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The Relationship Between Protective Factors and Outcomes for Children Exposed to Violence

Dana Schultz, MPP
Lisa H. Jaycox, PhD
RAND Corporation

Laura J. Hickman, PhD
Portland State University

Claude Setodji, PhD
Aaron Kofner, MS
Racine Harris, BA
Dionne Barnes, MSW
RAND Corporation

To develop prevention and intervention programs for children exposed to violence, it is necessary to understand what factors might help alleviate the negative effects of violence exposure. In this study, we sought to test whether relationships exist between certain protective factors and subsequent adjustment and to examine whether violence re-exposure contributed to changes in outcomes over time. The analyses revealed that caregiver reports of both child self-control and the quality of the parent–child relationship were related to changes in child posttraumatic stress disorder (PTSD) symptoms and behavior problems. Furthermore, children experiencing more categories of violence re-exposure had increased behavior problems at follow-up compared to those without re-exposure. These findings advance our understanding of the relationship between these protective factors and outcomes for children exposed to violence and suggest that intervening to bolster these protective factors could improve outcomes.

Keywords: protective factors; children; exposure to violence; trauma

Children's exposure to violence at home and in communities has gained wider recognition (Kracke & Hahn, 2008). A recent national survey reported that 61% of children had experienced or witnessed some type of violence, trauma, and abuse in the last year including physical assaults, property offenses, child maltreatment, sexual victimization, and witnessing violence (Finkelhor, Ormrod, Turner, & Hamby, 2009). Exposure to violence is often not an isolated event, with 66% of children exposed to violence reporting more than 1 type of exposure, 30% exposed to 5 or more types, and 10% exposed to 11 or more types in their lifetime (Turner, Finkelhor, & Ormrod, 2010).

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Child development involves biological, psychological, cognitive, and social changes at different stages on the path to adulthood (i.e., infancy, early and middle childhood, adolescence, young adulthood, adulthood). An ecological-developmental framework identifies individual, family, peer, and community characteristics or traits that support an optimal developmental trajectory (Shonkoff, 2010), with several risk and protective factors impeding healthy development or promoting resilience. In this framework, children may be particularly vulnerable to negative impacts from violence exposure. Moreover, the stress of acknowledging and coping with violence exposure may potentially alter the timing of developmental trajectories (Boney-McCoy & Finkelhor, 1995; Margolin & Gordis, 2000).

Children exposed to violence are at increased risk for a range of negative outcomes, including posttraumatic stress disorder (PTSD) symptoms and behavior problems (Bourassa, 2007; Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Sternberg, Lamb, Baradaran, Abbott, & Guterman, 2006; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). Yet, not all children exhibit these problems and approximately half will achieve developmental outcomes at least as good as their peers without similar exposure (Rutter, 2000). This "resilience" is a dynamic process that influences an individual's capacity to adapt and function despite experiencing risk or adversity. Resilience is not a trait or quality of an individual (Bernard, 2004; Masten, 2001; Masten & Powell, 2003) but rather a pattern of positive adaptation within the context of significant adversity (Garmezy, 1990; Luthar & Cicchetti, 2000; Masten, Best, & Garmezy, 1990; Masten & Powell, 2003; Werner & Smith, 1992) that is supported by protective factors that promote functioning within the individual, family, and community (Masten, 2001; Masten & Coatsworth, 1998). The process of positive adaptation does not imply excelling in all developmentally appropriate domains (Jaffee, Caspi, Moffitt, Polo-Tomas, & Taylor, 2007; Luthar, Cicchetti, & Becker, 2000). Rather, resilient children are those who function *at least as well* as the average child who has not been exposed to adversity (Luthar et al., 2000; Masten & Coatsworth, 1998). Furthermore, resiliency can occur in particular areas and can fluctuate over time (Jaffee et al., 2007; Kaufman, Cook, Arny, Jones, & Pittinsky, 1994; Luthar et al., 2000).

Protective factors include attributes such as social, emotional, and cognitive skills and competencies; parental involvement; and family functioning that work at the individual, family, or community level (Masten & Powell, 2003). For example, at the individual level, social competence includes the skills and characteristics essential to forming relationships and positive attachments including empathy, compassion, altruism, cooperation, assertion, responsibility, and self-control (Bernard, 2004; Elliott & Busse, 1991). These skills, in turn, help children avert emotional and behavioral problems (Garmezy, 1991) and foster close relationships with others (Kupersmidt, Coie, & Dodge, 1990). At the family level, supportive parent–child relationships are characterized by good communication and parental connectedness and concern (Brookmeyer, Henrich, & Schwab-Stone, 2005). Healthy early childhood development is also directly linked to the quality of the parent–child relationship (Davies, Winter, & Cicchetti, 2006; Sroufe, Duggal, Weinfield, & Carlson, 2000). Factors that impede this relationship, such as parental stress, can prevent positive adjustment (Garmezy, 1991; U.S. Department of Health and Human Services, 2001). Protective factors are thought to differ by developmental trajectory, with family level factors more salient for younger children than for adolescents (Masten et al., 1990; Wright & Masten, 1997).

Based on these concepts, interventions have been developed for children exposed to violence that target the development or strengthening of protective factors as a primary or secondary goal (Hyde, Lamb, Arteaga, & Chavis, 2008; Jaycox et al., 2011; Kracke & Hahn, 2008; Schultz et al., 2010). Interventions focused on building protective factors could result in better

outcomes for these children by ameliorating existing harms or shielding children from further harm in the event of violence re-exposure. This study aims to increase understanding of the relationship between protective factors and outcomes through analyses of a sample of children exposed to violence who were recruited to participate in the Safe Start Promising Approaches (SSPA) initiative's national evaluation, funded by the U.S. Department of Justice's Office of Juvenile Justice and Delinquency Prevention (Jaycox et al., 2011). We explore protective factors within a sample of children who were identified through contact with an agency within the community's system of care, and who participated in the control conditions of these studies, as a way to inform future intervention development and refinement.

Specifically, we explore two levels of protective factors: child- (social and emotional competencies) and family-level factors (quality of the parent–child relationship). We test whether baseline protective factors and changes in protective factors over time predict change in two key child-level outcomes (PTSD symptoms and behavior problems) when controlling for violence re-exposure. We expected to find a significant association between baseline protective factors and outcomes and between changes in protective factors and 6-month outcomes, controlling for violence re-exposure.

METHODOLOGY

Study Design

Data for this study were drawn from the national SSPA evaluation (Jaycox et al., 2011; Kracke & Hahn, 2008; Schultz et al., 2010). The SSPA outcome evaluation was designed to examine whether specific interventions are associated with individual-level changes in child outcomes in 15 different sites. For each program, a rigorous experimental or quasi-experimental design was implemented, either with a randomized control group or a comparison group receiving community services as usual selected on similar characteristics. The control or comparison group received usual care, which was augmented with limited case management or monthly check-in contacts with community service referrals. In this study, we examine data from the control or comparison groups only. By focusing on families who did not receive a specific intervention program, we can most clearly isolate the effects of protective factors on outcomes.

Although each site included some form of violence exposure in its eligibility criteria, the sites varied on other criteria (e.g., child age). The SSPA sites operated in various settings (hospitals, governmental agencies, and community-based agencies) and used locally determined referral networks such as social service agencies (see Jaycox et al., 2011). Thus, the pooled data in this study reflect a broad and diverse sample of families.

Data Collection and Sample

The SSPA baseline data were collected on standardized, age-appropriate measures for all families enrolled across the 15 sites. In-person interviews with primary caregivers for all children were conducted by trained staff. Primary caregiver status was determined by asking each referred family to identify the person with primary responsibility for making decisions for the child most of the time (e.g., the child's bedtime, when child goes to doctor). In most cases, the primary caregiver was a parent, usually the child's mother. Children aged 8 years and older also provided self-report data on age-appropriate measures. Longitudinal data on the same measures were collected at 6 months postenrollment.

We restricted the sample to control/comparison data from the 15 sites ($N = 826$) to eliminate the potential impact of the interventions on the relationship between the protective factors and outcomes. Despite eligibility criteria requiring violence exposure, some caregivers reported no exposure for their enrolled child at baseline and were thus eliminated from the sample. The sample was further restricted to those families who were retained in the SSPA sample for the 6-month follow-up assessment. Furthermore, because some measures were collected across a limited age range, we restricted the age range to children who, at baseline, were 1–12 years for the behavior outcome and 3–10 years for the PTSD outcome. To account for age differences in development for this age range, we selected measures that spanned the entire age range, had different versions for children of different ages, or used advanced psychometric techniques to combine scales. The final analysis sample comprises 350 families.

Measures

Protective factor and outcome measures were drawn from the baseline and 6-month follow-up assessments. Measures of control variables were drawn from the baseline assessment, and violence re-exposure measures were drawn from the 6-month follow-up assessment. Measures are fully described elsewhere (Jaycox et al., 2011) and are briefly described in the following sections.

Protective Factor Measures. Two scales were used to assess social–emotional competence and were combined to create measures that could be used across ages. First, caregivers with children aged 3–12 years completed either the 3- to 5-year-old or 6- to 12-year-old scale of the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) to assess the child's assertion and self-control. Each consists of 10 questions about behaviors related to assertion (e.g., shows interest in things) and self-control (e.g., controls temper with you) rated on a frequency scale (*never*, *sometimes*, or *very often*). This measure has been shown to be reliable with Cronbach's alphas that range from .74 to .76 for parent report of assertion and .80 to .83 for parent report of self-control (Gresham & Elliott, 1990). Other studies have examined convergent validity and found moderate to high correlations between the SSRS and other social competence measures (Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996; Lyon, Albertus, Birkinbine, & Naibi, 1996; Merrell & Popinga, 1994). Second, for children aged 1–3 years, caregivers completed the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2002) to assess social–emotional competence. The BITSEA is a 31-item questionnaire that asks caregivers to rate the frequency of the child's behavior or competence (e.g., shows pleasure when he/she succeeds) in the past month (*very true or often, somewhat true or sometimes*, *not true or rarely*). This measure has been shown to have good interrater reliability (0.65) and test–retest reliability (0.85) and to be valid with competence correlated with concurrent observed competence and predicted competence measures (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004). We combined the two SSRS scales with the BITSEA social–emotional scale items, using item response theory (IRT) factor analysis procedures, resulting in two scales that assess assertion and self-control. Scores on these scales derived for children aged 1–12 years have a mean value of 0 and a standard deviation of 1, with a higher score indicating more assertion or more self-control (Jaycox et al., 2011).

Caregivers completed the Parenting Stress Index—Short Form (PSI-SF) to assess the quality of the parent–child relationship. The PSI-SF is a 36-item questionnaire that consists of three scales measuring parental distress, dysfunctional parent–child interaction,

and difficult child characteristics. The questions ask caregivers to rate statements about themselves or feelings about/interactions with their child (e.g., I find myself giving up more of my life to meet my children's needs than I ever expected) on a 5-point scale (*strongly agree*, *agree*, *not sure*, *disagree*, *strongly disagree*; Abidin, 1995). The PSI-SF has been shown to be reliable with a Cronbach's alpha of .91 for the total score and valid when compared to the full length PSI (Abidin, 1995).

Outcome Measures

PTSD Symptoms. Caregivers of children aged 3–10 years completed the PTSD scale of the Trauma Symptom Checklist for Young Children (TSCYC) that includes 27 items that tap things the child does, feels, or experiences (e.g., bad dreams or nightmares; Briere, 1996). Caregivers rate the frequency of each symptom (*not at all*, *sometimes*, *often*, and *very often*). In prior research, the TSCYC has been shown to be reliable with a Cronbach's alpha of .87 (Briere et al., 2001).

Behavior Problems. Two measures were used to develop a score for total behavior problems that includes both internalizing and externalizing behaviors. For all children aged 3 years and older, caregivers completed the Behavior Problem Index (BPI) to assess behavior and conduct problems (Peterson & Zill, 1986) along with four additional items from the National Longitudinal Survey of Youth. The BPI is a 28-item caregiver questionnaire that asks respondents to assess the validity of statements (e.g., he/she has been too fearful or anxious). The measure has been demonstrated to be reliable with Cronbach's alphas ranging from .81 to .86 (Kahn, Brandt, & Whitaker, 2004) and valid with 78%–95% sensitivity and 68%–95% specificity when compared to the Child Behavior Checklist (Caselman & Self, 2008). For ages 1–3 years, we used the BITSEA problem scale items (see in previous section). These two measures were combined using IRT factor analysis procedures to create a total problem scale spanning the 1–18 years age range. The resulting score is a standard score with a mean of 0 and a standard deviation of 1, with a higher score indicating more behavior problems (Jaycox et al., 2011).

Control Variables. At the child level, we controlled for the child's age, gender, race/ethnicity, baseline violence exposure and 6-month violence re-exposure, and baseline outcome measures. At the caregiver/family level, we controlled for the caregiver's age, family income level, and number of children younger than 18 years in the household.

Children's exposure to violence was captured using caregiver reports on the Juvenile Victimization Questionnaire (JVQ; Hamby, Finkelhor, Ormrod, & Turner, 2004a, 2004b). The JVQ consists of 34 items (capturing specific violence exposure type) across five broad exposure categories. In the SSPA evaluation, 16 of these types were included within four categories: (a) child physical assault (assault with and without weapon), (b) child maltreatment (physical abuse by caregiver, psychological/emotional abuse, neglect, custodial interference/family abduction), (c) witnessing and indirect violence (witness to domestic violence; witness to parent assault of sibling; witness to assault with and without weapon; murder of family member or friend; exposure to random shooting, terrorism, or riots; exposure to war or ethnic conflict), and (4) sexual abuse (sexual assault by known adult, nonspecific sexual assault, sexual assault by peer). Caregivers were asked to report on their child's lifetime exposures at baseline and new exposures at 6 months. For every type of exposure, caregivers were asked how many times this had happened to the child in his/her lifetime (baseline) or in the past 6 months (6 months). In analyses, we captured baseline exposure with two variables: (a) total number of lifetime exposure incidents and (b) number of different categories of lifetime exposure.

Table 1 provides descriptive information about the sample and these control measures. Children were on average 4.5 years old and the sample was about equally split on gender.

TABLE 1. Baseline Descriptive Statistics

Child and Caregivers' Characteristics	
	Mean (*SE*)
Child's age	4.46 (0.13)
Caregiver's age	32.86 (0.55)
Number of children in household	2.40 (0.07)
Child's sex	Percentage
Male	49
Female	51
Child's race/ethnicity	Percentage
White	22
Black	27
Hispanic	26
Other	26
Family income level	Percentage
Less than $5,000	21
$5,000–$10,000	14
$10,001–$15,000	14
$15,001–$20,000	18
$20,001–$30,000	13
More than $30,000	20
Lifetime Violence Exposure	
	Mean (*SE*)
Total number of incidents of exposure	13.03 (0.92)
Number of categories of exposure	Percentage
1	41
2 or more	59
Protective Factor Measures	
	Mean (*SE*)
Assertion	−0.03 (0.05)
Self-control	0.01 (0.05)
Parent–child relationship	84.35 (1.32)
Outcome Measures	
	Mean (*SE*)
PTSD symptoms	41.32 (0.67)
Problem behaviors	0.05 (0.05)

Note. Percentages may not total 100% because of rounding. *SE* = standard error.

TABLE 2. Violence Re-exposure at the 6-Month Follow-Up

Violence Re-exposure	
	Mean (*SE*)
Total number of incidents of re-exposure	3.67 (0.45)
Number of categories of re-exposure	Percentage
0	45
1	34
2 or more	21

Note. Percentages may not total 100% because of rounding. *SE* = standard error.

The sample was about equally divided in terms of child race/ethnicity (27% Black, 26% Hispanic, 26% other or mixed race/ethnicity, 22% White). On average, the caregivers were 33 years of age with 2.4 children per household. Most families (80%) had income levels less than $30,000. At baseline, children had been exposed to an average of 13 incidents of violence in their lifetime. For 59% of the children, these exposure incidents were spread across two or more categories of violence. Scores on the measure of the parent–child relationship (mean = 84.35) fell just lower than the cut score indicating a clinically significant level of parenting stress. Mean PTSD symptom scores (41.32) fell in the normal range for males of all ages, in the "normal" range for younger girls, and in the "significant" range for older girls.

Table 2 presents the distribution of violence re-exposure. Overall, 45% of the children had not been reexposed to violence at 6 months. More than one-third (34%) experienced one or more incidents that fell into one category of re-exposure, and 21% experienced two or more categories of re-exposure. Measured by total frequency of re-exposure, children experienced an average of 3.7 incidents of re-exposure across all types and categories of violence assessment. This total could include multiple incidents of the same type of violence exposure (e.g., three incidents of child's physical assault) as well as several different types of violence exposure across multiple categories (e.g., child physical assault and sexual abuse).

Analysis

We excluded from relevant models those children missing 6-month follow-up data on measures of interest (ranging from 12 to 72 dropped cases across the measures) as well as missing responses on model covariates. We conducted a sensitivity analysis using multiple imputation (PROC MI in SAS) of the model covariates. We did not impute the dependent variables (PTSD symptoms and behavior problems), the primary independent variables of interest (protective factor measures), or violence re-exposure variables because these were central to our analyses. The results of the imputation analysis did not differ from those using unimputed data; thus we report only the latter here.

At baseline, participants were assumed to represent the target population of children exposed to violence who are known to the system of care in their community, but differential attrition rates across sites were observed at the 6-month follow up. Because some of the attrition could be related to site characteristics, household income, and baseline levels of parenting stress, sampling response weights were designed to compensate for

differential retention rates and ensure that the sample was as representative as possible of families seeking services within the SSPA initiative and allow estimation of unbiased population parameters. The weight for a respondent can be understood as the number of population members that the respondent represents. Weights were employed in all analyses described in the following section.

The distributions of the protective factors at baseline and the 6-month follow-up were investigated for descriptive purposes. We also examined the correlation between baseline and 6-month scores on the protective factor and outcome measures.

Multivariate linear regression models with site cluster adjustments (Huber, 1967; White, 1980) were estimated to assess the relationship between change in the protective factors and change in child outcomes. For each outcome, we first estimated separate models for each protective factor (Models 1–3) and then a final full model with all three protective factors simultaneously. In each model, we included the baseline protective factor measure and a variable representing the change in protective factor score from baseline to the 6-month follow-up. Baseline control and violence exposure variables were included in all models. The baseline outcome variable was also included to test whether a given protective factor predicts more positive outcomes beyond any continuity in the outcome that might exist. For violence exposure at baseline, we treated the number of categories of violence exposure variable as binary (one vs. two or more) because relatively few children were exposed to more than two categories. For 6-month re-exposure, we included the total number of exposure incidents over the past 6 months and a categorical variable of re-exposure to different types of violence (no repeat exposure, reexposed to one category, reexposed to two or more categories). The models assume that the impact of the protective factors was the same after controlling for the severity of the violence exposure. We tested models with both violence exposure variables as interaction terms with each of the protective factors and conducted the analyses using age as a continuous variable rather than a categorical variable and found similar results. Because the practical results were similar, these results are not shown.

RESULTS

We first assessed the stability of the measures over time by examining the correlation between baseline and 6-month protective factor and outcome measure scores. Baseline and 6-month follow-up correlations were 0.68 for assertion, 0.65 for self-control, and 0.72 for parenting stress. For the outcome measures, the correlation between baseline and the 6-month follow-up score was 0.71 for PTSD symptoms and 0.69 for behavior problems. Overall, these correlations indicate that there was a strong relationship between baseline and 6-month follow-up scores on all of the measures.

We next examined the relationship between the protective factors and changes in outcomes at 6 months using hierarchical linear regression models for the two outcome variables (child's PTSD symptoms and behavior problems) as described earlier.

PTSD Symptoms

Table 3 presents the results of the four models showing the association between changes in protective factors and change in PTSD symptoms between baseline and 6 months. In Models 1–3 that test each protective factor independently, the results indicate that, after controlling for baseline demographics and violence exposure, change in the protective factor

TABLE 3. Effects of the Protective Factor Measures on 6-Month Changes in PTSD Symptoms

Model Parameters	Model 1 Estimate (*SE*)	Model 2 Estimate (*SE*)	Model 3 Estimate (*SE*)	Full Model Estimate (*SE*)
Baseline PTSD symptoms	−0.42 (0.07)*	−0.43 (0.05)*	−0.41 (0.07)*	−0.42 (0.06)*
No. of incidents of baseline violence exposure	−0.02 (0.03)	−0.04 (0.03)	−0.01 (0.03)	−0.03 (0.03)
No. of categories of baseline violence exposure[a]				
2 or more	0.42 (1.59)	1.44 (1.48)	1.53 (1.67)	1.48 (1.53)
No. of incidents of violence re-exposure	−0.04 (0.04)	−0.05 (0.04)	−0.07 (0.03)	−0.06 (0.04)
No. of categories of violence re-exposure[b]				
1	3.19 (1.26)*	2.44 (1.39)	2.30 (1.14)	2.09 (1.23)
2 or more	2.56 (1.48)	1.42 (1.39)	1.26 (1.45)	1.12 (1.50)
Protective Factors				
Assertion (baseline)	−1.12 (0.84)			0.04 (0.78)
Assertion (change)	−4.09 (0.83)*			−1.38 (0.88)
Self-control (baseline)		−1.96 (0.53)*		−1.55 (0.83)
Self-control (change)		−5.45 (0.84)*		−3.94 (0.95)*
Parent–child relationship (baseline)			0.07 (0.04)	0.03 (0.05)
Parent–child relationship (change)			0.17 (0.04)*	0.09 (0.04)*
Control Variables				
Child's age (1 = 6–12 years of age)	1.66 (1.93)	1.89 (1.79)	1.84 (1.82)	1.56 (1.71)
Child's gender (1 = female)	0.78 (1.01)	1.39 (0.94)	0.89 (0.89)	1.46 (0.93)
Child's race/ethnicity[c]				

(continued)

TABLE 3. Effects of the Protective Factor Measures on 6-Month Changes in PTSD Symptoms

Model Parameters	Model 1 Estimate (*SE*)	Model 2 Estimate (*SE*)	Model 3 Estimate (*SE*)	Full Model Estimate (*SE*)
Black	−2.55 (1.47)	−0.91 (1.68)	−1.96 (1.69)	−1.37 (1.56)
Hispanic	−0.15 (2.43)	2.13 (2.47)	1.04 (2.47)	1.63 (2.43)
Other	−2.80 (1.77)	−0.98 (1.65)	−1.54 (1.79)	−1.17 (1.56)
Caregiver's age	−0.05 (0.05)	−0.03 (0.06)	−0.06 (0.05)	−0.02 (0.06)
Family income level[d]				
$5,000–$10,000	1.31 (1.46)	2.23 (1.50)	1.56 (1.63)	2.02 (1.52)
$10,001–$15,000	1.94 (1.69)	1.61 (1.63)	1.23 (1.93)	1.79 (1.59)
$15,001–$20,000	−1.85 (1.76)	−1.84 (2.05)	−2.86 (2.57)	−1.53 (2.18)
$20,001–$30,000	−2.86 (1.49)	−2.26 (1.32)	−2.30 (1.45)	−2.22 (1.33)
More than $30,000	−2.06 (1.39)	−0.44 (1.34)	−1.46 (1.48)	−0.52 (1.27)
Number of children in household	−0.41 (0.50)	−0.63 (0.43)	−0.36 (0.39)	−0.54 (0.40)
Sample size	251	251	249	249
R^2	0.3525	0.4242	0.3599	0.4472

Note. PTSD = posttraumatic stress disorder; *SE* = standard error.
[a]The omitted category for this set of variables is 1 category of violence exposure.
[b]The omitted category for this set of variables is no categories of violence re-exposure.
[c]The omitted category for this set of variables is White.
[d]The omitted category for this set of variables is less than $5,000.
*$p < .05$.

over time is associated with changes in PTSD symptoms. In the model testing self-control, the baseline level of self-control is also significant. In the full model, changes in self-control and the quality of the parent–child relationship were both related to changes in PTSD symptoms from baseline to the 6-month follow-up assessment, controlling for baseline demographics and violence exposure. Children with increasing levels of self-control over time had significantly improved with fewer PTSD symptoms at follow-up, whereas those with poor quality parent–child relationships, as indicated by increasing levels of parenting stress, had significantly worsened with more PTSD symptoms. The analysis did not reveal a statistically significant relationship between the baseline levels of these two protective factors and changes in PTSD symptoms. Furthermore, the full model results indicate that the child's assertion was not predictive of changes in PTSD symptoms when examined together with the other protective factors under study. The baseline level of PTSD symptoms was significantly related to change in PTSD symptoms from baseline to follow-up in all models. Higher levels of baseline PTSD symptoms were associated with less change in these symptoms over time. None of the violence exposure measures were related to changes in PTSD symptoms in the final full model.

Behavior Problems

Table 4 provides the results for the behavior problems outcome. The results indicate that when the protective factors were included independently, both the baseline level and the change over time were statistically significant in predicting changes in behavior problems, controlling for baseline demographics and violence exposure. However, in the full model, self-control and the quality of the parent–child relationship emerged as having the strongest relationship with changes in behavior problems. For self-control, higher levels of self-control at baseline were associated with decreasing behavior problems over time, and increasing self-control between baseline and follow-up was associated with fewer behavior problems at follow-up. For the quality of the parent–child relationship, poor quality relationships, as indicated by higher levels of parenting stress at baseline, were associated with increasing behavior problems over time, and increasing parental stress over time was related to more behavior problems at follow-up. Furthermore, the full model results indicate that the child's assertion was not predictive of changes in behavior problems. As expected, behavior problem scores at baseline were significantly related to behavior problem scores at the 6-month follow-up, with more baseline behavior problems associated with less change in behavior problems over time. Baseline violence exposure and violence re-exposure also predicted 6-month change in behavior problems. At baseline, the number of lifetime exposure incidents was significantly related to 6-month behavior problem changes but not in the expected direction. That is, greater lifetime exposure to violence incidents at baseline was associated with improvement in child behavior by 6 months, holding other factors constant. At follow-up, the number of categories of violence re-exposure was predictive of changes in behavior problems. Children experiencing more categories of violence re-exposure had increased behavior problems compared to those without re-exposure.

DISCUSSION

The goal of these analyses was to explore the relationship between certain protective factors and changes in child outcomes over a 6-month period in a sample of children exposed to violence. The study also tested whether violence re-exposure contributed to the changes

TABLE 4. Effects of the Protective Factor Measures on 6-Month Changes in Behavior Problems

Model Parameters	Model 1 Estimate (*SE*)	Model 2 Estimate (*SE*)	Model 3 Estimate (*SE*)	Full Model Estimate (*SE*)
Baseline behavior problems	−0.44 (0.03)*	−0.47 (0.05)*	−0.49 (0.07)*	−0.51 (0.08)*
No. of lifetime incidents of baseline violence exposure	−0.00 (0.00)	−0.01 (0.00)*	−0.00 (0.00)	−0.00 (0.00)*
No. of categories of baseline violence exposure[a]				
2 or more	0.05 (0.07)	0.12 (0.06)	0.14 (0.06)	0.13 (0.07)
No. of incidents of violence re-exposure	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
No. of categories of violence re-exposure[b]				
1	0.37 (0.10)*	0.36 (0.10)*	0.29 (0.10)*	0.30 (0.11)*
2 or more	0.36 (0.12)*	0.35 (0.11)*	0.25 (0.12)*	0.28 (0.11)*
Protective Factors				
Assertion (baseline)	−0.21 (0.05)*			−0.02 (0.05)
Assertion (change)	−0.32 (0.09)*			−0.10 (0.08)
Self-control (baseline)		−0.26 (0.08)*		−0.18 (0.07)*
Self-control (change)		−0.42 (0.04)*		−0.29 (0.05)*
Parent–child relationship (baseline)			0.01 (0.00)*	0.01 (0.00)*
Parent–child relationship (change)			0.01 (0.00)*	0.01 (0.00)*
Control Variables				
Child's age	0.08 (0.08)	0.19 (0.09)	0.11 (0.10)	0.15 (0.09)
Child's gender (1 = Female)	−0.17 (0.08)	−0.11 (0.06)	−0.13 (0.07)	−0.09 (0.07)

Child's race/ethnicity[c]				
Black	−0.16 (0.08)	−0.09 (0.11)	−0.08 (0.10)	−0.09 (0.10)
Hispanic	−0.16 (0.09)	−0.05 (0.09)	−0.10 (0.10)	−0.09 (0.10)
Other	−0.20 (0.09)*	−0.10 (0.08)	−0.08 (0.10)	−0.09 (0.08)
Caregiver's age	−0.01 (0.00)	−0.01 (0.00)	−0.01 (0.00)	−0.01 (0.00)
Family income level[d]				
$5,000–$10,000	0.21 (0.11)	0.25 (0.09)*	0.22 (0.09)*	0.25 (0.09)*
$10,001–$15,000	0.30 (0.19)	0.24 (0.17)	0.25 (0.19)	0.28 (0.17)
$15,001–$20,000	−0.06 (0.11)	−0.04 (0.11)	−0.08 (0.10)	−0.02 (0.09)
$20,001–$30,000	0.07 (0.09)	0.05 (0.09)	0.15 (0.08)	0.11 (0.08)
More than $30,000	0.16 (0.11)	0.17 (0.09)	0.23 (0.10)*	0.22 (0.08)*
Number of children in household	0.00 (0.02)	−0.00 (0.02)	0.01 (0.03)	0.00 (0.03)
Sample size	300	300	297	297
R^2	0.4203	0.4999	0.4592	0.5361

Note. *SE* = standard error.
[a]The omitted category for this set of variables is 1 category of violence exposure.
[b]The omitted category for this set of variables is no categories of violence re-exposure.
[c]The omitted category for this set of variables is White.
[d]The omitted category for this set of variables is less than $5,000.
*$p < .05$.

in outcomes over time. The analyses used pooled control/comparison group data from the 15 Safe Start Promising Approaches sites, creating a sample of families engaged in a system of care related to children's exposure to violence but not taking part in specific Safe Start interventions under study. We implemented hierarchical linear regression models to assess the relationship between protective factors and changes in child outcomes over 6 months.

The demographics of the sample indicate that this is a population at high risk of poor outcomes. Most of the families (80%) have incomes less than $30,000 with 21% reporting family incomes of less than $5,000. Violence exposure was prevalent in the sample. Children had been exposed to an average of just more than 13 instances of violence in their lifetime. The violence was ongoing as well with an average of 3.7 re-exposure incidents for these children over a 6-month period.

We found that baseline levels of self-control were significantly related to changes in behavior problems and PTSD symptoms, with higher levels of self-control associated with decreasing behavior problems and PTSD symptoms. We also explored the relationship between changes in protective factors and changes in outcomes controlling for violence re-exposure. Change in child self-control was independently related to changes in both child PTSD symptoms and behavior problems.

The measure we used to assess child self-control contained items that tap the child's ability to control emotions and react appropriately to challenging situations. It makes sense that caregivers noticing improvements in their child's self-control may also report improvements in behavior problems, because older children who have gained the ability to control their tempers or younger children who can follow rules will likely display fewer behavior problems over time. Similarly, children who are able to control internal emotions and processes may display fewer PTSD symptoms.

In contrast, we found that baseline levels of assertion were significantly related to changes in behavior problems but not to changes in PTSD symptoms over time. At baseline, higher levels of assertion were associated with decreasing behavior problems only when the change in assertion over time was significantly related to changes in both behavior problems and PTSD symptoms. Thus, when examined independently, it appears that a child's increased self-confidence has a positive impact both behaviorally and emotionally.

We also examined the relationship between the quality of the parent–child relationship (as measured by the parenting stress level) and outcomes. We found that baseline levels of parenting stress were significantly related to changes in behavior problems but not to changes in PTSD symptoms. At baseline, higher levels of parenting stress were associated with increasing behavior problems. Furthermore, the change in parental stress over time was significantly related to both outcomes.

However, in the full model testing all three protective factors simultaneously, we found that both the baseline level and the change in child self-control remained significantly related to changes in both PTSD symptoms and behavior problems over time—as did changes in parenting stress. However, there was no relationship remaining between assertion and outcomes. Children with improved levels of self-control, or whose parents reported improvements in parenting stress, were more likely to improve over time in terms of behavior problems and PTSD when taking into account the other protective factors. Caregivers' reports of their own parenting stress may be related to their reports of child symptoms in a reciprocal relationship. It could be that increasing parenting stress works to worsen PTSD symptoms or behavior problems; or parents may become more stressed as behavior or symptoms worsen. It appears that assertion may be less important than the other protective factors in predicting changes over time for the particular outcomes under study.

Finally, we examined whether re-exposure to violence had an effect on changes in outcomes. At the 6-month follow-up, approximately one-half of the children had been reexposed to some type of violence. Our analysis found a relationship between violence re-exposure and behavior problems but not PTSD symptoms. Children who had more categories of re-exposure were more likely to have increased behavior problems than children with no re-exposure. These findings suggest that by addressing violence exposure, intervention programs may also improve child-level behavioral outcomes.

Overall, these findings suggest that, when the family is identified as needing services related to the child's violence exposure, the child's self-control and the quality of the parent–child relationship can make a difference for subsequent improvement in the child's behavior problems. Furthermore, these results suggest that an intervention that focuses on bolstering child self-control and improving the quality of the parent–child relationship by reducing parenting stress may result in positive adjustment. It appears that these two variables may be more important than child assertion in predicting changes over time.

LIMITATIONS

This study had several limitations. Variation in age, gender, race/ethnicity, socioeconomic status, violence exposure, and other individual characteristics confound the examination of protective factors and their relationship to outcomes. Although we controlled for some of these, there may be other factors that would contribute to understanding the relationship between protective factors and subsequent adjustment. Furthermore, measuring protective factors is difficult because many existing measures have been validated for use with a narrow age range or have not been validated as having appropriate sensitivity for use in longitudinal studies. Even when using modern psychometric techniques, we were only able to include children aged 1–12 years. Thus, we cannot speculate on whether how these findings may represent other children. Finally, this study relies on caregiver report for all of the measures. Although measures relying on caregiver report are common in the literature and often make such studies feasible to conduct (Acosta et al., 2012), caregiver report may also contain bias, including underestimation and denial. It is possible that data from other sources could prove to be useful in understanding the linkage between protective factors and outcomes over time, such as teacher reports, child self-reports, and observational measures.

Overall, these findings show that, when examined together, two of the three protective factors (self-control and parenting stress) were predictive of changes in child outcomes (PTSD and behavior problems) over time. If these findings can be replicated in other samples, the findings suggest that intervening to bolster these protective factors could improve outcomes for children exposed to violence. With the ongoing development of prevention and intervention programs that focus on building protective factors, this study contributes to a better understanding of specific protective factors that may be targeted as promising for improving outcomes for children exposed to violence.

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Correspondence regarding this article should be directed to Dana Schultz, RAND Corporation, 4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213. E-mail: dschultz@rand.org