Published in final edited form as:

J Appl Dev Psychol. 2010 September ; 31(5): 351–361. doi:10.1016/j.appdev.2010.06.004.

Temperament as a moderator of the relation between neighborhood and children's adjustment[☆]

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Abstract

Although proposed by bioecological models, there has been minimal empirical examination of whether children's individual differences moderate neighborhood effects on development. We used an urban community sample (8–12 years, $N = 316$) to examine interactions among neighborhood characteristics (problems and social organization) and children's temperament (fear, irritability and impulsivity) in predicting psychosocial adjustment. The main effects of neighborhood and temperament on outcomes were consistent with previous research. Findings show that development is challenging in disadvantaged neighborhoods whatever one's temperament, however, some effects of neighborhood were conditioned by temperament, particularly children's fear and irritability. Neighborhood problems were more strongly related to lower social competence for fearful and for less irritable children. Neighborhood problems were more strongly related to higher internalizing problems for low-fear children. Neighborhood social organization was more strongly related to greater social competence for low-fear children. Findings are discussed in relation to “diathesis–stress” and “differential responsiveness” models of temperament.

Keywords

Temperament; Neighborhood; Internalizing; Externalizing; Social competence; Bioecological model; Sensitivity to context

Introduction

Neighborhood characteristics are important predictors of children's social and psychological adjustment (see for review Ingoldsby & Shaw, 2002; Leventhal & Brooks-Gunn, 2000). However, developmental–ecological theory posits that development occurs within multiple contexts and is affected by factors at many levels, including individual factors, proximal interpersonal processes, and contextual factors, as well as interactions among these levels (Bronfenbrenner, 1979; Tolan, Guerra, & Kendall, 1995). Thus, the influence of neighborhood context is suggested to vary depending on other factors that are more proximal to the child.

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Increasingly, neighborhood factors have been examined as interacting with individual characteristics. For example, youth age and ethnicity (Roosa et al., 2005; Turley, 2003), as well as family and parenting variables (Dearing, 2004; Forehand & Jones, 2003), have been shown to condition the effects of neighborhood on youth adjustment.

Child temperament has been identified as a key factor affecting the direction or strength of the relation between contextual factors and problem behavior (Chess & Thomas, 1999; Sameroff, 1995) and renders children differentially responsive to the effects of contextual factors (Belsky, Hsieh, & Crnic, 1998; Belsky & Pluess, 2009; Rothbart & Bates, 2006; Wachs, 1991). Indeed, several lines of research have found evidence that temperament moderates the relation of socialization and contextual factors such as parenting (Belsky et al., 1998; Colder, Lochman, & Wells, 1997; Kochanska, 1997) and cumulative risk (Lengua, 2002) on child outcomes. Thus, an important direction for neighborhood research is understanding children's differential responsiveness or sensitivity to the effects of neighborhood characteristics. In this paper, we examined the additive and interactive effects of neighborhood characteristics, including neighborhood problems and social organization, and child temperament characteristics, including impulsivity, fearfulness, and irritability, in the prediction of children's social competence and adjustment problems.

Neighborhoods

There are a variety of conceptual and operational definitions of neighborhood (Furstenburg & Hughes, 1997). This results in a body of research with differences in terminology, size of physical dimensions examined, whose perspective of neighborhood is considered important, and what characteristics of neighborhood are thought to be fundamental. Subsequently, patterns of neighborhood effects are complex, as they vary depending upon a number of dimensions such as sampling and definition and measurement of neighborhood. Despite these challenges in the estimation of neighborhood effects, substantial evidence has linked neighborhood factors to a range of child adjustment outcomes such as aggression, delinquency, depression, anxiety, and social competence (Aneshensel & Sucoff, 1996; Gorman-Smith, Tolan, & Henry, 2000; Greenberg et al., 1999). Moreover, a number of studies have shown that the adverse effects of neighborhoods emerge above the effects of other risk factors, including individual and family attributes (see Leventhal & Brooks-Gunn, 2000) and after controlling for genetic liability for emotional or behavioral problems (Caspi, Taylor, Moffit, & Plomin, 2000). This suggests that the impact of neighborhood on adjustment may occur independently of family factors and heritability.

Neighborhood problems, which include crime, physical disorder, graffiti, deviant community members, and the availability of drugs, have been found to predict greater internalizing and externalizing problems (Aneshensel & Sucoff, 1996; Gorman-Smith et al., 2000; Greenberg et al., 1999) and lower social competence (Greenberg et al., 1999; O'Neil, Parke, & McDowell, 2001). Importantly, the impact of Census-measured, structural neighborhood effects have been found to be mediated by individuals' perceptions of neighborhood problems (Shumow, Vandell, & Posner, 1998; Tolan, Gorman-Smith, & Henry, 2003), suggesting individual's perspectives on their neighborhoods are particularly relevant.

Neighborhood social organization reflects connectedness among neighborhood residents, shared values, and trust. It is theorized to affect community efforts to monitor and regulate child behavior, which are expected to directly impact the development of problem behavior (Sampson, 2001; Sampson, Raudenbush, & Earls, 1997). Indeed, informal social networks within neighborhoods have been found to relate to lower levels of problem behavior (Elliot et al., 1996) and better social skills (O'Neil et al., 2001). Similarly, low involvement with neighbors has been found to predict greater delinquency for adolescent boys (Gorman-Smith et al., 2000) and greater depression in children (Aneshensel & Sucoff, 1996). Neighborhood

participation and collective efficacy have also predicted lower levels of depression for children, even controlling for risk characteristics and Census indicators of neighborhood SES (Xue, Leventhal, Brooks-Gunn, & Earls, 2005). Further, neighborhood cohesion has also been shown to predict better social competence for children over and above the effects of neighborhood physical disorder, maternal emotional distress, social support, and poor health (Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002). Thus, there is empirical evidence that both neighborhood problems and social organization independently predict a range of positive and negative adjustment outcomes for children.

Neighborhood contexts present both risk and protective factors that are thought to influence child adjustment in a variety of ways (Aneshensel & Sucoff, 1996; Jencks & Mayer, 1990; Roosa et al., 2003). For example, neighborhoods are thought to influence youth adjustment by regulating exposure to stressors and access to resources, with fewer resources and higher levels of stress increasing residents' risk for problems (Attar, Guerra, & Tolan, 1994). Yet neighborhood factors can also be protective, such as when emotional needs for a sense of belonging and support are met by neighborhood social processes (Kohen et al., 2002; Tolan et al., 2003). Whether different aspects of neighborhoods pose a risk or serve as protective factors may also depend on children's individual characteristics, such as temperament, which may lead them to be differentially sensitive to neighborhood influences.

Temperament

Temperament represents the physiological basis for affective arousal, expression, and regulation components of personality (Rothbart & Bates, 2006). This study includes dimensions reflecting Rothbart's theoretical model of temperament as individual differences in reactivity and self-regulation. Reactivity involves individual differences in arousal of negative emotions including fear and frustration. Self-regulation includes processes that modulate reactivity, facilitating or inhibiting the affective response (Rothbart, Ahadi, Hersey, & Fisher, 2001).

In particular, *fearful inhibition* is an important control system in the development of conscience and prosocial behavior because sensitivity to punishment leads children to be more inclined to inhibit punishable or prohibited behavior (Kochanska, 1997; Rothbart et al., 2001). Thus, fearfulness can be adaptive and lead to higher social competence (Rothbart & Bates, 2006) and be a protective factor against the development of externalizing problems (Kagan, 1997). Deficiencies in fearful control systems have been implicated in the development of externalizing problems (Fowles & Kochanska, 2000; Quay, 1993). However, fear may predispose one for developing internalizing problems (Quay, 1993; Rothbart & Bates, 2006). *Irritability* or *frustration* may result from having a high reward-orientation in a context where one's pursuit of goals is obstructed and predisposes children for externalizing problems and poor social relations (Eisenberg et al., 2001; Rothbart & Bates, 2006). Self-regulation is a multifaceted concept, and in this study, we focus on one key component, *impulsivity*, which has been defined as speed of response initiation or inability to delay (Rothbart et al., 2001). Children's impulsivity has been linked to lower social competence and higher internalizing and externalizing problems (Eisenberg et al., 2003; Lengua, 2003; Rothbart & Bates, 2006).

In addition to playing an important direct role in children's social and psychological development, evidence suggests that children's temperament characteristics might lead them to respond differently to key socialization experiences. For example, Kochanska (1997) demonstrated that children high in fear are more responsive to parental socialization, whereas children low in fear had better outcomes when their emotional bonds to their mothers were strong. Relatedly, Belsky et al. (1998) found that parenting was a stronger predictor of externalizing problems and inhibition for children who had been rated as high in negative affectivity as infants. If children high in negative emotionality are more sensitive to parental

influence, this suggests the possibility that they are more sensitive to contextual influences, such as neighborhood, more broadly. Because children's temperament is theorized to affect how they filter and select environmental experiences (Rothbart & Bates, 2006), individual differences in sensitivity to environmental threats and rewards, emotional reactions to the environment, and ability to regulate behavior may result in neighborhoods having varied impact on children.

Temperament is likely to affect children's experience of neighborhood characteristics, which could explain why some are more affected by characteristics of the neighborhood they reside in relative to others. Specifically, a fearful youth who responds to a dangerous neighborhood with heightened physiological arousal, appraisals of threat, and withdrawal may be at heightened risk for internalizing problems and reduced opportunities for prosocial development. Conversely, this same child is less likely to seek out antisocial activities or peers and is more sensitive to punishment, thus, he or she might demonstrate a lower likelihood of developing externalizing behavioral problems associated with residence in neighborhoods with more problems. Children's irritability is also likely to exacerbate or buffer the influence of neighborhood. For example, in high problem or socially disconnected neighborhoods, high irritability might increase the likelihood that a child responds to situations with aggression and displays lower levels of social competence. Furthermore, children's impulsivity may limit their ability to manage negative affect associated with neighborhood problems and increase their tendency to engage in or approach dangerous situations present in problem neighborhoods. On the other hand, neighborhoods that provide opportunities for positive social interaction and few opportunities for problem behavior may engender prosocial behavior for impulsive, approach-oriented children.

Only a few studies have examined how temperament might moderate the effect of neighborhood. Lynam et al. (2000) examined the relations among impulsivity, neighborhood SES, and juvenile offending in a sample of predominantly high-risk boys. They found that neighborhood SES interacted with impulsivity to predict offending in boys such that impulsivity more strongly predicted delinquency in poorer neighborhoods, but impulsivity was not related to offending in high SES neighborhoods. This ground-breaking study indicated the importance of examining temperament as a moderator of the effects of neighborhood, but examined only impulsivity, as opposed to a range of temperament characteristics, and only crime outcomes, rather than more general indicators of children's adjustment. Colder, Lengua, Fite, Mott, and Bush (2006) showed that combinations of low positive affect with high fear or high positive affect with low fear in infancy interacted with perceived neighborhood quality to predict antisocial behavior at age six, suggesting that negative affect and approach-related characteristics lead to differential responsiveness to characteristics of neighborhood over time. These studies highlight the importance of considering the interaction between temperament and neighborhood characteristics.

This study

The goal of this study was to examine temperament characteristics of fear, irritability and impulsivity as moderators of the effects of neighborhood characteristics on child adjustment with the aim of identifying child characteristics that render children more or less responsive to the characteristics of neighborhoods. We sought to advance existing research in a number of ways. First, our measures of neighborhood included both independent observer ratings of neighborhood risk conditions in addition to participants' perceptions of their neighborhoods, resulting in measures of both neighborhood problems and social organization. Second, we included a range of temperament characteristics and adjustment indices to identify potential specificity in the relations between neighborhood and adjustment. Third, we examined these relations during middle childhood, an important developmental period relatively unexamined

for neighborhood effects (Ingoldsby & Shaw, 2002). During middle childhood children increase their encounters with neighborhood contexts and learn to interact with peers and cultivate a sense of belonging (Garcia-Coll & Szalacha, 2004; Masten & Coatsworth, 1998). The social-cognitive processes that emerge and consolidate as children are increasingly exposed to new adults, peers, and settings during this period can have long-term consequences for children, in both positive and negative ways (Aber, Brown, & Jones, 2003). Finally, since studies to date have tended to focus on urban high-risk neighborhoods, less is known about whether similar patterns of effects would be observed across the continuum of neighborhood risk. Here we use a socioeconomically diverse sample, with neighborhoods ranging from advantaged to disadvantaged, allowing us to examine the effects of a range of both neighborhood problems and social organization.

On the basis of limited prior research (Colder et al., 2006; Lynam et al., 2000) and a developmental-ecological model for understanding the relations between risk and youth development, we hypothesized that neighborhood problems and social organization would predict child adjustment, and temperament would account for additional variance in adjustment. We also expected that fear, irritability and impulsivity would moderate the relation between neighborhood and adjustment. Specifically, the positive association between neighborhood problems and adjustment problems, and the negative association between neighborhood problems and social competence, were expected to be stronger for children high in fearfulness, irritability, or impulsivity compared to those low in those characteristics. Also, the positive association between neighborhood social organization and social competence, and the negative association between neighborhood social organization and adjustment problems was expected to be weaker for children lower in fearfulness, irritability, or impulsivity.

Method

Participants

Participants were recruited through Seattle Public School elementary classrooms. Schools within the city limits were selected for recruitment to represent a variety of sociodemographic and ethnic/racial characteristics of the urban area surrounding the University of Washington campus to ensure the sample included adequate representation of families of color, single- and two-parent households, and a full range of family income. Information forms were sent home with children. Parents were asked to indicate their interest in participating and return the form to their children's classroom. Participants were recruited in two waves during 1997–1998 and 1999–2001. Over that period, approximately 1830 information forms were distributed to all possible families from 83 3rd–5th grade classrooms in 18 schools; 1068 families returned the information forms, with 488 families indicating interest in participating. One child in the target grades per family was asked to participate. Although father or male primary caregiver participation was encouraged, mother or female primary caregiver participation was required.

This study utilized mother and child report to retain the majority of the sample for analyses. Children with developmental disabilities and families who were not fluent in English were excluded from the study to ensure adequate comprehension of the measures. A total of 316 third through fifth grade children ($M = 9.6$, range = 7.8–12.0 years) and their female primary caregivers participated. Three families had missing outcome data, so they were deleted from analyses, resulting in 313 cases.

The sample was ethnically diverse, with 29% African American, 2% Asian/Pacific Islander, 59% European/White, 2% Hispanic, 1% Native American, and 7% multiple or other ethnicities. The children were 53% female, and 72% lived in two-parent households. Caregivers included 294 biological mothers, 10 adoptive mothers, 2 foster mothers, 1 stepmother, and 5 grandmothers and 1 great aunt who had primary residential custody of the child (heretofore

referred to as mothers). Annual family income was distributed roughly evenly across sextiles of income: 12% less than \$20,000; 23% \$21,000 to \$40,000; 18% \$41,000 to \$60,000; 14% \$61,000 to \$80,000; 16% \$81,000 to \$100,000, and 17% over \$100,000. Mothers' modal level of educational attainment was college/university graduate, and ranged from 9 individuals with less than a high school diploma to 20 individuals with advanced degrees. A specific aim of this study was to recruit a sample that was economically and racially diverse. The demographics of the sample largely match the demographics of the communities from which it was drawn, except that the sample contained a larger portion of families in poverty (14% in the sample compared to approximately 8% in the population) and racial or ethnic minorities (41% in the sample was non-White compared to approximately 32% in the population) than the population from which it was drawn.

Data collection in this study was originally designed to test relations among individual differences in temperament and parenting behaviors and how those relate to child adjustment. The resulting design presented some limitations for the study of neighborhood effects. As a result of mandatory busing within school districts, each of the 18 schools in this study served a heterogeneous population drawn from a minimum of two different neighborhoods of the city, and students in our study from any particular zip code attended as many as 8 different schools. Thus, participants were unevenly distributed among 43 different zip codes, with over half of neighborhoods represented by only one family and the other neighborhoods represented by 2–50 participants. This precluded the use of HLM, because analyses with unbalanced data (i.e., unequal number of observations per group) and few observations per group (<5 observations per cluster) can lead to convergence failures, bias in regression estimates, or bias in standard errors and significance tests (Bryk & Raudenbush, 1992; Clarke, 2008). Thus, a disaggregated technique, ordinary least squares, was used for analyses.

Procedures

Data were collected using structured, scripted 2 1/2 hour interviews conducted in the families' homes. The interview team consisted of advanced psychology undergraduate and graduate students. Before conducting research, interviewers were trained for one semester in structured group sessions and individual role play trainings led by the Principal Investigator and doctoral students in child clinical psychology. Mothers' informed consent and children's assent were obtained prior to the start of the interview. Participants were assured of confidentiality of their responses, and children were informed that their answers would not be shared with their parents. Mothers and children were interviewed in separate areas of the house to ensure privacy. Questionnaire measures were administered with interviewers reading scripted instructions and all items on the questionnaires to the participants. Families were compensated with \$40 and children received small prizes for participating. These study procedures were approved by the Social and Behavioral Sciences Institutional Review Board at the University of Washington.

Measures

Children's temperament, adjustment problems, and social competence were assessed using both mothers' and children's reports on questionnaire measures. Although reports on questionnaire measures can include reporter bias and other measurement problems, they also provide perspective on children's consistent behaviors across settings. Observational ratings and maternal report were used to assess neighborhood problems and social organization.

Descriptive statistics for measures used in the study (excluding the demographic variables that are presented above), prior to combining across reporter, are presented in Table 1. Sociodemographic variables were obtained from the mother using a structured interview made up of questions regarding family composition and structure, income, and education. The child's age, sex, and race or ethnicity, as well as parents' income were included in this study. Families

reported annual family income on an 11-point scale, ranging from “less than \$10,000” to “above \$100,000,” which was modeled as a continuous variable.

Our sample was not designed to examine ethnic or racial differences, and the distribution across ethnic and racial groups is unbalanced. Thus, to optimize our ability to account for ethnic group membership yet retain the full sample for analyses, two categorical variables were formed based on child ethnicity: “African American” and “other ethnic minority.” Thus, when estimated simultaneously in statistical models, the effects of African American and other ethnic minority statuses represented comparisons with Caucasian status.¹ Minority group status tends to relate to neighborhood residence due to historical, political, and social constraints on ecological areas of residence (Sampson, 2001; Wilson, 1987). Minority youth often reside within high-risk environments (Spencer, 2001), and previous studies have found large racial differences in neighborhood quality and social processes (e.g., Dearing, 2004). Thus, studies that do not include adjustments for race/ethnicity may produce biased estimates of neighborhood effects (Leventhal & Brooks-Gunn, 2000). However, it is important to note that combining multiple ethnicities into one group should not imply that all members within that group share experiences or conditions (Helms, Jernigan, & Mascher, 2005) and is only intended to capture some of the explanatory power of the relations of racial or ethnic minority status to residence for groups with very limited sample size.

Neighborhood—Objective ratings of the quality of the neighborhood were obtained using interviewers' reports on the Neighborhood Environment subscale from the Post Visit Inventory (PVI; Dodge, Bates, & Pettit, 1990), which consists of four questions in a structured format that characterize neighborhood noise, safety, and quality. The coding system takes into account the presence of trash, physical damage to structures, vacant housing, abandoned cars, gang activity, and loitering, as well as whether the home is in a residential or commercial setting. Inter-rater reliability for the average PVI ratings from observer pairs (mother and child interviewers) was .71, as assessed using an average-measure intra-class correlation coefficient (ICC; Shrout & Fleiss, 1979). Internal consistency for the coders' combined scale was .75.

Mothers reported on the 16-item Neighborhood Questionnaire (NQ; Conduct Problems Prevention Research Group, 1991), which assesses neighborhood safety and social involvement (Greenberg et al., 1999). Participants responded to questions about their “neighborhood” and were told to “define neighborhood by whatever it means to *you*.” For this study, six NQ items assessed neighborhood safety. Mothers reported how much of a problem were: (1) break-ins, burglaries, muggings, assaults, or anything else like that; (2) the selling and using of drugs; (3) serious violence involving a stabbing or shooting in this neighborhood using a 4-point response scale (1 = *never happen*, 2 = *happen but not very often*, 3 = *happen fairly often* and 4 = *happen very often*). Three additional items used a similar 4-point scale to assess the participant's level of satisfaction with police protection in her neighborhood, how well police and people in the neighborhood got along, and whether she felt the neighborhood was a good place to live. The internal consistency for the safety subscale of the NQ was .75.

Resident perceptions of neighborhood safety and disorder have been found to strongly correspond with Census measures of neighborhood structural disadvantage (see Herrenkohl, Hawkins, Abbott, Guo, & SDRG, 2002; Ingoldsby et al., 2006) and provide valuable information about how individuals experience their environment, which is especially relevant to child mental health outcomes (Tolan et al, 2003). Use of ratings from a single informant greatly increases bias for both self-reports and single-knowledgeable-informant reports

¹Analyses were also run with only the Caucasian and African American sample, which proved to produce the exact pattern of findings as when the entire sample was used. Analyses with the entire sample were used to maximize power, although the separate analyses give us confidence that including the third “other” category does not change our pattern of findings.

(Biesanz & West, 2004), thus, we capitalized on different types of informants to minimize the extent to which biases would be shared across different types of informants. *Neighborhood problem* scores were the average of standardized mother report NQ safety items and observers' combined PVI scores, which were correlated at .39.

Neighborhood social organization scores were based on mother report of seven items from the NQ. Three items on the "social involvement" subscale assessing social connectedness and level of involvement within the neighborhood were included. An example item from this subscale is: "How many of your neighbors do you know well enough to visit or call on? *None* (1), *some* (2), *a few* (3), or *many* (4)." Three items assessing involvement in community organizations were added to the original scale. An example item is "How many neighborhood groups are you involved in?" Finally, an item relating to residential stability, which has been found to strongly relate to neighborhood social processes, was included in the social organization subscale (Sampson et al., 1997). This item read, "Have most of the people in this neighborhood lived here: *less than 2 years* (1), *2–5 years* (2), *5–10 years* (3), or *more than 10 years* (4)?" Internal consistency for the social organization scale was .80.

Temperament—Multiple reporters of temperament and adjustment were sought to partially address the effects of reporter bias on the observed associations. Combining reporters has been suggested to capture differing perspectives of behavior (Bird, Gould, & Staghezza, 1993; Hinshaw & Park, 1999) and reduce the number of statistical tests conducted. There are limitations to combining reporters, including modest to moderate correlations across reporters and loss of information from differing perspectives (Tein, Roosa, & Michaels, 1994). However, others have suggested that the practice results in substantial reduction in distortion due to bias and an increase in statistical power (Biesanz & West, 2004; Hoyt, 2000) and can produce a more reliable estimate of the construct being rated, increasing the generalizability of the findings (Cook & Goldstein, 1993). Confirmatory factor analyses (CFAs) conducted in previous analyses in this sample support combining child and mother reports of temperament and adjustment (Lengua, 2006; Lengua, Bush, Long, Kovacs, & Trancik, 2008). In those analyses, models were specified such that mother and child reports of each construct loaded on a latent factor of that construct (e.g., mother and child report of fear loaded on a fear latent factor). Reporter variances were estimated consistent with a multitrait, multi-method model (i.e., error variances for mother report indicators were correlated, and error variances for child report indicators were correlated). These models demonstrated adequate fit to the data, and the majority of factor loadings were significant and substantial.

Children's negative emotionality was assessed using mother and child report on the fear and irritability subscales of the Early Adolescent Temperament Questionnaire (EATQ; Capaldi & Rothbart, 1992), and children's self-regulation was assessed using the impulsivity subscale of the Child Behavior Questionnaire (CBQ; Rothbart et al., 2001). Subscale internal consistency reliabilities ranging from .65 to .79 have been reported for these measures. In this study, internal consistency reliabilities for mother and child report of fearfulness were .47 and .63, respectively, and the reports were correlated .26. Internal consistency reliabilities for mother and child report of irritability were .76 and .71, respectively, and the reports were correlated .11. Internal consistency reliabilities for mother and child report of impulsivity were .68 and .65, respectively, and the reports were correlated .28. Although some of the correlation coefficients are low, as described above, prior CFAs support the combination of mother and child reports.² The composite α (calculated to take into account the alpha and variance for each contributing scale as well as the covariance between the scales) for the fearfulness, irritability, and impulsivity measures combined across reporter were .65, .76, and .74, respectively.

Children's adjustment—Again, multiple reporters were sought to reduce bias, and mother and child reports of adjustment and social competence were combined by averaging the

standardized mother and child report scores. As was true for report of temperament, the results of previous confirmatory factor analyses support combining these mother and child report measures of adjustment (Lengua et al., 2008). Mothers reported on children's adjustment using the Child Behavior Check List (CBCL; Achenbach, 1991). Internal consistency reliability for maternal report of child internalizing was .86 and for child externalizing was .88.

The Child Depression Inventory (CDI; Kovacs, 1981) and the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978) were used to obtain children's report on their own internalizing problems. The CDI is a 27-item self-report scale designed to assess children's depression. Children respond to three choices, indicating which statement is most true for them. Examples of items are: "I do most things okay," "I do some things okay," and "I do everything wrong." On the RCMAS, children indicate whether they have experienced symptoms (yes or no) such as "I am nervous" or "I have trouble making up my mind." Internal consistency reliabilities for the CDI and RCMAS in this sample were .81 and .85, respectively. Scores on these measures were standardized and combined, and the composite α for child report of internalizing was .90. The delinquent and aggressive behavior subscales of the Youth Self-Report (YSR; Achenbach, 1991) were used to assess child report conduct problems. This scale has been used reliably with children as young as 8 years old (Sandler, Tein, & West, 1994). Internal consistency reliability in this sample was .82.

Social competence was assessed using mother and child report on the 34-item Social Skills Rating Scale (SSRS; Gresham & Elliot, 1990), which assesses cooperation, assertion, responsibility, empathy, and self-control. Internal consistency reliabilities for mother and child report of social competence were .86 and .87, respectively. Scores on all of the mother and child subscales were standardized and then combined to create internalizing and externalizing problems and social competence measures: the correlations between mother and child report were .18, .39, and .27, respectively; and the composite α for the measures combined across reporter were .85, .90, and .89, respectively.

Results

Correlations among predictors are presented in Table 2 and were examined to determine the potential for unique information provided by each variable. Child ethnic group status and family income were significantly related to neighborhood social organization and problems, confirming the importance of controlling for these family-level factors in the analyses. African American and Caucasian group statuses were related to family income and all temperament variables. The temperament variables were modestly to moderately intercorrelated, and the neighborhood variables were modestly correlated, indicating that attention to potential problems of multicollinearity was warranted. Values of variance inflation factor (VIF) ranged from 1.06 to 1.73, which were all in an acceptable range. Child age was not significantly related to any of the predictors, except fearfulness, nor to any of the outcome variables. Further, it did not affect the patterns of associations in the regression models. Therefore, it was dropped from analyses.

²Due to the low correlations between some child and mother reports of temperament in these data (particularly irritability) analyses were also run within reporter (child report temperament predicting child report adjustment and mother report temperament predicting mother report adjustment). Findings were similar across reporters and when compared to models run with aggregated reports of temperament. Further, there is debate in the field regarding whether children or parents are better reporters of children's internalizing or externalizing behavior (see for discussion Achenbach, 2006; or Loeber, Green, Lahey, & Stouthamer-Loeber, 1989). Additional analyses were run to determine whether associations differed when aggregated temperament reports were used to predict single-informant outcomes. Findings were similar for single-reporter and aggregated-report outcomes. In summary, nearly all associations among interactions and adjustment were in the same directions and had similar magnitudes, regardless of reporter of temperament or adjustment, although in some cases interaction beta weights only reached significance when using aggregated reports. Thus, in the interests of parsimony and representation of multiple perspectives of children's development, we have chosen to present the findings from models run with aggregated measures of both temperament and adjustment.

Tests of the interactions between temperament and neighborhood were conducted using multiple regression as outlined by Aiken and West (1991). Each neighborhood and temperament variable was initially centered and interaction terms were formed as the product of the two centered predictors. We used a hierarchical order of entry of the predictor variables in which covariates were entered first, then the main effects of the predictor variables, followed by the interaction terms. The order in which the sets of predictors were entered into the regression equation was: (1) child sex, family income and ethnicity; (2) neighborhood problems and social organization; (3) three temperament variables (fearfulness, irritability, and impulsivity) and (4) six interaction terms reflecting the three temperament $\times$ two neighborhood product terms. This order of entry allows conservative assessment of the interaction effects above the effects of the predictors and the independent effects of each possible interaction term, providing a test of an additive model of the direct and interactive effects of neighborhood and temperament. Significant interactions were probed by estimating the effects of neighborhood variables on outcome variables at 1 *SD* below the mean (low) and 1 *SD* above the mean (high) on the temperament variables.

Regression analyses are presented in Table 3. After controlling for child sex, ethnic group, and income, at initial entry both neighborhood and temperament were directly related to children's adjustment. Neighborhood problems were positively and social organization was negatively related to internalizing problems, together accounting for 5% of the variance in internalizing problems. Neighborhood problems were positively related to externalizing problems. There was a trend towards an association between neighborhood social organization and social competence, with lower levels of organization related to poorer social competence, accounting for 2% of the variance in social competence. Fearfulness predicted more internalizing problems and greater social competence. Irritability was strongly, positively related to externalizing problems and negatively related to social competence. Impulsivity predicted higher levels of externalizing problems and lower levels of social competence. Thus, temperament significantly predicted children's adjustment above the effects of covariates and neighborhood variables, but significant interaction effects indicated that some of the effects of neighborhood and temperament were dependent on each other (Aiken & West, 1991).

There were a total of 4 significant temperament $\times$ neighborhood interactions out of 18 interactions tested (22%) and a trend toward a 5th significant interaction. Given the difficulty in detecting interactions (particularly in low-risk samples) and the limited research in this area, we present and discuss interactions that were significant at the $p < .10$ level. Four interactions involved *neighborhood problems*. Neighborhood problems were more strongly associated with higher internalizing for low-fear children than for high-fear children, although high-fear children had higher levels of internalizing across variations in neighborhood problems (Fig. 1a). Neighborhood problems were more strongly associated with lower social competence for high-fear children than for low-fear children, with low-fear children having lower levels of social competence across variations of neighborhood problems (Fig. 1b). Similarly, neighborhood problems were more strongly associated with lower social competence for children low in irritability than for children high in irritability, with children high in irritability demonstrating lower levels of competence across variations in neighborhood problems (Fig. 1c). A trend towards a significant interaction between neighborhood problems and impulsivity occurred such that neighborhood problems were more strongly associated with lower social competence for children high in impulsivity than for children low in impulsivity, with children low in impulsivity having higher levels of competence across variations in neighborhood problems (Fig. 1d). One interaction involved *neighborhood social organization* such that it was more strongly related to higher social competence for low-fear children than for high-fear children. Low-fear children demonstrated higher levels of social competence in more socially organized neighborhoods, whereas high-fear children showed higher social competence across

variations in neighborhood social organization (Fig. 2). There were no significant interactions for externalizing problems.

Discussion

In this study, fearfulness, irritability, and impulsivity moderated the effects of neighborhood problems and social organization in predicting internalizing problems or social competence. The present results illustrate the complex interactions among individual and environmental influences on child adjustment by providing evidence that the effects of neighborhoods partly depend on children's temperament. Neighborhood effects are of ten modest in magnitude, and patterns of findings are complex and inconsistent, which may be because typical results are averaged across children who are differentially sensitive to the characteristics and problems in their neighborhoods.

That the differentiating effects of temperament were most evident in low-problem neighborhoods is interesting given arguments that the functional significance of temperament is thought to be greatest in its influence on responses to stress (Strelau, 2001). In particular, Rothbart and Bates (2006) suggest that fearful reactivity is more salient in high stress environments where it becomes activated and modulates an individual's behavior, making a fearful child more responsive to environmental influence (Belsky et al., 1998; Kochanska, 1997). In contrast, some of our findings suggest that in higher-problem neighborhoods, healthy development may be very challenging whatever one's temperament, as indicated by lower levels of social competence irrespective of the individual's level of fear and irritability. Likewise, high problem neighborhoods appear to contribute to higher levels of internalizing problems irrespective of individuals' levels of fear. Across levels of neighborhood problems, children higher in fear, irritability or impulsivity tended to have greater adjustment problems. Yet temperament had smaller associations with behavior in worse neighborhoods, which is similar to Colder et al.'s (2006) findings. Neighborhood settings with higher levels of accidents, crime, or deviant peers may be experienced as difficult for most children and provide few opportunities for prosocial exchanges, leading even low-fear children to experience internalizing symptoms and highly fearful and less irritable children to be less socially competent. This pattern of findings is also consistent with Raine's (2002) "social push perspective," which hypothesizes that the influences of individual difference factors are more expressed in advantaged environments. Indeed our findings suggest that temperamental distinctions are more salient when children live in low-problem neighborhoods.

These findings have bearing on Belsky's differential susceptibility hypothesis (2005), which proposes that some children will be more susceptible than others to both the adverse and beneficial effects of contextual environments, demonstrating a "plasticity" in response to environment rather than just a "vulnerability" as is proposed by traditional "diathesis-stress" or "dual risk" models. As Belsky and Pluess (2009) point out in their review of the empirical evidence for differential susceptibility, few studies assess both positive and negative environmental conditions when testing for temperamental moderation of environmental effects on adjustment. Even fewer test these relations on both positive and negative adjustment outcomes. This study tested both positive and negative neighborhood characteristics as well as positive and negative child outcomes, thus, the findings add important information for consideration. The bivalent range of constructs assessed may explain the complexity of findings. For example, some of our findings lend support to Belsky's (2005) prediction that children with more reactive temperaments would be more susceptible to the effects of environment (although we did not run all statistical tests suggested by Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007). However, contrary to the differential susceptibility hypothesis, in some analyses, children with high fear and irritability were relatively impervious to the effects of neighborhood. That is, they were higher in problems or lower in social

competence regardless of the neighborhood, which supports a direct vulnerability framework for the development of problems (see Compas, Connor-Smith, & Jaser, 2004; Nigg, 2006). It may be that distal contextual influences have relatively little impact when children have strong biobehavioral protection or vulnerability, whereas children low in those characteristics are more sensitive to the risks or benefits present in their context (Wikstrom & Sampson, 2003).

Temperamental fearfulness demonstrated the greatest evidence for interactions with both neighborhood problems and social organization. Patterns involving fear were somewhat complex, however, with opposite ends of the spectrum predicting greater sensitivity to neighborhood environment, depending on the dimension of neighborhood and outcome considered. For example, neighborhood problems were associated with higher levels of internalizing symptoms only for children low in fear. Fearful children are consistently found to have higher levels of anxiety and depression than their low-fear peers (Rothbart & Bates, 2006). As described above, perhaps in safer neighborhoods temperamental distinctions are more salient, and children low in fear experience few environmental stressors that contribute to the development of anxiety and depression, whereas highly fearful children are more prone to these problems regardless. Living in environments with higher levels of crime and disorder could create stressors intense enough to erode the protection from internalizing that low fear typically provides children.

In a similar pattern of findings, neighborhood social organization was associated with higher social competence only for children lower in fear, whereas higher fear children exhibited higher social competence regardless of neighborhood. If neighborhoods where residents are involved and attached to neighbors can be likened to secure relationships in families, this pattern is consistent with Kochanska's (1997) finding that the impact of parental socialization depends on children's level of fear. In other words, poorly socially organized neighborhoods predicted worse prosocial adjustment only for low-fear children just as poor relationships with mothers were related to poor conscience development only for low-fear children. Fearful children are more likely to be socially competent than their low-fear peers (Rothbart & Bates, 2006). It may be that the superior conscience development associated with higher fear is protective against the detrimental effects of poor neighborhood social organization on social competence. However, for children lower in fear, neighborhood appears to be one of the factors that contribute to their internalizing and social competence.

The pattern for the previous two interactions was surprising given that we had expected children higher in fear to be most affected by neighborhood problems. More in line with our expectations, and a diathesis–stress framework, was our finding that high-fear children were most strongly affected by neighborhood problems in that they had poorer social competence. Although higher fear generally predicts better social competence (Kochanska, 1997), as it did in these data, emotionality also relates to greater appraisals of threat and avoidant coping (Lengua & Long, 2002). In neighborhoods with higher levels of crime and disorder, fearful children may be more likely to either behave in a socially incompetent manner or avoid social interaction. Parents are apt to be less likely to encourage them to socialize outside the home, reducing opportunities for enriching experiences that facilitate social development.

The evidence for irritability and impulsivity moderating neighborhood was minimal in these data, yet still bears consideration. Higher levels of neighborhood problems were associated with worse social competence only for children low in irritability, whereas highly irritable children had poor social competence regardless of neighborhood problems. As in two of the fear interactions, the more reactive children were less sensitive to context. Children low in irritability generally display less negative affect and engage in more prosocial experiences, whereas highly irritable children are more likely to quarrel, provoke, or reject others, thereby resulting in lower competence (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Rothbart & Bates,

2006). Children lower in irritability might lose their potential for prosocial gains if they reside in communities with more danger and disorder that engender distress, demoralization, or dysregulation.

We had expected that impulsivity and neighborhood risk would interact to predict externalizing problems to parallel Lynam et al.'s (2000) findings with delinquency. Instead, there was a trend toward an interaction between impulsivity and neighborhood problems to predict social competence. Although it did not reach significance, we highlight this association because it most closely parallels Lynam et al.'s findings. Neighborhoods with more problems may provide more opportunities for aversive interactions with others and increased engagement with antisocial individuals (Sampson & Groves, 1989), and these data suggest that such influences are exacerbated by a child's impulsivity. For impulsive children who experience difficulty with behavioral regulation or compliance, frequent experience of stressful interactions or criticism for deviant behavior may lead to withdrawal from prosocial peers, frequent discipline, rejection by peers, and lower social competence (Patterson, Reid, & Dishion, 1992; Rothbart & Bates, 2006). Although not significant at the .05 level, this trend suggests that low impulsivity could buffer children from the effects of neighborhood problems, which may occur because these children are more likely to resist engagement in risky contexts.

Social competence is a particularly relevant outcome to consider in middle childhood because it is thought to protect children from the development of emotional and behavioral problems later on (Masten & Coatsworth, 1998). A developmental framework might suggest that the decreases in social competence found for highly impulsive children in higher-problem neighborhoods in our sample lead to associations with more deviant peers, and thus, increased likelihood of delinquency at ages 13 and 17 as measured by Lynam et al. (2000). It is important to note that Lynam et al. studied only males who were at high risk for delinquency and in one study, examined boys at the extremes of impulsivity, rather than examining a full range of impulsivity. The associations found in extreme groups of adolescent males might not emerge in a community sample such as ours that included typically developing boys and girls with the full range of impulsivity.

That the block of interactions accounted for 3% of variance in both internalizing and social competence outcomes is consistent with effect sizes found in reviews of studies of interactive effects in personality and applied psychology (Champoux & Peters, 1987; Chaplin, 1997). The magnitude of the observed effect size of the interaction can be expected to be an underestimate of the true effect size, because the strength of the association between neighborhood and adjustment, rather than the direction of effects, is what was affected by temperament, and effects are limited by the lowest reliability of the two first-order predictors (Aiken & West, 1991). In addition, our regression models used the full range of the variables being investigated, whereas, in other approaches, cases are often selected from the extremes of distributions, or from extreme samples, increasing the observed effect size (McClelland & Judd, 1993).

Despite the intriguing presence of interaction effects, numerous nonsignificant interactions suggest that the additive main effects of neighborhood and temperament on adjustment outcomes may be more salient than interaction effects, particularly in the prediction of externalizing problems (35% of the variability in externalizing problems was accounted for before examining interactions). Consistent with previous findings, neighborhood problems predicted higher internalizing and externalizing problems, and social organization predicted lower internalizing problems and better social competence. A primary task for psychological research is determining which levels of influence, and which aspects of each level, are most salient for specific outcomes (Lynch & Cicchetti, 1998). Both neighborhood problems and social organization were significant predictors of internalizing problems when examined simultaneously, which is consistent with previous findings (e.g., Xue et al., 2005). Examination

of both features contributes to a fuller understanding of effects of neighborhood context on child development (Sampson, 2001; Tolan et al., 2003). Also consistent with previous findings, temperament was associated with adjustment, and the relation of each temperament variable to adjustment was a unique effect, controlling for neighborhood and other temperament variables. Together, consideration of the significant main effects highlights the value of accounting for multiple contextual and individual traits. Moreover, it is important to note that, given the modest and varied pattern of interaction effects, these findings might also suggest that a model that includes only the main effects of temperament and neighborhood on outcomes is more parsimonious.

Despite the strengths of this study, limitations of the design and some caveats must be noted. Some of the neighborhood effects reported in this study were modest in comparison to results of other research showing neighborhood accounts for around 5% of variance in child adjustment (see Leventhal & Brooks-Gunn, 2000). One likely explanation is that the level of disadvantage of families and neighborhoods in this sample represented the full range of the continuum rather than the extremes, and neighborhoods in this urban area were not as severely disadvantaged (less racial segregation and violent crime) as those typically examined in other neighborhood research (New York and Chicago). Further, our sample is representative of typically developing children, and thus, has a low level of externalizing problems, which is in contrast to much of the research reviewed by Leventhal and Brooks-Gunn which often utilized high-risk samples. Yet, it is important to note that main effects and interactions were found even using a community sample with this greater range in neighborhoods. This suggests that examination of the influence of neighborhood characteristics, even for children outside of high-crime, inner-city urban environments, can add important information to our developmental models.

Another limitation of this study is the reliance on questionnaire measures that can include reporter bias and other measurement problems. However, combining mothers' and children's reports of temperament and adjustment provides a measure of children's consistent behaviors across settings and across multiple perspectives, reducing the potential impact of bias. Perhaps a more "pure" measure of temperamental individual differences might be found using physiological or genetic measures of these biologic predispositions (see Rutter, 2006). Although neighborhood problems were assessed by multiple informants (mothers and two interviewers), the correlations between the respondents' reports were modest. Perceptions of neighborhood play an important role in neighborhood influences on behavior, but given the possibility that distressed parents have an especially negative view of their environment, this study's inclusion of interviewers' objective problems ratings was a strength. Indeed, both subjective and objective measures of neighborhood problems are important to consider in relation to children's adjustment (Richters & Martinez, 1993). In this study, the advantages of multi-informant assessments likely outweigh the error that was added to the neighborhood construct by combining mothers' and interviewers' reports (in fact, the additional error probably attenuated the strength of the associations).

It is also important to note that the unbalanced sampling design of these data precluded the use of neighborhood as a nesting variable in analyses. Thus, it is possible that these findings do not account for dependence among the reports of residents who reside in the same community. Future tests of these relations should be conducted in samples with balanced representations across neighborhoods, in order to facilitate multi-level modeling of these associations.

In addition, the cross-sectional data do not allow determination of the direction of effects among the variables, whether these interactions have reverberating effects on developmental trajectories, or whether they are consistent at older ages. Interaction effects may be more salient during adolescence, when children spend increasing unsupervised time in neighborhoods.

Also, results might differ if youth perceptions of neighborhood are used. Further, the decision to view temperament as the variable that moderates neighborhood is largely theoretical, as the statistical test for the interaction is equivalent regardless of which variable is viewed as the moderator. Our approach parallels that of other researchers who seek to understand how individual differences in temperament exacerbate or buffer the influence of context (see Belsky & Pluess, 2009; Boyce & Ellis, 2005). However, longitudinal data is needed to clarify these issues. Moreover, only three dimensions of temperament were studied—additional research is needed to determine whether other dimensions, not considered here, have relations to outcomes that also interact with neighborhood contexts. Further, the effects considered in this study occurred after controlling for the associations between ethnicity and outcomes. Not only do social forces influence racial segregation and residency (Wilson, 1987), creating confounds to the examination of the influence of neighborhood, but evidence also suggests that ethnicity and culture may relate to neighborhood socialization processes (e.g. Roosa et al., 2005; Turley, 2003). Ethnicity/culture may also moderate the association between neighborhood and adjustment. We were unable to adequately address such issues with these data, but hopefully future studies will do so.

Implications for research and practice

As described in detail above, the pattern of findings presented here suggests that investigators must simultaneously consider both “diathesis–stress” and “differential susceptibility” models of temperament when examining individual differences in temperament and their relation to contextual effects. Consideration of these models together allows for a more complete understanding of the effects of neighborhood and temperament on a range of developmental outcomes. Neighborhood and temperament factors can be associated with the development of problems or skills in isolation, or through the exacerbation or buffering effects due to an interaction between the two factors.

These findings are important to consider when attempting to understand variability in children's adjustment. They provide further evidence that the impact of the sociological characteristics of the communities in which youth and families reside depends upon individual differences. If replicated, recognizing these and other bioecological interaction patterns in development could be an important advance in designing components of prevention and intervention efforts. Researchers and clinicians who focus on disadvantaged environments may need to consider the temperament of the children within the environments that they target, while those interested in individual child characteristics may need to evaluate children's contexts more carefully.

In conclusion, these findings highlight the importance of considering not only direct predictors of adjustment but the possibility of effects conditioned by child temperament. Psychosocial factors interacting with biological predispositions often have greater predictive power for adjustment outcomes than assuming environmental influences operate in a universal fashion (Sameroff, 1995), yet neighborhood research has largely neglected this consideration. Indeed, our findings support the possibility that children vary in their sensitivity to neighborhood influences. Moreover, they suggest that children's variability in fearfulness is particularly predictive of their response to the level of problems and social organization children experience within their neighborhood.

Acknowledgments

This study was supported by grants awarded to Liliana Lengua from the National Institute of Mental Health (#R29MH57703) and from the University of Washington Royalty Research Fund. The authors gratefully acknowledge the contributions of the doctoral students who helped to collect these data, Lara Embry, Erica Kovacs, Anna Long, and Anika Trancik. The authors also thank the children, families, teachers and school principals who participated in the study and the numerous research assistants who collected these data.

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Fig. 1.

Two-way interactions between neighborhood problems (NP) and temperament predicting internalizing problems: (A) neighborhood problems $\times$ fear; and predicting social competence: (B) neighborhood problems $\times$ fear; (C) neighborhood problems $\times$ irritability (Irr); (D) neighborhood problems $\times$ impulsivity (Imp).

Fig. 2. Two-way interactions between neighborhood social organization (NSO) and temperament predicting social competence: neighborhood social organization $\times$ fear.

Table 1

Means, standard deviations, ranges, and skewness for predictor variables before combination.

	Mean	SD	Maximum	Maximum	Skewness*
Neighborhood measures:					
Rater report of risk	6.97	1.55	4	13	.81
Mother report of problems	9.83	2.74	6	24	1.27
Mother report of social org.	17.06	4.46	7	28	-.03
Temperament measures:					
Child report					
Fearfulness	19.87	4.83	6	30	-.23
Irritability	26.14	5.62	8	40	-.12
Impulsivity	20.11	4.80	7	33	.09
Mother report					
Fearfulness	17.59	3.94	8	29	-.09
Irritability	26.81	5.43	11	40	-.05
Impulsivity	22.35	4.33	11	33	-.02
Adjustment measures:					
Child report					
Depression/anxiety	31.88	12.51	7	58	-.22
Conduct problems	4.41	4.05	0	31	1.90
Social competence	61.96	9.16	20	80	-.56
Mother report					
Internalizing problems	9.31	6.34	0	33	.93
Externalizing problems	10.71	7.01	0	33	.86
Social competence	42.22	7.04	18	56	.14

* All skew errors ranged from .136 to .138 (all rounded to .14). Several of the measures' skewness statistics were significant (≥ 1.96). However, large samples give rise to small standard errors, and significant values arise from even small deviations from normality, thus, this criterion can be misleading. Skewness statistics were markedly reduced in the combined measures. Further, visual inspection of the histograms of the combined variables used in analyses suggested that all variables approximated normal distributions.

Table 2

Correlations among the predictor variables.

	Child African American ^a	Child other ethnicity ^b	Child sex ^c	Family income	Fearfulness	Irritability	Impulsivity	Neigh. soc. org.	Neigh. problems
Child African Am ^a	–								
Child other ethnicity ^b	-.25**	–							
Child sex ^c	.08	-.04	–						
Family income	-.36**	-.08	-.10	–					
Fearfulness	.23**	.13*	-.09	-.22**	–				
Irritability	.28**	.07	-.01	-.23**	.48**	–			
Impulsivity	.25**	.05	.08	-.18**	.15**	.41**	–		
Neigh. social organization	-.29**	-.06	-.01	.28**	-.20**	-.15**	-.09	–	
Neigh. problems	.21**	.13*	.10	-.46**	.11*	.21**	.15**	-.25**	–

^a Child ethnicity is coded 0 = if “Caucasian” or “other ethnic minority”, 1 = if “African American”.^b Child ethnicity is coded 0 = if “Caucasian” or “African American”, 1 = if “other ethnic minority”.^c Child sex is coded 1 = girls, 2 = boys.* $p \leq .05$.** $p \leq .01$.

Table 3

Standardized regression coefficients and proportion of variance accounted in the prediction of adjustment for neighborhood, temperament, and neighborhood × temperament interactions.

Predictors	Internalizing		Externalizing		Social competence	
	β at entry	β final	β at entry	β final	β at entry	β final
Step 1: R^2 (controls)	.03*		.11***		.10***	
Child sex ^a	.07	-.03	.16	.14	-.13*	-.13*
Family income	-.12 ^t	.04	-.18**	-.10 ^t	.13*	.06
Child ethnicity African Am. ^b	-.16*	-.27**	.13	-.03	-.20**	-.10
Child ethnicity other ^b	.01	-.05	.12	.05	-.14*	-.10 ^t
Step 2: ΔR^2 (neighborhood)	.05***		.01 ^t		.02*	
Neighborhood problems	.14*	.11 ^t	.13*	.06	-.09	-.05
Neighborhood social org.	-.18**	-.16**	-.01	.00	.10 ^t	.07
Step 3: ΔR^2 (temperament)	.08***		.23***		.11***	
Fearfulness	.22***	.20**	-.09	-.09	.15*	.16*
Irritability	.11 ^t	.11 ^t	.41***	.41***	-.30***	-.31***
Impulsivity	.07	.07	.24***	.23***	-.15**	-.14**
Step 4: ΔR^2 (interactions)	.03 ^t		.01		.03 ^t	
Neib. prob. × fearfulness	-.14*		.03		-.16*	
Neib. prob. × irritability	.02		.04		.12*	
Neib. prob. × impulsivity	.09		.01		-.09 ^t	
Neib. soc. org. × fearfulness	-.03		-.01		-.17**	
Neib. soc. org. × irritability	.03		.00		.07	
Neib. soc. org. × impulsivity	-.08		.01		.00	

Note: N = 313.

^a Child sex was coded 1 = girl, 2 = boy.

^b Child ethnicity was dummy coded with three variables. Children were coded "1" for only one variable: as either Caucasian, African American, or other ethnic minority.

t
* $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.