44)	2.08 (.47)	2.00 (.41)			
	Relational Aggression	357	1.60 (.63)	1.64 (.67)	1.57 (.60)			
Father	Resiliency	358	5.20 (.85)	5.18 (.88)	5.21 (.83)			
	Impulsivity	261	4.49 (.76)	4.65 (.80)	4.38 (.72)			
	Effortful Control	261	4.39 (.72)	4.19 (.70)	4.52 (.70)			
	Approach	261	5.18 (.60)	5.31 (.52)	5.09 (.63)			
	Psychopathy	260	1.62 (.24)	1.67 (.25)	1.59 (.23)			
	Externalizing	261	1.98 (.42)	2.07 (.40)	1.91 (.42)			
Teacher	Relational Aggression	261	1.64 (.60)	1.73 (.64)	1.59 (.57)			
	Resiliency	260	6.58 (.85)	6.47 (.83)	6.66 (.85)			
	Impulsivity	281	4.10 (.97)	4.19 (.95)	4.04 (.97)			
	Effortful Control	282	4.54 (1.11)	4.48 (1.13)	4.59 (1.09)			
	Psychopathy	282	1.50 (.31)	1.52 (.33)	1.49 (.29)			
	Externalizing	281	1.67 (.57)	1.68 (.58)	1.66 (.57)			
Relational Aggression		279	1.84 (.90)	1.87 (.98)	1.81 (.84)			
	Resiliency	282	5.03 (1.19)	5.09 (1.20)	4.99 (1.18)			

Table 2

Relations of the Major Variables with Age and Sex: Unstandardized Betas

Reporter/Composite	Measures	n	Age			Sex				
			f	B	df	SE	f	B	df	SE
Mother, Father, & Teacher	Impulsivity	415	17.62**	-.01	410.71	.01	11.99**	.23	411.63	.07
Mother, Father, & Teacher	Effortful control	415	3.04	.01	399.96	.01	26.24**	-.35	400.73	.07
Mother reported	Approach\anticipation	358	7.34**	-.01	334.28	.01	.06	-.02	344.56	.06
Father-reported	Approach\anticipation	261	4.48*	-.01	237.07	.01	.78	-.06	244.77	.07
Mother, Father, & Teacher	Externalizing Problems	414	2.13	-.01	389.14	.01	7.37**	.21	392.52	.08
Mother and Father	Relational Aggression	402	.20	-.01	365.11	.01	1.09	-.06	373.80	.05
Teacher-reported	Relational aggression	279	.08	-.01	275.79	.01	4.54*	-.23	274.68	.11
Mother, Father, & Teacher	Resiliency	414	5.10*	-.01	389.89	.01	2.11	.12	394.15	.08

Note: Values are unstandardized estimates.

* $p < .05$ ** $p < .01$.

Table 3
 Relations (Unstandardized Coefficients) Among Measures of Temperament and Adjustment Controlling for Age and Sex (Betas)

Predictor Variable	Dependent Variable																								
	Impulsivity MFT			EC MFT			Approach Mother			Approach Father			Ext Prob MFT			Rel Agg MF			Rel Agg Teacher			Resiliency MFT			
	B	SE	n	B	SE	n	B	SE	n	B	SE	n	B	SE	n	B	SE	n	B	SE	n	B	SE	n	
Impulsivity MFT																									
EC	-.49**	.04	(n = 415)																						
MFT				.27**	.05	(n = 358)																			
Approach				.28*	.05	(n = 261)																			
Mother				.00	.06	(n = 215)																			
Approach				.12**	.04	(n = 358)																			
Father				-.62**	.03	(n = 414)																			
Ext Prob				.44**	.04	(n = 414)																			
MFT				.20**	.04	(n = 402)																			
Rel Agg				-.25**	.04	(n = 402)																			
MF				.10	.06	(n = 357)																			
Rel Agg				.17*	.07	(n = 260)																			
Teacher				.36**	.08	(n = 279)																			
Rel Agg				-.42**	.07	(n = 279)																			
Teacher				.11	.10	(n = 245)																			
Resiliency				.09	.04	(n = 358)																			
MFT				.04	.04	(n = 414)																			
Rel Agg				.36**	.05	(n = 414)																			
Teacher				-.10**	.03	(n = 268)																			
Resiliency				-.30**	.07	(n = 279)																			
MFT				.23*	.10	(n = 402)																			
Rel Agg				.09	.05	(n = 260)																			
Teacher				.09	.05	(n = 174)																			
Resiliency				.04	.04	(n = 358)																			
MFT				.04	.04	(n = 414)																			

Note: MFT = mother, father, and teacher composite; MF = mother and father composite; EC = effortful control; Ext Prob = externalizing problems; Rel. Agg. = relational aggression. The horizontal measures were the dependent variables and the vertical measures were centered and used as the predictor in the mixed model analyses.

* $p < .05$

** $p < .01$

Table 4

Statistics for the Significant Interaction Models

Analysis	B	df	F	P
Externalizing Problems (M/F/T composite)				
Impulsivity (M/F/T composite): 3-way effect	.51	338.00	7.23	.008
COA status X impulsivity interaction	-.41	347.59	9.11	.003
Boys of alcoholics group	.93	348.14	71.04	.000
Boys of non-alcoholics group	.51	372.55	37.21	.000
Sex X impulsivity interaction	-.46	336.41	9.63	.002
Boys of alcoholics group	.93	351.71	70.49	.000
Girls of alcoholics group	.46	330.30	20.29	.000
Effortful control (M/F/T composite): 2-way effect	-.18	401.64	4.88	.028
Alcoholic group	-.83	401.53	131.54	.000
Non-alcoholic group	-.64	393.62	80.60	.000
Approach (Father reports): 3-way effect	.79	226.68	5.82	.017
COA status X approach interaction	-.69	249.00	11.69	.001
Boys of alcoholics group	.62	241.09	13.33	.000
Boys of non-alcoholics group	-.07	241.38	.36	<i>ns</i>
Sex X approach interaction	-.62	242.43	5.03	.026
Boys of alcoholics group	.62	241.09	13.33	.000
Girls of alcoholics group	.00	242.67	.00	<i>ns</i>
Relational aggression (teacher reports)				
Impulsivity (teacher reports): 2-way effect	.31	267.00	8.30	.004
Alcoholic group	.60	267.00	38.92	.000
Non-alcoholic group	.29	267.00	10.55	.001
Effortful control (teacher reports): 2-way effect	-.18	265.86	3.99	.047
Alcoholic group	-.56	266.24	46.45	.000
Non-alcoholic group	-.38	266.70	22.31	.000
Resiliency (M/F/T composite)				
Approach (father reports): 3-way effect	-1.44	238.04	17.94	.001
Sex X approach interaction	.72	235.25	14.61	.000
Boys of non-alcoholics group	.54	247.12	21.56	.000
Girls of non-alcoholics group	-.18	246.34	1.43	<i>ns</i>
Sex X approach interaction	.72	247.33	6.37	.012
Boys of alcoholics group	-.38	248.08	4.76	.030
Girls of alcoholics group	.34	248.00	2.21	<i>ns</i>
COA status X approach interaction	.92	248.76	19.44	.000
Boys of alcoholics group	-.38	242.08	4.76	.030
Boys of non-alcoholics group	.54	247.12	21.56	.000
Approach (mother reports): 2-way effect	-.31	347.73	5.28	.022
Alcohol group	-.15	347.80	1.70	.193
Non-alcoholic group	.16	340.82	1.78	.183

Note: M/F/T = composite of mother, father, and teacher reports.