HHS Public Access

Author manuscript

Fam Relat. Author manuscript; available in PMC 2016 February 01.

Published in final edited form as:

Fam Relat. 2015 February 1; 64(1): 64–79. doi:10.1111/fare.12105.

Protective factors in the development of early child conduct problems

Ella Vanderbilt-Adriance[a], **Daniel S. Shaw**[b], **Lauretta M. Brennan**[b], **Thomas J. Dishion**[c], **Frances Gardner**[d], and **Melvin N. Wilson**[e]

Ella Vanderbilt-Adriance: elv4@uw.edu; Daniel S. Shaw: casey@pitt.edu; Lauretta M. Brennan: lmb103@pitt.edu; Thomas J. Dishion: tomd@uoregon.edu; Frances Gardner: frances.gardner@socres.ox.ac.uk; Melvin N. Wilson: mnw@virginia.edu

[a]UW Autism Center, University of Washington, Box 35790, Seattle, WA 98195

[b]Department of Psychology, University of Pittsburgh, 210 S. Bouquet St., Pittsburgh, PA 15260

[c]Child and Family Center, University of Oregon, 195 W. 12th Ave., Eugene, OR 97401

[d]Department of Social Policy & Social Work, Oxford University, 32 Wellington Square, Oxford OX1 2ER, UK

[e]Department of Psychology, University of Virginia, 102 Gilmer Hall, P.O. Box 400400, Charlottesville, VA 22904

Abstract

The present study utilized a resilience model to investigate child, family, and community protective factors in toddlerhood as they relate to low levels of conduct problems at age 5 in a sample of low income children at risk for early disruptive problem behavior. Child, family, and community factors were associated with lower levels of conduct problems at age 5. Child, family, and community protective factors also distinguished between children who remained below and above a clinical threshold for aggressive problems between age 2 and 5. Finally, each domain of protective factors made small but significant unique contributions to lower aggression at age 5. These results emphasize the importance of multivariate analysis of the ecology of development predicting child outcome, and suggest potential areas for intervention with children at high risk for conduct problems.

Over the past several decades, the concept of resilience has gained prominence as a way to study the processes and mechanisms through which exposure to risk factors may be associated with children's positive and negative outcomes. The term resilience has been defined as a positive outcome in the context of adversity (Luthar, Cicchetti, & Becker, 2000), and centers on the study of various child, family, and community protective factors that may be associated with positive adjustment despite exposure to risk factors. Early resilience researchers defined protective factors as those variables that interacted with risk status to predict outcome (Garmezy, Masten, & Tellegen, 1984; Rutter, 1987); that is, only variables that were *more* strongly associated with positive outcomes in the context of high

Corresponding Author: Daniel S. Shaw, Department of Psychology, University of Pittsburgh, 4101 Sennott Square, 210 S. Bouquet St., Pittsburgh, PA 15260. casey@pitt.edu; phone: 412-624-1836; fax: 412-624-8991.

risk, as opposed to low risk, were considered to be protective. However, in recent years this term has been used to refer to all factors associated with positive outcomes in high-risk groups, regardless of whether relationships are stronger for children living in high-risk contexts (Luthar & Zelazo, 2003).

Another important issue in resilience research is the operationalization of "positive outcome" as either the absence of a negative outcome (e.g., psychopathology) or the presence of a positive outcome, such as academic competence, social competence, or meeting appropriate developmental milestones (Luthar et al., 2000). While the absence of a negative outcome doesn't necessarily translate to the presence of positive outcomes (e.g., low antisocial behavior may not indicate high school achievement), there is still benefit in studying the absence of negative outcomes, based on their high impact on the affected individuals and society at large. Indeed, utilizing a resilience approach to studying the high risk situations under which negative outcomes do *not* occur can provide essential information for prevention and intervention efforts aimed at guiding public policy and social programs to improve outcomes for children at risk.

Conduct problems (CP), such as aggression, theft, or firesetting, are one high impact negative outcome that place a great burden on society, requiring services from schools, mental health centers, and the judicial system (Kazdin, 1996). CP identified as early as age 3 have been found to be associated with more serious forms of antisocial behavior in both adolescence and adulthood (Henry, Caspi, Moffitt, & Silva, 1996; Shaw & Gross, 2008), and as such, toddlerhood can be a window of opportunity for early intervention efforts aimed at altering trajectories of early-starting antisocial behavior. Although it is informative to examine risk factors associated with the development of CP, a resilience model investigating factors associated with decreases in CP or the maintenance of low CP over time could provide a different and useful perspective. Understanding such protective factors is particularly important given that not all children who exhibit high levels of CP in toddlerhood persist (Campbell, Shaw, & Gilliom, 2000; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Tremblay, 2000). Identifying predictors that differentiate between desisters and persisters can help detect children who are at risk for CP and more serious forms of antisocial behavior. In addition, protective factors that are related to desistance may be particularly beneficial to target and promote in intervention as they may have greater potential to change developmental trajectories already in motion, rather than to simply maintain positive outcomes.

Although there are many studies examining the development of CP, including some that have been initiated during early childhood (Aguilar, Sroufe, Egeland, & Carlson, 2000; Campbell, Pierce, Moore, & Marakovitz, 1996; Moffitt, Caspi, Harrington, & Milne, 2002; Shaw et al., 2003), there are few studies that have utilized a resilience model to examine protective factors associated with low CP in early childhood in the context of high levels of sociodemographic, family, and child risk. The current paper also adds to the resilience literature in several ways by: 1) examining the relation between protective factors and clinically meaningful outcomes, 2) identifying protective factors that predict "desistance," rather than just the maintenance of positive outcomes, and 3) examining domains of protective factors within a multivariate model, which can provide valuable information on

how different factors work together to contribute to child outcomes (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Greenberg et al., 1999). The current paper examines child, family, and community-level protective factors at ages 2 and 3 as they relate to lower levels of CP, specifically aggression, at age 5 in a large sample of low income, ethnically diverse children initially identified and recruited from rural, suburban, and urban sites on the basis of multiple domains of risk for early CP. This paper will also examine the multivariate effects of protective factors from three domains (i.e., child, family, community) to elucidate their unique and combinatory contributions to child CP.

Protective factors

Within child, family, and community areas, a number of early childhood factors have been identified that are associated with CP. Within the *child*, temperamental factors are thought to be particularly important contributors to the development of CP (Frick & Morris, 2004). Rothbart and Ahadi (1994) conceptualize temperament as constitutional individual differences in reactivity (i.e., physiological and affective reactivity to stimuli) and self-regulation (i.e., the ability to manage and control behavioral and emotional expression) that are in turn influenced over the course of development by genetics, environment, and biological maturation. Although individual differences in reactivity have been frequently studied, self-regulatory aspects of temperament (e.g., inhibitory control, focusing and shifting attention) are also important for socio-emotional development (Kochanska, Murray, & Coy, 1997), and have been linked to lower levels of externalizing problems beginning in early childhood (Kochanska et al., 2009; Raaijmakers et al., 2008; Rothbart, Ahadi, & Evans, 2000).

Inhibitory control, defined as “the capacity to plan and to suppress inappropriate action” (Rothbart et al., 2000, p. 126), and the ability to shift and focus attention are thought to be related to the maturation of attentional networks associated with the development of the frontal cortex, which is also important in the emergence of other aspects of executive function (e.g., planning, organization, Frick & Morris, 2004; Rothbart & Ahadi, 1994). In particular, inhibitory control has been theorized as important in the development of conscience, prosocial behavior, and the inhibition of antisocial behavior (Frick & Morris, 2004). Consistent with the assumption of inhibitory control, young children who can inhibit their responses have been found to be more likely to comply with maternal directions, exhibit internalization of rules (Kochanska et al., 1997), and to have lower rates of aggression (Eisenberg et al., 1995; Raaijmakers et al., 2008).

Family factors, ranging from distal measures of family demographic factors (e.g., single parent status, SES) to more proximal measures of caregiving and factors that compromise caregiving quality (e.g., social support satisfaction), are also of importance in predicting child outcome (Gardner et al., 2007; Jaffee et al., 2007), particularly in early childhood when children’s contact with the wider environment tends to be more limited. Furthermore, although family factors such as parenting are obviously important for a number of child outcomes, they may be especially important for CP. During early childhood, parents serve as children’s primary socializing agents (Dishion & Patterson, 2006), setting guidelines for

acceptable behavior and teaching their children the skills they need to succeed in later developmental tasks (Masten & Coatsworth, 1998).

Positive behavior support, or positive parenting that is high in warmth, responsivity, and anticipating a child's needs and reactions to daily routines (e.g., taking a toy to occupy a toddler's attention for a long car ride or a trip to the supermarket), is one of several parenting dimensions that has been linked to lower levels of early CP (Gardner, 1987; Gardner et al., 2007; Pettit & Bates, 1989; Shaw, Keenan, & Vondra, 1994). Children whose parents are warm and responsive, and can anticipate the types of situations that tend to be frustrating for them are more likely to respond positively to parental guidance and standards of behavior (Kochanska, 2002), and less likely to engage in coercive cycles (Gardner et al., 2007). Not surprisingly, parenting characteristics related to positive behavior support, such as warmth, nurturance, consistency, and a good parent-child relationship have been found to be associated with many positive outcomes, including lower levels of CP (Kim-Cohen, Moffitt, Caspi, & Taylor, 2004; Masten et al., 1999), for school-age children and adolescents. These associations also have been replicated for younger children and specifically in relation to the development of low rates of CP (Dishion et al., 2008; Gardner et al., 2007; Pettit & Bates, 1989; Shaw et al., 1994).

Since Belsky's (1984) theoretical paper describing factors that might compromise or facilitate parenting quality, empirical evidence has supported the association of factors such as parental well-being, parenting hassles, and marital quality with caregiving quality. A related factor that has been theorized to impact child CP directly and indirectly through its effect on caregiving is the quality of maternal social support within and outside of the family (Crnic et al., 1983; Shaw, Bell, & Gilliom, 2000a). Empirically, maternal social support has been linked to several child outcomes, particularly in early childhood, including CP (Shaw et al., 2000a). For example, Shaw and colleagues (2000a) found a large effect size (d = .80) for the association between high dissatisfaction with maternal social support when children were 1.5 years old and above-clinical scores on teacher reports of child CP at age 8.

Finally, in addition to child and family protective factors, there is also evidence that *community* level factors related to neighborhood quality (e.g., dangerousness, social cohesion, SES) contribute to multiple child outcomes, ranging from school readiness and achievement to CP (Leventhal & Brooks-Gunn, 2000). Many studies have examined the relation between low neighborhood quality and CP in childhood (see Leventhal & Brooks-Gunn, 2000, for a review), but some studies have also examined high neighborhood quality as a protective factor (Jaffee et al., 2007; Li, Nussbaum, & Richards, 2007). For example, one study found that neighborhood quality (e.g., high social cohesion and control, low crime) at age 5 was associated with lower levels of teacher-rated CP in elementary school (Jaffee et al., 2007). Studies have more consistently linked neighborhood quality to the development of CP beginning around formal school entry (Leventhal & Brooks-Gunn, 2000); however, a couple of investigative teams have noted direct associations between neighborhood quality and child CP as early as ages 3 or 4 in high-risk urban settings (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Supplee, Unikel, & Shaw, 2007). Neighborhood quality can affect children directly through their experiences with peers and adults outside of the home, or indirectly, through influences on parenting (Bronfenbrenner,

1979). In fact, parental involvement has been found to buffer the effects of poor neighborhood quality on young children's risk for CP (Supplee et al., 2007). However, neighborhood quality may also have unique effects on child outcome, apart from its impact on parenting (Leventhal & Brooks-Gunn, 2003).

Thus, there are a number of child, family, and community factors that have been found to promote positive child outcomes in early childhood, including low levels of CP. However, few resilience studies, if any, have simultaneously examined protective factors at all three levels in early childhood with a sample specifically selected based on the presence of multiple risk factors for early-starting CP. Assuming that protective factors are associated with lower levels of CP, it is also important to determine whether they are associated with clinically meaningful differences in CP (Jacobson & Truax, 1991). That is, are children initially identified with higher versus lower levels of protective factors during the toddler period more likely to fall in the nonclinical range for CP as they approach formal school entry?

Incremental Multivariate Model

As has been pointed out in the literature on risk factors, it is not uncommon for factors to covary (Rutter, 2000), leading to questions regarding how different factors work together to contribute to child outcomes. Deater-Deckard and colleagues (1998) have proposed two alternate hypotheses: 1) risk domains are "empirically redundant," with one domain accounting for all unique variation in outcome; 2) multiple factors contribute to the child outcomes incrementally. An example of the first hypothesis could be a child with a difficult temperament being more likely to experience harsh parenting as a result of their own behavior. The child's temperament and parenting are correlated with one another, but because the child's temperament may elicit the harsh parenting, the latter would not provide any additional predictive power to the model (Deater-Deckard et al., 1998). The second hypothesis asserts that multiple factors work together in an incremental fashion; thus, child temperament and harsh parenting would both contribute unique variance to outcomes, and including both factors in the model would increase prediction.

Incremental risk is one method of examining cumulative risk, but in contrast to the most common method of creating a cumulative risk index by summing dichotomized risk factors and then examining the total variance explained, incremental risk models measure the *unique* variance associated with each individual factor or domain. For example, in a longitudinal study of 566 children followed from age 5 to 10, Deater-Deckard and colleagues (1998) found support for an incremental risk model, in that all four domains examined (child, sociocultural, parenting, and peer-related) made unique contributions to externalizing problems. Deater-Deckard and colleagues' finding is also consistent with other theories on developmental psychopathology that emphasize the importance of multiple aspects of the child's environment (Cummings, Davies, & Campbell, 2000). Although incremental models have been studied more frequently in the context of a risk model, it is reasonable to assume that protective factors might work similarly in combination, with different domains adding incrementally to one another.

The present study

The present study examines child (i.e., inhibitory control, attention), family (i.e., positive parenting, social support satisfaction) and community level (i.e., neighborhood quality) protective factors at ages 2 and 3 as they relate to lower CP, or more specifically aggression, at age 5. Strengths of the current study include the utilization of a large, ethnically diverse, low income sample of children from diverse types of communities with multiple risks for continuing CP because of demographic, child, and family risk factors; the use of multiple methods and informants; and the use of a prospective longitudinal design. The current study tested two main hypotheses. First, child, family, and community level protective factors at ages 2 and 3 were expected to be directly associated with lower levels of CP at age 5. As a follow-up to this hypothesis, we examined whether protective factors meaningfully differentiated between children with clinically significant levels of CP and those without, as well as between "desisters" and "persisters." Second, in line with an incremental multivariate model (Deater-Deckard et al., 1998), we hypothesized that each domain of protective factors would account for unique variance in CP at age 5. The current sample was part of a randomized controlled trial testing the effectiveness of a family-centered intervention to reduce early CP (Dishion et al., 2008), but as intervention outcomes were not the focus of this paper, intervention status was accounted for only as a covariate in analyses.

Method

Participants

Participants included 731 mother-child dyads recruited between 2002 and 2003 from WIC Programs in the metropolitan areas of Pittsburgh, PA, and Eugene, Oregon, and within and outside the town of Charlottesville, VA (Dishion et al., 2008). Families were approached at WIC sites and invited to participate if they had a son or daughter between 2 years 0 months and 2 years 11 months of age, following a screen to ensure that they met the study criteria by having socioeconomic, family, and/or child risk factors for future behavior problems. Risk criteria for recruitment were defined at or above one standard deviation above normative averages on several screening measures within the following three domains: (a) child behavior (conduct problems, high-conflict relationships with adults), (b) family problems (maternal depression, daily parenting challenges, substance use problems, teen parent status), and (c) socio-demographic risk (low education achievement and low family income using WIC criterion). Two or more of the three risk factors were required for inclusion in the sample. Children who met criteria based on family problems and socio-demographic risk were also required to have above-normative levels of externalizing problems (t-scores ≥50 on either the Intensity or Problem factor of the Eyberg Inventory when screened at WIC) to ensure significant levels of problem behavior.

Of the 1666 parents who were approached at WIC sites across the three study sites and had children in the appropriate age range, 879 families met the eligibility requirements (52% in Pittsburgh, 57% in Eugene, 49% in Charlottesville) and 731 (83.2%) agreed to participate (88% in Pittsburgh, 84% in Eugene, 76% in Charlottesville). The children in the sample had a mean age of 29.9 months (*SD* = 3.2) at the time of the age 2 assessment.

Of the 731 families (49% female), 272 (37%) were recruited in Pittsburgh, 271 (37%) in Eugene site, and 188 (26%) in Charlottesville. More participants were recruited in Pittsburgh and Eugene because of the larger population of eligible families in these regions relative to Charlottesville. Across sites, the children were reported to belong to the following racial groups: 27.9% African American (AA), 50.1% European American (EA), 13.0% biracial, and 8.9% other races (e.g. American Indian, Native Hawaiian). In terms of ethnicity, 13.4% of the sample reported being Hispanic American (HA). During the period of screening from 2002 to 2003, more than two-thirds of those families enrolled in the project had an annual income of less than $20,000, and the average number of family members per household was 4.5 (*SD* = 1.63). Twenty-four percent of the sample had less than a high school diploma, 41% had a high school diploma or GED equivalency, 32% had one to two years of post–high school training, and 3% attained a standard college degree.

Of the 731 families who initially participated, 659 (90%) were available at the age-3 follow-up, 619 (85%) participated at the age-4 follow-up, and 621 (85%) participated at the age 5 follow-up. Selective attrition analyses revealed no significant differences at age 2 between retained participants and those who would later drop out of the study at ages 3, 4, or 5 with respect to project site, children's race, ethnicity, or gender, levels of maternal depression, or children's externalizing behaviors. Furthermore, no differences were found in the number of participants who were not retained in the control versus the intervention groups at age 3 (n = 40 and n = 32, respectively), age 4 (n = 58 and n = 53, respectively), and age 5 (n = 48 and n = 62, respectively). For the current study, children were included if they had data on parent reported age 2 and 5 conduct problems (n = 611).

Design and procedure

At child ages 2, 3, 4, and 5, the target child, primary caregiver, and when available, alternate caregiver (e.g., father, grandmother), participated in annual 2–3 hour, home-based assessments which consisted of a battery of self-report measures and observational interaction tasks. Age 2 assessments began by having an adult stranger (i.e., undergraduate videographer) approach the child, introduce him/her to an assortment of age-appropriate toys, and then allow him/her to play for 15 minutes while the primary caregivers completed questionnaires. After the free play (15 min.), each primary caregiver and child participated in a cleanup task (5 min.), followed by a delay of gratification task (5 min.), four teaching tasks (3 min. each, with the last task being completed by alternate caregiver and child), a second free play (4 min.), a second cleanup task (4 min.), the presentation of two inhibition-inducing toys (2 min. each), and a meal preparation and lunch task (20 min.). Similar procedures were used to assess child behavior and parent-child interaction at ages 3, 4, and 5, with minor modifications made to adjust for the developmental status of the child (e.g., wait task lasting 5 vs. 3 minutes at age 5 vs. age 3, respectively).

Families who participated in the age 2, 3, 4, and 5 assessments were reimbursed $100, $120, $140, and $160, respectively. The randomization sequence was computer-generated by a member of staff who was not involved with recruitment. Randomization was balanced on gender to assure an equal number of males and females in the control and intervention sub-sample. To ensure blindness, the examiner opened a sealed envelope, revealing to the family

their group assignment only after the assessment was completed. Examiners carrying out follow-up assessments were not informed of the family's assigned condition. For a detailed description of the intervention, see Dishion and colleagues (2008). Because intervention group status was not a focus of the current study, it was used as a covariate in all analyses.

Measures

Inhibitory control—At the age 2 and 3 visits, primary caregivers completed the 13-item inhibitory control subscale of the Child Behavior Questionnaire (CBQ, Rothbart, Ahadi, Hersey, & Fisher, 2001) to assess behavioral self-regulation (e.g., "Has difficulty waiting in line for something," and "Can easily stop an activity when s/he is told 'no.'"). The scale demonstrated adequate internal consistency (α = 59 and .71 at ages 2 and 3, respectively). Scores at each time point were summed and averaged to create a more generalizable measure of inhibitory control (r = .51, p < .001). In cases when data from only one of the two assessments were available, those data were used as the final measure, a principle that was followed for all measures in which two administrations of the same measure occurred.

Attention—At the age 3 home visit, trained examiners rated impressions of children's behavior during a language assessment on nine temperament items spanning a range of dimensions (e.g., distractibility, irritability, approach) derived from a system developed by Caspi and colleagues (1995). Scores ranged from 1 (not at all representative of the child) to 3 (definitely representative of the child). Five of the temperamental items reflected difficulty paying attention, restlessness, and impulsivity (e.g., fleeting attention, inability to sit still) and were averaged to create a composite of attentional problems. Factor analysis supported the combination of the five attentional problems items, and confirmed that they were distinct from the other four items on the temperamental measure; internal consistency for the 5-item measure was satisfactory (α = .85).

Positive behavior support—A team of undergraduates coded the videotaped family interaction tasks at ages 2 and 3 using the Relationship Process Code (RPC, Jabson, Dishion, Gardner, & Burton, 2004) (average team RPC percent agreement = .87, kappa = .86; Dishion et al., 2008). The RPC is a third-generation code derived from the Family Process Code (Dishion et al., 1983) used extensively in previous research. After coding each family interaction, coders completed a coder impressions inventory regarding proactive and positive parenting practices. All family interaction tasks were evaluated in the scoring of positive behavior support. In addition, the home visitors' ratings of parent involvement with the young child were used as another indicator of the positive behavior support construct. In detail the following items were entered into the positive behavior support scores:

1. The Parent Involvement measure is based on the home visitor's rating of the parents' involvement using the following items from the Home Observation for Measurement of the Environment inventory (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001): "Parent keeps child in visual range, looks at often"; "Parent talks to child while doing household work"; "Parent structures child's play periods."
2. The Positive Behavior Support measure is based on videotape codings (durations) of caregivers prompting and reinforcing young children's positive behavior as

captured in the following RPC codes: positive reinforcement (verbal and physical), prompts and suggestions of positive activities, and positive structure (e.g., providing choices in a request for behavior change).

3. The Engaged Parent-Child Interaction Time score reflects the average length of parent-child sequences involving talking or physical interactions such as turn taking or playing a game. Thus, the average duration of episodes that included consecutive parent-child exchanges involving RPC codes such as Talk and Neutral Physical Contact were used to define the engaged parent-child interaction time episodes.

4. For the Proactive Parenting measure, videotape coders rated each parent on his or her tendency to anticipate potential problems and to provide prompts or other structural changes to avoid young children becoming upset and/or involved in problem behavior (e.g., parenting gives child choices for behavior change whenever possible; parent communicates to the child in calm, simple, and clear terms; $\alpha = .84$).

To create a composite measure of positive behavior support, all four variables were standardized at each time point, and then averaged. Previous research with the current sample using latent growth mixture modeling found that these four variables formed a coherent construct and were highly stable from ages 2 to 3 ($\beta = .81$, Dishion et al., 2008).

Parental social support satisfaction—The General Life Satisfaction scale (GLS, Crnic et al., 1983) was administered to primary caregivers at the age 2 and 3 assessments to evaluate involvement and satisfaction with social support across a number of settings (e.g., neighbors, family, and friends). The 15-item Satisfaction scale from the GLS was used to assess the primary caregiver's contentment with the quality of her support across contexts. Internal consistency was found to be adequate for the factor in this sample at both age 2 ($\alpha = .71$) and 3 ($\alpha = .78$). Scores were averaged across time points ($r = .56$, $p < .001$) to create a more generalizable measure.

Neighborhood quality—At the age 2 and 3 visits, primary caregivers completed the 30-item Me and My Neighborhood questionnaire (Pitt Mother & Child Project, 2001) that assesses perception of characteristics of their neighborhood. The Neighborhood Quality questionnaire was adapted from prior research on urban neighborhoods (Ewart & Suchday, 2002; Sampson, Raudenbush, & Earls, 1997) and has been associated with conduct problems during early childhood (Ingoldsby et al., 2006). Two of four scales were used for purposes of the present study: 1) A 5-item subscale tapping neighborhood cohesion and belonging (e.g., "Living in this neighborhood gives me a sense of belonging"; "The friendships and connections I have with people in my neighborhood mean a lot to me."); 2) A 15-item subscale tapping neighborhood dangerousness (e.g., "A family member was robbed or mugged"; "I saw people dealing drugs near my home."), with ratings ranging from 1 (never) to 4 (often) ($\alpha = .85$ and .86 for the cohesion subscale and .88 and .76 for the dangerousness subscale at ages 2 and 3, respectively). To create a composite measure of perceived neighborhood quality, each subscale was averaged across time points and

standardized. Finally, neighborhood dangerousness was subtracted from neighborhood cohesion (r = .56, p < .001).

Conduct Problems—Conduct problems were rated by primary caregivers at age 2 using the Child Behavior Checklist (CBCL) for Ages 1.5–5, and by both primary caregivers and alternate caregivers at age 5 using the CBCL for Ages 6–18 (Achenbach & Rescorla, 2001). The CBCL is a frequently used questionnaire that assesses behavioral problems such as aggression and rule-breaking behavior in children. Use of the CBCL for Ages 6–18 with children who are almost 6 years old is supported by the manual (Achenbach & Rescorla, 2001), and made pragmatic sense as children were entering the school-age period where items geared at younger children might be less appropriate. Because of our focus on more serious disruptive forms of conduct problems (i.e., versus symptoms pertaining to attention), the CBCL narrow-band Aggression factor T score was used at both time points to evaluate the frequency of problem behavior. The Aggression factor includes items assessing physical aggression and noncompliance as well as temper and attention-seeking behaviors. To examine declines in CP, primary caregiver report of aggression at age 2 was controlled for in all analyses. Primary caregiver (PC) report at age 2 was selected as the control variable because primary caregivers provided the initial reports that met criteria for study participation and because alternate caregivers (AC) were not necessarily the same from age 2 to age 5. Internal consistency for Aggression was acceptable at both ages 2 (PC report = .85) and 5 (PC report = .89; AC report = .89). For secondary analyses, children were divided into four groups (i.e., stable low, increasing, desister, persister) based on the clinical significance of primary caregiver reported aggression levels over time. On the CBCL, a T score of 63 or above is considered clinically significant, and 60–62 is in the borderline clinical range. To ensure that movement in externalizing scores from age 2 to 5 was a meaningful change (e.g., a score of 63 at age 2 and a score of 62 at age 5 likely does not reflect meaningful change in behavior, even though the score is changing from the clinically significant range to the borderline range), the following criteria were used to create the groups: stable low (T < 63 at both age 2 and 5, n = 318, 52%), increasing (T < 60 age 2, T ≥ 63 age 5, n = 50, 8.2%), desister (T ≥ 63 at age 2, T < 60 age 5, n = 75, 12.3%), and persister (T ≥ 63 at both age 2 and 5, n = 168, 27.5%). Children who moved from the borderline clinical range into the clinical range or vice versa were classified in the persister group. One-way ANOVAs indicated that the clinical groups were significantly different from one another on primary caregiver reported aggression scores at age 2 (F = 345.76, p < .001) and age 5 (F = 442.61, p < .001).

Results

Results are presented in the following sequence: 1) descriptive statistics and intercorrelations for study variables; 2) associations between individual protective factors and aggression at age 5, accounting for intervention status and age 2 CP (i.e., as indexed by CBCL Aggression); 3) differences among clinical groups on individual protective factors; and 4) multivariate analyses to examine the unique contribution of each set of protective factors (i.e., child, family, and community) to lower levels of CP at age 5.

Preliminary analyses

Descriptive statistics for all study variables appear in Table 1. In line with the high-risk nature of the sample, average primary caregiver reported CBCL aggression *T* scores at age 2 were one standard deviation above the normative mean. Bivariate correlations among protective factors also are presented in Table 1. Significant intercorrelations were found among all protective factors (*r*s ranged from .11 to .24, *p*s < .05 to .001), with the exception of nonsignificant associations for child attention with parental social support satisfaction ($r = -.01$, $p > .05$) and neighborhood quality ($r = -.03$, $p > .05$).

Associations between protective factors and lower levels of conduct problems

To examine the hypotheses that protective factors assessed at ages 2 and 3 would be directly associated with lower levels of CP at age 5, a series of five hierarchical regressions were initially computed to assess univariate associations between child (i.e., inhibitory control, attention), family (i.e., positive behavior support, parental social support satisfaction), and neighborhood quality and primary caregiver reported CP (i.e., aggression, see Table 2). Intervention status and primary caregiver reported aggression at age 2 were entered first as covariates. As expected, inhibitory control ($B = -1.61$, $p < .01$), attention problems ($B = 1.54$, $p < .05$), positive behavior support ($B = -1.42$, $p < .05$), parental social support satisfaction ($B = -.18$, $p < .001$), and neighborhood quality ($B = -.71$, $p < .001$) were all associated with lower levels of CP at age 5. To assess the robustness of the associations across informants, the analyses were repeated using alternate caregiver reports of aggression at age 5 (Table 2). Controlling for intervention status, results across informants were similar; however, the relations between social support satisfaction and CP at age 5 ($B = 3.07$, $p < .01$), as well as neighborhood quality and CP at age 5 became nonsignificant trends (*B*s = −.12 and −.45, respectively, *p*s < .10).

Differences among conduct problem clinical groups on individual protective factors

As a follow-up to the association between protective factors and a continuous measure of CP, clinical groups were also created to determine whether levels of protective factors significantly differentiated between the clinical groups. A series of one-way ANOVA were performed with clinical group as the independent factor and one of the protective factors as the dependent variable. Levels of all protective factors differed across clinical groups (inhibitory control: $F = 38.90$, $p < .001$; attention problems: $F = 3.16$, $p < .05$; positive behavior support: $F = 4.35$, $p < .01$; parental social support satisfaction: $F = 7.51$, $p < .001$; neighborhood quality: $F = 6.80$, $p < .001$). Planned comparisons indicated that children in the stable low CP group had significantly higher levels of attention ($t = 2.44$, $p < .05$), positive behavior support ($t = 3.45$, $p < .01$), parental social support satisfaction ($t = 3.11$, $p < .01$), and neighborhood quality ($t = 2.12$, $p < .05$) than children in the increasing CP group. Children in the desister group had significantly higher levels of inhibitory control ($t = 2.75$, $p < .01$) and parental social support satisfaction ($t = 2.01$, $p < .05$) when compared to the persister CP group. In summary, attention, positive behavior support, parental social support satisfaction, and neighborhood quality were associated with maintenance of nonclinical levels of CP, while child inhibitory control and parental social support satisfaction were associated with clinically significant decreases in CP.

Incremental Multivariate Model: Unique Effects of Each Domain

Following Deater-Deckard and colleagues (1998), the following analytic strategy was used to test the hypothesis that each domain of protective factors would account for unique variance in CP at age 5. Protective variables within each of three domains (*child domain*: inhibitory control, attention; *family domain*: positive behavior support, parental social support satisfaction; *community domain*: neighborhood quality) were entered as a set into a hierarchical regression, with the significance of the R square change of a particular domain when entered on the last step providing a measure of its unique contribution to variance in CP. For example, in the first regression analysis, intervention group status and primary caregiver report of age 2 aggression were entered in the first step, followed by the family and community domain sets in the second step, and finally the child set in the last step. This analytic strategy was repeated twice, substituting either the family or community domain sets in the last step. Results indicated that each domain, when entered on the last step, made small but significant and unique contributions to the prediction of variance in declines in CP (Table 3). When the analyses were rerun using alternate caregiver report of CP at age 5, results were similar but attenuated. The community domain was nonsignificant and the family domain was reduced to a trend, while the child domain remained significant.

Discussion

The current study utilized a resilience framework to examine how child, family, and community level factors in toddlerhood might serve a protective role in relation to the development or desistance of CP at age 5 in a large and diverse, low-income sample of at-risk children. In line with hypotheses, inhibitory control, attention, positive behavior support, parental social support satisfaction, and neighborhood quality at ages 2 and 3 were all significantly associated with lower levels of primary caregiver reported CP over the course of early childhood, after controlling for intervention status. There was some evidence that higher levels of certain protective factors were associated with both maintaining nonclinical levels of CP and desistance from clinical levels of CP over time. Results were similar across informants (Primary Caregiver versus Alternate Caregiver). Finally, consistent with an incremental multivariate model (Deater-Deckard et al., 1998), each set of protective factors (i.e., child, family, community) made small but significant and unique contributions to the prediction of variance in primary caregiver reported CP, although results were attenuated for alternate caregiver reported CP.

Direct associations between protective factors in toddlerhood and lower levels of conduct problems at age 5

Consistent with prior research (e.g., Gardner et al., 2007; Raaijmakers et al., 2008; Shaw et al., 2000a), inhibitory control, attention, positive behavior support, parental social support satisfaction, and neighborhood quality were all positively associated with lower levels of primary caregiver reported CP, even after controlling for intervention status. Researchers have noted that children who are able to inhibit inappropriate behavioral responses in the context of stressful or challenging situations may be able to respond more adaptively than those who do not have such abilities (Rothbart et al., 2000). Additionally, children with higher levels of inhibitory control may decrease their arousal and level of negative affect in

difficult situations, and render them less likely to engage in coercive cycles with their caregivers (Patterson, Reid, & Dishion, 1992; Shaw & Bell, 1993). Similarly, positive behavior support, or parenting that is high in warmth, responsivity, and anticipating a child's needs and reactions to daily routines, has also been found to be important in the development of early CP (Gardner et al., 2007; Pettit & Bates, 1989). Children whose parents are able to provide positive behavior support may be more likely to respond positively to parental guidance and to the internalize standards for behavior (Kochanska, 2002). Relatedly, factors such as parental social support satisfaction, which can compromise or facilitate parenting quality, have also been shown to be related to the emergence of problem behavior in early childhood (Shaw et al., 2000a). Finally, although associations between neighborhood quality and CP have been more consistently examined and found beginning during middle childhood and increasing during adolescence, the current findings for young children are consistent with several other studies using families living in predominantly impoverished communities (Brooks-Gunn et al., 1993; Supplee et al., 2007; Winslow & Shaw, 2007). Neighborhood quality may impact children directly through their contact with influences outside the home (e.g., peers, neighbors, violence) or indirectly through influences on parenting or other proximal family factors.

Incremental Multivariate Model: Unique Effects of Each Domain

Consistent with expectations, there was some modest support for the notion that protective factors from multiple domains contribute to child outcomes incrementally. Each of the three domains of protective factors (child, family, community) made small but significant and unique contributions to the prediction of CP at 5 after controlling for the effects of age 2 CP, intervention status, and all other protective domains. Although the associations between each domain and CP were quite small, it is important that each domain contributes unique variation in CP over time. Given the greater proximity of child and family factors relative to community factors during early childhood, it is significant that neighborhood quality continued to account for unique variance in CP after accounting for child and family factors. Effects of neighborhood on child CP at age 5 might reflect indirect and unmeasured effects on the broader family environment (e.g., increased stress on parental adjustment and family harmony) or direct effects on child behavior because of higher rates of exposure to deviant peers and adults in the neighborhood.

Deater-Deckard and colleagues (1998) found support for an incremental multivariate model of *risk* factors, and it is important to test an incremental multivariate model of protective factors as well. Support for an incremental multivariate model of protection suggests that intervention and prevention efforts focusing on multiple contexts within a child's environment may be most efficacious in deterring CP (e.g., Dishion et al., 2008; Henggeler, 1999). Just as cumulative risks have been shown to be associated with worse outcomes than single risk factors, the accumulation of protective factors seems likely to be associated with more positive outcomes. For example, one study of premature infants with multiple risks found that children at the highest level of risk needed at least three protective factors to be categorized in the "resilient" group at age 3 (i.e., meeting developmentally appropriate cognitive, health, and behavioral milestones, Bradley et al., 1994). In another approach, data from the Pittsburgh Youth Study (Stouthamer-Loeber et al., 2002) also illustrates the

importance of multiple protective factors. Dichotomous protective factors were created and then added to create a summary score across domains of protective factors. Findings showed that adolescent boys who had a higher number of protective domains were more likely to desist from serious delinquency than boys with a low number of protective domains (Stouthamer-Loeber et al., 2002). Although these two studies were measuring the overall cumulative benefit of protective factors, rather than the incremental *unique* effects of specific domains of protective factors, they point to the importance of considering how the number and type of protective factors may impact positive outcomes.

Implications for Prevention and Intervention

The analyses and findings most relevant to clinical practice and prevention evidence examined how protective factors may meaningfully differentiate between clinical and nonclinical levels of CP over time. These results indicated that children who had stable nonclinical levels of CP over time had significantly higher levels of positive behavior support, attention, parental social support satisfaction, and neighborhood quality than children in the increasing CP group. Importantly, child inhibitory control and parental social support satisfaction also differentiated between children who exhibited clinically significant levels of CP over time (persisters) and children who decreased over time, moving into the nonclinical group by age 5 (desisters), suggesting child and family targets for preventive interventions during early childhood.

For both clinical practitioners and social policy makers, the role of protective factors in maintaining positive outcomes points to the importance of early intervention to strengthen and promote protective factors *prior* to the development of significant behavior problems (Reid, 1993). Although there is some evidence to suggest that children are more malleable to intervention during early childhood versus middle childhood or adolescence (Reid, 1993), the current results suggest that once a pattern of CP has been established, it may be difficult to change given the transactional effects of child and parent behavior (Shaw & Bell, 1993). For example, in a coercive cycle in which the child escalates negative behaviors and noncompliance and the parent becomes increasingly harsh and/or inconsistent, it may take larger changes in the parent's behavior and a longer amount of time for observed benefits in child behavior than it would for a child who had never escalated to this level of negative behavior.

The findings suggesting an incremental, albeit modest, contribution of protective factors across child, family, and community domains, also has implications for the targets of early intervention programs. The results suggest the validity of targeting multiple domains within the same intervention rather than focusing solely on improving one specific domain (e.g., parenting, child emotion regulation skills). Furthermore, the results suggest the use of a broad ecological assessment of the family's and child's strengths and challenges before making decisions about the target(s) of intervention, much like the approach taken by Dishion and colleagues in using the Family Check-Up (Dishion et al., 2008).

Relatedly, consistent with prior research using the current sample examining the efficacy of the Family Check-Up (FCU) in reducing CP during early childhood (Dishion et al., 2008; Shaw et al., 2009), the FCU was associated with reductions in child CP at age 5 according to

primary caregiver reports (Tables 2 and 3). Continued follow-up of the current sample suggests such improvements in child CP continue as a function of the FCU across time and context, as reported on by teachers when children are age 7.5 (Dishion et al., in press).

Limitations

Several limitations should be noted when considering the results of the current study. First, as the focus was on early childhood, children were only followed from age 2 to 5, with outcomes measured at one time point. Although there is evidence that early rates of CP are moderately associated with later and more serious forms of antisocial behavior (Campbell, 1997; Henry et al., 1996), correlations with serious offending during adolescence are relatively modest across time, context, and informant. It will be necessary to follow these children to see if these same protective factors in early childhood continue to predict lower levels of CP later on in childhood and adolescence. Furthermore, although results were corroborated by alternate caregiver reports, it will also be interesting to see if teacher and self-report measures in middle childhood and adolescence show similar findings.

Second, although efforts were made to include observational measures whenever possible to minimize shared method and informant variance, three of five protective factors were based solely on primary caregiver report. Primary caregivers also reported on age 2 and 5 CP, but results were generally corroborated by alternate caregiver report of CP at age 5, suggesting that although most associations were modest, they were relatively consistent. Future studies using multiple methods and reporters for protective factors and outcomes will add to the strength of these conclusions.

Third, it should be noted that the current sample consisted of ethnically diverse, low income, multi-risk families, and although relevant to the study of resilience and protective factors, such results may not generalize to more normative samples. Thus, children in the current study who were living in relatively “high” levels of neighborhood quality would not be considered as above average or middle class in the context of an epidemiologically representative sample. However, because our aim was to evaluate the efficacy of protective factors in the context of high risk, the sample was well suited to our purposes. Adding to the generalizability of the findings for other high-risk populations was the inclusion of both boys and girls, as well as a range of geographic locations (e.g., rural, urban, suburban).

Finally, although the current study identified protective factors associated with lower levels of CP, these types of correlational analyses do not speak to clinical significance – “lower levels of CP” could still include children with above normative levels of CP. For this reason, we also looked at clinical groups, specifically desisters or children who initially exhibited clinically significant rates of CP, but later moved into the normative range. Interestingly, protective factors were more strongly associated with the maintenance of nonclinical levels of CP, rather than desistance per se. However, it is still important to identify factors that are associated with the maintenance of lower CP, as such factors may prove good targets for early prevention and intervention programs.

Summary and Conclusions

The current study adds to our existing understanding of resilience and protective factors highlighting the importance of examining the unique influence of multiple domains on CP in early childhood. Specifically, the paper contributes to the broader field of resilience by demonstrating the incremental and unique contributions of multiple protective factors within the child, family, and community, and the relation of protective factors to both the maintenance of low CP and desistance of CP during early childhood.

Acknowledgments

We would like to thank the families who participated in this study. Research was supported by grant 016110 to Drs. Shaw, Dishion, and Wilson from the National Institute on Drug Abuse.

References

Achenbach, TM.; Rescorla, LA. Manual for the ASEBA school-age forms and profiles. U.S.A: Library of Congress; 2001.

Aguilar B, Sroufe L, Egeland B, Carlson E. Distinguishing the early-onset/persistent and adolescence-onset antisocial behavior types: From birth to 16 years. Development and Psychopathology. 2000; 12:109–132. [PubMed: 10847620]

Belsky J. The determinants of parenting: A process model. Child Development. 1984; 55:83–96. [PubMed: 6705636]

Bradley RH, Corwyn RF, McAdoo HP, Garcia Coll C. The home environments of children in the United States Part I: Variations by age, ethnicity, and poverty status. Child Development. 2001; 72:1844–1867. [PubMed: 11768149]

Bradley RH, Whiteside L, Mundfrom DJ, Casey PH, et al. Early indications of resilience and their relation to experiences in the home environments of low birthweight, premature children living in poverty. Child Development. 1994; 65:346–360. [PubMed: 8013226]

Bronfenbrenner, U. The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press; 1979.

Brooks-Gunn J, Duncan GJ, Klebanov PK, Sealand N. Do neighborhoods influence child and adolescent development? American Journal of Sociology. 1993; 99:353–395.

Campbell SB. Behavior problems in preschool children: Developmental and family issues. Advances in Clinical Child Psychology. 1997; 19:1–26.

Campbell SB, Pierce EW, Moore G, Marakovitz S. Boys' externalizing problems at elementary school age: Pathways from early behavior problems, maternal control, and family stress. Development and Psychopathology. 1996; 8:701–719.

Campbell SB, Shaw DS, Gilliom M. Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. Development and Psychopathology. 2000; 12:467–488. [PubMed: 11014748]

Caspi A, Henry B, McGee RO, Moffitt TE, et al. Temperamental origins of child and adolescent behavior problems: From age three to fifteen. Child Development. 1995; 66:55–68. [PubMed: 7497829]

Crnic KA, Greenberg MT, Ragozin AS, Robinson NM, Basham RB. Effects of stress and social support on mothers and premature and full-term infants. Child Development. 1983; 54:209–217. [PubMed: 6831987]

Cummings, EM.; Davies, PT.; Campbell, SB. Developmental psychopathology and family process. New York: Guilford; 2000.

Deater-Deckard K, Dodge KA, Bates JE, Pettit GS. Multiple risk factors in the development of externalizing behavior problems: Group and individual differences. Development and Psychopathology. 1998; 10:469–493. [PubMed: 9741678]

Dishion TJ, Brennan LM, McEachern A, Shaw DS, Wilson MN, Weaver CM, Gardner F. The prevention of early onset problem behavior through periodic family check ups in early childhood: A health maintenance model with indigent, high risk families. Journal of Abnormal Child Psychology. (in press).

Dishion, TJ.; Gardner, K.; Patterson, GR.; Reid, JB.; Thibodeaux, S. Unpublished coding manual. Oregon Social Learning Center; 160 East 164th Avenue, Eugene, OR 97401-92426: 1983. The Family Process Code: A multidimensional system for observing family interaction.

Dishion, TJ.; Patterson, GR. The development and ecology of antisocial behavior in children and adolescents. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology. 2. Vol. 3. Hoboken, NJ: John Wiley & Sons Inc; 2006. p. 503-541.

Dishion TJ, Shaw D, Connell A, Gardner F, Weaver C, Wilson M. The Family Check-Up with high-risk indigent families: Preventing problem behavior by increasing parents' positive behavior support in early childhood. Child Development. 2008; 79:1395–1414. [PubMed: 18826532]

Eisenberg N, Fabes RA, Murphy B, Maszk P, et al. The role of emotionality and regulation in children's social functioning: A longitudinal study. Child Development. 1995; 66:1360–1384. [PubMed: 7555221]

Ewart CK, Suchday S. Discovering how urban poverty and violence affect health: Development and validation of a neighborhood stress index. Health Psychology. 2002; 21:254–262. [PubMed: 12027031]

Frick PJ, Morris AS. Temperament and Developmental Pathways to Conduct Problems. Journal of Clinical Child and Adolescent Psychology. 2004; 33:54–68. [PubMed: 15028541]

Gardner FE. Positive interaction between mothers and conduct-problem children: Is there training for harmony as well as fighting? Journal of Abnormal Child Psychology. 1987; 15:283–293. [PubMed: 3611525]

Gardner FE, Shaw DS, Dishion TJ, Supplee LH, Burton J. Family-centered approach to prevention of early conduct problems: Positive parenting as a contributor to change in toddler problem behavior. Journal of Family Psychology. 2007

Garmezy N, Masten AS, Tellegen A. The study of stress and competence in children: A building block for developmental psychopathology. Child Development. 1984; 55:97–111. [PubMed: 6705637]

Greenberg MT, Lengua LJ, Coie JD, Pinderhughes EE, Bierman K, Dodge KA, et al. Predicting developmental outcomes at school entry using a multiple-risk model: Four American communities. Developmental Psychology. 1999; 35:403–417. [PubMed: 10082011]

Henggeler SW. Multisystemic therapy: An overview of clinical procedures, outcomes, and policy implications. Child Psychology and Psychiatry Review. 1999; 4:2–10.

Henry B, Caspi A, Moffitt TE, Silva PA. Temperamental and familial predictors of violent and nonviolent criminal convictions: Age 3 to age 18. Developmental Psychology. 1996; 32:614–623.

Ingoldsby EM, Shaw DS, Winslow E, Schonberg M, Gilliom M, Criss MM. Neighborhood Disadvantage, Parent-Child Conflict, Neighborhood Peer Relationships, and Early Antisocial Behavior Problem Trajectories. Journal of Abnormal Child Psychology. 2006; 34:303–319. [PubMed: 16705498]

Jabson, JM.; Dishion, TJ.; Gardner, FE.; Burton, J. Unpublished coding manual. the Child and Family Center; 195 West 112th Avenue, Eugene, OR 97401-93408: 2004. Relationship Process Code v-2.0. training manual: A system for coding relationship interactions.

Jacobson NS, Truax P. Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. Journal of Consulting and Clinical Psychology. 1991; 59:12–19. [PubMed: 2002127]

Jaffee SR, Caspi A, Moffitt TE, Polo-Tomas M, Taylor A. Individual, family, and neighborhood factors distinguish resilient from non-resilient maltreated children: A cumulative stressors model. Child Abuse & Neglect. 2007; 31:231–253. [PubMed: 17395260]

Kazdin, AE. Conduct disorders in childhood and adolescence. 2. Thousand Oaks, CA: Sage; 1996.

Kim-Cohen J, Moffitt TE, Caspi A, Taylor A. Genetic and environmental processes in young children's resilience and vulnerability to socioeconomic deprivation. Child Development. 2004; 75:651–668. [PubMed: 15144479]

Kochanska G. Mutually responsive orientation between mothers and their young children: A context for the early development of conscience. Current Directions in Psychological Science. 2002; 11:191–195.

Kochanska G, Barry RA, Jimenez NB, Hollatz AL, Woodard J. Guilt and effortful control: Two mechanisms that prevent disruptive developmental trajectories. Journal of Personality and Social Psychology. 2009; 97:322–333. [PubMed: 19634978]

Kochanska G, Murray K, Coy KC. Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. Child Development. 1997; 68:263–277. [PubMed: 9180001]

Leventhal T, Brooks-Gunn J. The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. Psychological Bulletin. 2000; 126:309–337. [PubMed: 10748645]

Leventhal T, Brooks-Gunn J. Children and youth in neighborhood contexts. Current Directions in Psychological Science. 2003; 12:27–31.

Li ST, Nussbaum KM, Richards MH. Risk and protective factors for urban African American youth. American Journal of Community Psychology. 2007; 39:21–35. [PubMed: 17380378]

Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. Child Development. 2000; 71:543–562. [PubMed: 10953923]

Luthar, SS.; Zelazo, LB. Research on resilience: An integrative review. In: Luthar, SS., editor. Resilience and vulnerability: Adaptation in the context of childhood adversities. New York, NY: Cambridge University Press; 2003. p. 510-549.

Masten AS. Ordinary magic: Resilience processes in development. American Psychologist. 2001; 56:227–238. [PubMed: 11315249]

Masten AS, Coatsworth J. The development of competence in favorable and unfavorable environments: Lessons from research on successful children. American Psychologist. 1998; 53:205–220. [PubMed: 9491748]

Masten AS, Hubbard JJ, Gest SD, Tellegen A, Garmezy N, Ramirez M. Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. Development and Psychopathology. 1999; 11:143–169. [PubMed: 10208360]

Moffitt TE, Caspi A, Harrington H, Milne BJ. Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. Development and Psychopathology. 2002; 14:179–207. [PubMed: 11893092]

Patterson, GR.; Reid, JB.; Dishion, TJ. Antisocial boys. Eugene, OR: Castalia; 1992.

Pettit GS, Bates JE. Family interaction patterns and children's behavior problems from infancy to 4 years. Developmental Psychology. 1989; 25:413–420.

Pitt Mother & Child Project. Unpublished measure. 2001. Me and My Neighborhood.

Raaijmakers MA, Smidts DP, Sergeant JA, Maassen GH, Posthumus JA, van Engeland H, et al. Executive functions in preschool children with aggressive behavior: Impairments in inhibitory control. Journal of Abnormal Child Psychology. 2008; 36:1097–1107. [PubMed: 18437548]

Reid J. Prevention of conduct disorder before and after school entry: Relating interventions to developmental findings. Development and Psychopathology. 1993; 5:243–262.

Rothbart MK, Ahadi SA. Temperament and the Development of Personality. Journal of Abnormal Psychology. 1994; 103:55–66. [PubMed: 8040481]

Rothbart MK, Ahadi SA, Evans DE. Temperament and personality: Origins and outcomes. Journal of Personality and Social Psychology. 2000; 78:122–135. [PubMed: 10653510]

Rothbart MK, Ahadi SA, Hersey KL, Fisher P. Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. Child Development. 2001; 72:1394–1408. [PubMed: 11699677]

Rutter M. Psychosocial resilience and protective mechanisms. American Journal of Orthopsychiatry. 1987; 57:316–331. [PubMed: 3303954]

Rutter, M. Resilience reconsidered: Conceptual considerations, empirical findings, and policy implications. In: Shonkoff, JP.; Meisels, SJ., editors. Handbook of early childhood intervention. 2. New York, NY: Cambridge University Press; 2000. p. 651-682.

Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. Science. 1997; 277:918–924. [PubMed: 9252316]

Shaw DS, Bell RQ. Developmental theories of parental contributors to antisocial behavior. Journal of Abnormal Child Psychology. 1993; 21:493–518. [PubMed: 8294650]

Shaw DS, Bell RQ, Gilliom M. A truly early starter model of antisocial behavior revisited. Clinical Child and Family Psychology Review. 2000a; 3:155–172. [PubMed: 11225751]

Shaw DS, Connell A, Dishion TJ, Wilson MN, Gardner F. Improvements in maternal depression as a mediator of intervention effects on early childhood problem behavior. Development and Psychopathology. 2009; 21:417–439. [PubMed: 19338691]

Shaw, DS.; Gilliom, M.; Giovannelli, J. Aggressive behavior disorders. In: Zeanah, CH., editor. Handbook of Infant Mental Health, 2nd edition. New York: Guilford; 2000b. p. 397-411.

Shaw DS, Gilliom M, Ingoldsby EM, Nagin DS. Trajectories leading to school-age conduct problems. Developmental Psychology. 2003; 39:189–200. [PubMed: 12661881]

Shaw, DS.; Gross, HE. What we have learned about early childhood and the development of delinquency. In: Liberman, AM., editor. The long view of crime: A synthesis of longitudinal research. New York, NY: Springer; 2008. p. 79-127.

Shaw DS, Keenan K, Vondra JI. Developmental precursors of externalizing behavior: Ages 1 to 3. Developmental Psychology. 1994; 30:355–364.

Stouthamer-Loeber M, Loeber R, Wei E, Farrington DP, Wikstrom POH. Risk and promotive effects in the explanation of persistent serious delinquency in boys. Journal of Consulting and Clinical Psychology. 2002; 70:111–123. [PubMed: 11860037]

Supplee LH, Unikel EB, Shaw DS. Physical environmental adversity and the protective role of maternal monitoring in relation to early child conduct problems. Journal of Applied Developmental Psychology. 2007; 28:166–183. [PubMed: 18311323]

Tremblay RE. The development of aggressive behaviour during childhood: What have we learned in the past century? International Journal of Behavioral Development. 2000; 24:129–141.

Winslow EB, Shaw DS. The impact of neighborhood context on boys' early conduct problem trajectories in a low-income sample. Aggressive Behavior. 2007; 33:207–219. [PubMed: 17444527]

Table 1

Descriptive Statistics and Intercorrelations Between Protective Factors

Variable	N	Mean (SD)	2	3	4	5
Protective factors						
1. Inhibitory control	600	4.10 (.70)	−.22***	.14**	.24***	.10*
2. Attention	567	.42 (.51)	.---	−.11*	−.01	−.03
3. Positive behavior support	611	.00 (.65)		.---	.11**	.12**
4. Social support satisfaction	611	40.01 (6.62)			.---	.17***
5. Neighborhood quality	610	.00 (1.61)				.---
Conduct problems						
PC report AGG *T* score (age 2)	611	60.09 (7.97)				
PC report AGG *T* score (age 5)	611	59.34 (8.67)				
AC report AGG *T* score (age 5)	338	56.83 (7.68)				

Note. AGG = Aggression; PC = Primary Caregiver; AC = Alternate Caregiver.

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Fam Relat. Author manuscript; available in PMC 2016 February 01.

Table 2

Summary of hierarchical regression analyses testing the association between protective factors at ages 2 and 3 and lower Aggressive Behavior (AGG) at age 5.

	Primary caregiver (PC) report AGG age 5			Alternate caregiver (AC) report AGG age 5		
Independent variables	***B***	***SE B***	**β**	***B***	***SE B***	**β**
Age 2 PC reported AGG	.42***	.04	.40	.18**	.06	.20
Intervention status	−1.19[a]	.62	−.07	.09	.81	.01
Inhibitory control	−1.61**	.51	−.13	−1.56*	.66	−.14
Age 2 PC reported AGG	.49***	.04	.45	.26***	.05	.27
Intervention status	−1.22 [a]	.64	−.07	.39	.84	.03
Attention	1.54*	.63	.09	2.32**	.85	.15
Age 2 PC reported AGG	.49***	.04	.45	.23***	.05	.25
Intervention status	−1.24*	.62	−.07	.09	.80	.01
Positive behavior support	−1.42**	.48	−.11	−1.41*	.63	−.12
Age 2 PC reported AGG	.47***	.04	.43	.22***	.05	.24
Intervention status	−1.43*	.62	−.08	−.01	.81	−.00
Social support satisfaction	−.18***	.05	−.14	−.12 [a]	.06	−.10
Age 2 PC reported AGG	.47***	.04	.43	.23***	.05	.25
Intervention status	−1.39*	.62	−.08	−.01	.81	−.1
Neighborhood quality	−.71***	.20	−.13	−.45 [a]	.25	−.10

[a] $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

Fam Relat. Author manuscript; available in PMC 2016 February 01.

Table 3

Summary of hierarchical regression analyses predicting lower aggressive behavior at age 5 from protective factor domains measured at ages 2 & 3[1]

	Primary caregiver report Aggression age 5				Alternate caregiver report Aggression age 5			
Independent Variable	**B**	**SE B**	***β***	**ΔR²**	**B**	**SE B**	**β**	**ΔR²**
Covariates				.21***				.07***
Group status	−1.35*	.65	−.08		.08	.84	.01	
Age 2 Agg (PC)	.49***	.04	.45		.25***	.05	.27	
When entered as final step:								
Child				.01*				.02*
Inhibitory Control	−1.18*	.57	−.09		−.96	.76	−.08	
Attention	.99	.64	.06		1.88*	.88	.12	
Family				.02**				.01[a]
Positive Behavior Support	−1.03*	.52	−.07		−1.25[a]	.71	−.10	
Social Support Satisfaction	−.13*	.05	−.10		−.08	.07	−.07	
Community				.01**				.00
Neighborhood Quality	−.54**	.20	−.10		−.33	.27	−.07	
	Total R^2 = .26***				Total R^2 = .13***			

[a] $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

[1] Protective variables within each of three domains were entered as a set into a hierarchical regression, with the significance of the R square change of a particular domain when entered on the last step providing a measure of its unique contribution to declines in externalizing behavior. For example, covariates were entered in the first step, followed by the family and community domain sets in the second step, and finally the child set in the last step. This strategy was repeated twice, substituting either the family or community domains sets in the last step.