

# A defensive mindset: A pattern of social information processing that develops early and predicts life course outcomes

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## Abstract

The hypothesis was tested that some children develop a defensive mindset that subsumes individual social information processing (SIP) steps, grows from early experiences, and guides long-term outcomes. In Study 1 (Fast Track [FT]), 463 age-5 children (45% girls; 43% Black) were first assessed in 1991 and followed through age 32 (83% retention). In Study 2 (Child Development Project [CDP]), 585 age-5 children (48% girls, 17% Black) were first assessed in 1987 and followed through age 34 (78% retention). In both studies, measures were collected of early adverse experiences, defensive mindset and SIP, and adult outcomes. Across both studies, a robust latent construct of school-age defensive mindset was validated empirically (comparative fit index = .99 in each study) and found to mediate the impact of early child abuse (38% in FT and 29% in CDP of total effect) and peer social rejection (14% in FT and 7% in CDP of total effect) on adult incarceration.

One of the most compelling hypotheses in the study of social development is that children acquire stable personality characteristics early in life that guide their social behavior and predict major outcomes over the life course. The “trait” approach to personality posits static individual differences in characteristics such as extraversion and temperament that are inherent from birth and life-lasting (Goldberg, 1993). We propose a complementary, dynamic approach to personality development that postulates that pivotal early life experiences lead children to acquire patterns of approaching and responding to particular situations, which then guide their behavior in those situations, such as Mischel's observation that children differ in their willingness to delay the gratification of eating a marshmallow (Cervone & Mischel, 2002). Mischel and Shoda

(1995) suggested these situation-dependent approach-and-response processing patterns become stable personality-like characteristics. In this tradition, Dweck (1999, 2006) has shown that children acquire a mindset to frame an academic problem situation as either an instance to display their fixed intelligence or an opportunity for learning. Individual differences in this “growth” versus “fixed” mindset, in turn, predict a wide array of important outcomes across the lifespan. As another example, French and Chang (2016) proposed a “global” versus “local” mindset to understand individual resource allocation decision-making.

We postulate a novel acquired mindset pattern, defensive processing, that draws on but is distinct from social information processing (SIP) theory, which is among the most empirically supported accounts of children's aggressive behavior problems (Crick & Dodge, 1994; Dodge & Pettit, 2003). We assert that some children experience threats in early life that lead them to approach and respond to potentially harmful situations in a generally guarded, defensive manner (in contrast with an open, non-defensive style) that is exhibited in specific information-processing

**Abbreviations:** AS, Adolescent Stories; CBCL, Child Behavior Checklist; CDP, Child Development Project; DSM, Diagnostic and Statistical Manual of Mental Disorders; FT, Fast Track; HAB, Hostile attributional bias; HIWC, Home Interview with Child; SEM, structural equation model; SES, socioeconomic status; SIP, social information processing; STI, sexually transmitted infection; TOCA-R, Teacher Observation of Classroom Adaptation-Revised; WDYT, What Do You Think.

action steps (e.g., being hypervigilant to threat, making a hostile attribution about a peer's intention, accessing retaliatory aggressive responses from memory, and evaluating retaliatory aggression as leading to desired outcomes). Although this defensive mindset may be adaptive in truly threatening circumstances, when applied to more neutral contexts, we assert it disrupts social interactions and leads to long-term maladaptive outcomes. In the current manuscript, we pose and test four hypotheses about the defensive processing mindset.

## SIP patterns are nested within a broader construct of defensive mindset

Many studies have shown that SIP patterns can be measured reliably, become stable in childhood, and predict children's aggressive behavior problems. We briefly review SIP studies that assume that each processing pattern is an independent pattern, even though they share the same antecedents and lead to similar outcomes. In the current study, we assert a novel hypothesis that these distinct patterns are nested within a broader latent construct called a defensive mindset.

Building on Simon's Nobel Prize-winning model of how humans process information in real time to solve cognitive problems, Dodge et al. (1986; Crick & Dodge, 1994) articulated a model of how children process information in social situations. In response to a challenging social stimulus, such as an ambiguous provocation by a peer (e.g., being bumped from behind while standing in line, being teased, being ignored), a child responds in real time through a sequence of mental processes that start with attention to the stimulus and move to interpretation of the stimulus, generation of possible behavioral responses to the stimulus, and evaluation of those responses as likely leading to desired outcomes. These steps occur in real time, usually outside of awareness and without executive control, although developing executive control over these processes is a part of social development and a goal of some intervention programs.

## Sequential processing steps in social behavior

### *Step 1: Hypervigilant selective attention and emotion recognition*

The first step of processing in response to a social stimulus is to attend to a social cue and the emotions of the other person. Gible et al. (2016) and Gouze (1987) found that selective attention to hostile rather than neutral cues are correlated with, and predicts growth in, aggressive behavior. Ribordy et al. (1988) measured emotion recognition by presenting scenarios depicting different emotional displays. Acland et al. (2021) found that poor negative emotion recognition is associated with concurrent higher overt aggression, although not with future

overt aggression. Shackman et al. (2007) found that an early experience of being abused predicts children's over-attention to others' anger cues, and this pattern of hypervigilance mediates the relation between the prior experience of abuse and the child's anxious behavior.

### *Step 2: Hostile attributional bias*

As cues are encoded, they get interpreted and given meaning. Hostile attributional bias (HAB) is the tendency to interpret peers' intentions as hostile, particularly in ambiguous situations. Meta-analyses (Guerra & Huesmann, 2004; Orobio De Castro et al., 2002) show highly robust associations between HAB and aggressive behavior. Addressing concern about possible reverse causal effects, Weiss et al. (1992) found that HAB predicts growth in aggressive behavior even controlling for prior aggressive behavior. Dodge et al. (2015) found the relation between HAB and future aggressive behavior problems is universal: it held in each of 12 diverse cultures worldwide. Dodge et al. (1990) found that an early experience of being physically abused predicts the development of HAB, which mediates the relation between early abuse and later aggressive behavior. Dodge et al. (2003) found that experiences of social rejection by peers also predict the development of HAB, which mediates the impact of rejection on aggressive behavior.

### *Step 3: Reactive aggressive response generation*

Once a cue is interpreted, a child accesses possible responses from memory, often called problem-solving. Matthys and Lochman (2005) summarized studies showing that aggressive children generate more aggressive responses and fewer competent responses than other children. As with previous SIP steps, aggressive response generation can be predicted from prior experiences of abuse and mediates the impact of abuse on aggressive behavior outcomes (Weiss et al., 1992).

### *Step 4: Positive aggressive response evaluation*

The next step of processing is evaluation of accessed responses and decision-making. Fontaine et al. (2009) used cross-lagged models to support the hypothesis that a response evaluation pattern favoring retaliatory aggression leads to growth in aggressive behavior over time. Early experiences of abuse and rejection predict aggressive response evaluation patterns, which mediate future aggressive outcomes (Weiss et al., 1992).

## Construct validity of each processing step

Dodge et al. (2002) used multidimensional, latent-construct, confirmatory factor analyses to support the within-construct internal consistency and cross-construct discriminant validity of each of these four distinct SIP patterns. Dodge et al. (1986) and Weiss et al. (1992) found that measures of each SIP step provide unique increments

in predicting future aggressive behavior, validating distinct processes. Finally, measures of these four SIP steps mediate the relation between early adverse experiences of physical abuse (Pettit et al., 2010) and peer social rejection (Dodge et al., 2003) and later aggressive behavior.

## Defensive mindset as an organizing framework

Although the SIP model has provided a useful guide for empirical inquiry and intervention development (e.g., Conduct Problems Prevention Research Group, 2019), two problems await resolution. First, theorists note that in order for a prior experience to guide SIP during a future social interaction, the initial experience must be encoded in memory in a way that organizes future cognitive processes in response to social stimuli. Bargh et al. (1995) suggested that memories are stored through latent knowledge structures, such as normative beliefs about aggression (Guerra et al., 1995), schemas, and scripts (Huesmann, 2017). Troop-Gordon et al. (2018) showed that a child's pre-existing negative social schemas and beliefs, measured through a scale of negative beliefs about peers developed by Rabiner et al. (1993), were positively correlated with aggressive behavior; furthermore, negative peer beliefs were positively correlated with a longer latency before attending to amused peers in a provocation vignette, meaning that children with negative peer beliefs were not attending to any specific feature of the peer interaction. Finally, negative peer beliefs moderated the relation between time before fixating on a peer provocateur and aggressive behavior, such that time to fixation on a peer provocateur was most strongly related to aggressive behavior among children with strong negative peer beliefs. Thus, the current SIP model does not

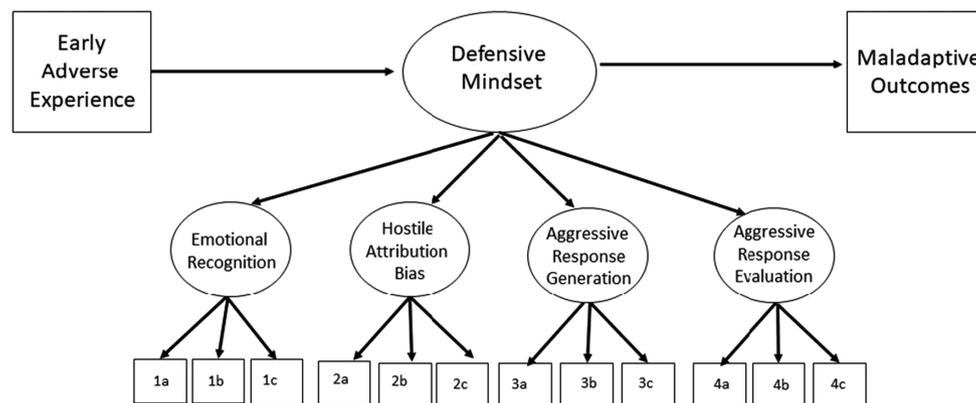
yet incorporate a mechanism through which early events are stored in memory to guide SIP.

Second, empirical findings that measures of each SIP step operate similarly beckon for an integrative construct: the empirical literature suggests that distinct SIP patterns share common antecedents, are (modestly) positively correlated with each other, and lead to common outcomes. An integrative theory is needed that allows for both unique SIP patterns and a higher-order construct that unifies these processes.

We integrate these concepts by proposing a higher-order organizing construct that we call a defensive mindset, depicted in Figure 1. We hypothesize that a defensive mindset develops from early adverse experiences, guides SIP, and mediates long-term outcomes. Imagine a young child who has been the object of physical maltreatment from parents and/or chronic rejection by peers. We suggest the human species has evolved so that this child adapts and survives by developing a defensive mindset that minimizes short-term harm by leading the child to become hyper-vigilant in attending to cues that might signal further threat, become "perceptually ready" to attribute threat to ambiguous cues, develop a repertoire of reactive aggressive and self-protective responses that can be called from memory quickly, and learn to evaluate reactive aggression as morally acceptable and likely to lead to desired outcomes.

## Defensive mindset and SIP as nested processes

The concept of a defensive mindset does not reduce SIP patterns merely to indicators of this latent construct; rather, we hypothesize that each SIP pattern has its own psychometric validity (and some unique antecedents and consequences) but also serves as an indicator of a higher-order latent



**FIGURE 1** Hypothesized model of the role of a defensive mindset in the development of maladaptive adult outcomes for Fast Track analysis. *Note:* Variables in squares are observed, and those in circles are latent. The measurement model shows the relations between latent variables and their indicators. The first latent variable was created by emotional recognition measured annually at Grade K, 1, and 2. The second latent variable was created by hostile attribution assessed annually at Grade K to 8 except Grade 7. The third latent variable was built by aggressive response generation evaluated annually at Grade K to 8 except Grade 7. The fourth latent variable was made by aggressive response evaluation measured annually at Grade K to 8 except Grade 7. The fifth latent variable, defensive mindset, was measured by the four latent variables described above. All latent variables are continuous. Model fit statistics: (1)  $\chi^2(2) = 4.49, p = .11$ ; (2) comparative fit index = .993; (3) root mean square error of approximation = .052; and (4) standardized root mean squared residual = .021

construct of a defensive mindset. As depicted in [Figure 1](#), we hypothesize nested latent constructs that we test in the current study through confirmatory factor analyses.

### **A defensive mindset predicts maladaptive outcomes in adulthood**

Social information processing patterns have been shown to predict growth in aggressive behavior problems during childhood, but less is known about the long-term consequences. Although defensive SIP patterns may be adaptive in the short-term threatening context, unfortunately for the child, a defensive mindset exacerbates rather than defuses interpersonal conflicts and prevents a child from experiencing new opportunities and friendships. We assert that the child's psychological growth is stunted, and the child becomes unhappy, without understanding her or his own role in that development. Thus, we hypothesize a defensive mindset will lead to increased violent behavior over time and will cascade into other problem outcomes in adulthood, including school dropout and government dependency, internalizing mental health problems and unhappiness, poor social relationships, and poor health.

We hypothesize that a defensive mindset will predict increasingly severe forms of violence across the life course, including incarceration for violent behavior, externalizing psychopathology, and violence in romantic relationships. This hypothesis follows directly from previous studies showing that early defensive patterns of processing social information predict growth in aggressive behavior in mid-childhood (Weiss et al., 1992) and adolescence (Pettit et al., 2010).

Because a defensive mindset limits a child's opportunities to develop friendships, thwarts exposure to enriching experiences, and impairs long-term planning, we assert a secondary hypothesis that this mindset will cascade to predict maladaptive outcomes in at least four additional domains of adult life. First, it will predict educational failure (high school dropout and limited college) and economic self-insufficiency in the form of low income and dependence on government support (e.g., food stamps, welfare). Second, it will lead to internalizing mental health problems of anxiety and depression, substance abuse, and unhappiness. Third, it will lead to problems in interpersonal relationships, including a lower likelihood of marrying and having close friendships, as well as more victimization by others. Finally, it will predict poor health indicated by sedentary lifestyle, obesity, sexually transmitted infections (STIs), and reliance on pain-killing medication.

### **A defensive mindset is a product of early adverse experiences**

We hypothesize that a defensive mindset grows from adverse early life events with parents and peers.

### **Physical abuse**

We imagine a young child being chronically physically abused by parents and assert that this child will adapt for survival by developing a defensive mindset. The experience of physical abuse in the first several years of life is known to predict a child's aggressive behavior problems during childhood (Dodge et al., 1990) and a wide variety of maladaptive outcomes in health, education, and well-being in adolescence (Lansford et al., 2002) and young adulthood (Petersen et al., 2014). Petersen et al. (2014) propose "cascading consequences" as the mechanism through which early abuse has reverberating impacts by altering brain development, attention, executive function, and hostile attributional biases, which then mediate long-term effects.

Dodge et al. (1990) found that the experience of physical maltreatment by a parent in the first 5 years of life predicts the development of defensive SIP patterns measured at kindergarten matriculation, which, in turn, mediate the impact of abuse on the development of the child's aggressive behavior later in kindergarten.

### **Peer social rejection**

We imagine a young child being chronically rejected from play by peers and assert that this child, too, will develop a defensive mindset. The experience of peer social rejection in early school years is known to increase aggressive behavior problems in childhood (Bagwell et al., 1998) and maladaptive outcomes in adulthood (Parker & Asher, 1987). Social-cognitive processes have been proposed as mediators of these relations.

Dodge et al. (2003) found the experience of social rejection by peers in school predicts the development of defensive SIP patterns, which mediate the impact of rejection on growth in aggressive behavior problems during early elementary school. Lansford et al. (2010) identified a cascading sequence in which peer rejection leads to defensive SIP patterns, which exacerbate a child's aggressive behavior and increase peer rejection in middle school. Pettit et al. (2010) found this sequence extends into late adolescence.

### **A defensive mindset mediates the impact of adverse events on adult outcomes**

A defensive mindset develops as a short-term adaptive response to threat from adults or peers but leads to problematic aggressive behavior when the mindset leads a child to respond defensively in new situations when the threat is not real, or an aggressive response is dysfunctional. A pernicious characteristic of a defensive mindset is that it is very difficult to extinguish: these patterns lead others to be annoyed and to respond aggressively, which reinforces the child's original world

view that a defensive mindset is necessary. The mindset becomes a self-fulfilling prophecy in later outcomes. Masten and Cicchetti (2010) described how early minor problems can grow into larger problems and generalize to problems in other domains over the life course through developmental cascades that reinforce behavior and limit alternate opportunities. Because SIP patterns acquired through early life experiences have been found to play a mediating role in a developmental cascade toward adolescent violence (Dodge et al., 2008) and substance abuse (Dodge et al., 2009), we hypothesize that a defensive mindset will mediate an array of maladaptive life course outcomes.

## The current study

We follow children from age 5 through age 34 in each of two independent samples, the FT Project (FT; CPPRG, 1999) and the Child Development Project (CDP; Dodge et al., 1990) to test these hypotheses and to evaluate the generalizability of findings across diverse populations. The FT sample represents a high-risk population living in low-income, disadvantaged circumstances in four communities. The CDP sample represents a more middle-class population in three communities. Each study includes measures of early adverse experiences of physical maltreatment and peer-nominated social rejection and childhood defensive mindset and SIP. Because the particular instruments vary between studies, the analyses should be viewed as a conceptual, rather than literal, replication that tests the generalizability of the model. Each study includes identical measures of adult outcomes that were assessed through coordinated protocols.

Although the hypotheses are grounded in past empirical findings and theory, the tests in Study 1 must be considered exploratory. Given the empirical support for all four hypotheses reported below in Study 1, the tests in Study 2 should be considered confirmatory.

## STUDY 1: FAST TRACK

### Methods

#### Participants

Participants included a population-representative sample of 5-year-old children from each of four high-risk communities. Sampling over-represented high-risk aggressive children who were members of a control group in an intervention experiment, but no intervention children were included in the current study.

Based on high neighborhood crime and poverty rates, 55 at-risk elementary schools were selected from four sites (Durham, NC; Nashville, TN; rural Pennsylvania;

and Seattle, WA). Within each site, schools were matched on demographics, and one of each pair was randomly assigned to intervention and the other to control. Intervention-assigned schools and children are not included in the current study and are not discussed any further. The normative/community sample was selected to represent kindergarteners in the control schools in high-risk communities. In 1991, teachers evaluated all kindergarteners in 27 control schools for conduct problems using the Teacher Observation of Classroom Adaptation-Revised (TOCA-R) Authority Acceptance Scale (Werthamer-Larsson et al., 1991). Within each site, a stratified sample of about 100 children was selected based on race, sex, and decile of the TOCA-R score. A two-stage screening process was used to recruit high-risk aggressive children. First, problem behaviors at school were assessed using the TOCA-R scores. If a child scored in the top 40% within site, his/her parent was solicited over the phone and in-person to complete a 22-item instrument based on the Child Behavior Checklist (CBCL; Achenbach, 1991) to capture problem behaviors at home. An *early aggressive behavior problems score* was created by combining the standardized teacher and parent scores and re-standardizing within site. This score was used as a covariate in analyses. Other covariates included *date of adult interview*, *gender*, *race*, and *urbanicity* (to capture site variation, with Pennsylvania as the rural site).

Within site, study children were recruited in-person and over-the-phone until desired sample sizes were recruited. Among recruited families, 91% consented, yielding a sample of 463 (387 normative, 76 high-risk aggressive; 45% girls; 52% European American, 43% African American, 5% other ethnicity; 58% living in single-parent families; Mean Hollingshead socioeconomic status [SES] score = 26.31,  $SD = 13.28$  [range = 5–66]), indicating this sample was relatively disadvantaged and high-risk. Because children at high risk for adult violence are intentionally over-represented in this already high-risk sample, probability weights were constructed as the inverse of the probability of being selected into the sample. Within each site, the population of kindergarteners from study schools was divided into 57 risk groups based on the combined teacher and parent screening scores. Within each risk-group, probability weights were calculated as the inverse of the sampling fraction (risk-group sample size/risk-group kindergarten population). All analyses adjust for these weights.

Present analyses included data from assessments when the participants were ages 6, 7, 8, 9, 10, 11, 14, and 32. Data were available for 83% of the still-living original participants at age 32. These participants did not differ from those without age-32 data on year-1 SES, single-parent status, or ethnicity/urban status but had lower initial-risk screen scores and were more likely to be female. Covariates were included to account for these differences.

## Procedures and measures

### *Early adversity*

*Physical abuse.* At child age 5, mothers and fathers completed face-to-face interviews about the child's problem behaviors, techniques they and their partners used to address these behaviors, and details about physical punishment used by each parent. Interviewers then privately rated the probability that the child had been physically abused between the ages of 0 and 5 on a 5-point scale (extremely unlikely, probably not, suspected/possible, probably occurred, and authorities involved, based on the criterion of having bruises or marks that lasted more than 24 h). The agreement between ratings of abuse by the interviewer and an independent observer (made on 10% of interviews) was .90 ( $\kappa = .56$ ; Dodge et al., 1995). Dodge et al. (1995) reported the correlation between mother and father scores for this measure was .65, and the combined score across parents and eras was reliable ( $\alpha = .72$ ). *Physical abuse* was coded 1 if, based on either parent's report, the interviewer rated the likelihood of physical abuse as suspected/possible, probably occurred, or authorities involved, and 0 otherwise. 12.8% of the sample was scored as having experienced physical abuse in the first 5 years of life.

*Peer social rejection.* Sociometric interviews following the protocol described by Coie et al. (1982) were conducted in all classrooms when children were in grades 1, 2, and 3 (ages 6, 7, and 8). Interviews were conducted individually and orally. Children viewed a class roster of pictures for grades 1 and 2 and names for grade 3, and named up to three peers they especially liked and up to three peers they especially disliked. A social preference score was created by taking the standardized difference between the standardized like-most nomination score and the standardized dislike-most nomination score. Children met criteria for being rejected by peers if their social preference score was  $<1$ , like-most score was  $>0$ , and like-least score was  $>0$ . Based on these criteria, 17.9%, 15.1%, and 15.4% of all children were rejected by peers in first, second, and third grade, respectively. We constructed a variable reflecting the proportion of non-missing years a child was rejected by peers ( $M = 0.17$ ,  $SD = 0.31$ , range = 0–1).

### *Early aggressive behavior problems*

Kindergarten teachers rated each child's behavior problems using the 10-item Authority Acceptance scale of the TOCA-R (Werthamer-Larsson et al., 1991), which describes aggressive and oppositional behaviors (i.e., fighting, teasing, disobedience). Parents rated their child's behavior problems at home, using a 24-item measure drawn from the aggression scales of the CBCL (Achenbach, 1991), the Revised Problem Behavior Checklist (Quay & Peterson, 1987), and other items generated by the investigators (for further details, see

Lochman & CPPRG, 1995). Children's scores on teacher and parent ratings of behavior problems were standardized within site and averaged to yield a score for *early aggressive behavior problems*.

### *SIP Assessment*

During the summer at ages 6, 7, 8, 9, 10, 11, and 14, children were tested privately using age-appropriate instruments. Scores were generated for each of four SIP steps at each age of assessment, and each age-specific score became an indicator in confirmatory factor analyses and structural equation models (SEMs). Although other measures of social cognition were also collected (e.g., goals, accuracy of interpretations), they were less germane to a defensive mindset or were not collected reliably across ages and were excluded. All instruments, response options, and scoring details can be found at [fasttrackproject.org](http://fasttrackproject.org).

*Step 1: Emotion recognition.* At ages 6, 7, and 8, each child was presented with each of 16 cartoon vignettes, with four depicting each emotion: happiness, sadness, anger, and fear (Ribordy et al., 1988). For each vignette, the child was asked to select which emotion had been portrayed from pictorial representations of the four expressions. Responses were coded as incorrect or correct. The largest proportion of errors consisted of over-interpretations of anger. Deficient cue-encoding was measured as the proportion of 16 emotions identified incorrectly ( $\alpha = .68, .65, \text{ and } .53$  at ages 6–8, respectively).

*Step 2: Hostile attributional bias.* At ages 6, 7, 8, and 9, each child was presented with eight drawings depicting situations in which the child was asked to imagine attempting to enter a peer group unsuccessfully or being provoked ambiguously by a peer (Home Interview with Child [HIWC]; CPPRG, 1991). After the interviewer described the situation, the child was asked why the peers acted the way they did. The child's free response was coded as non-hostile, do not know, or hostile. Interviewers were trained to over 90% agreement. A hostile attribution score was computed as the proportion of the eight situations for which the child made a hostile attribution about the peers ( $\alpha = .77, .69, .70, \text{ and } .70$  at ages 6, 7, 8, and 9, respectively).

At ages 10 and 11, the child was asked to imagine being the child in each of six hypothetical stories, three for which a peer ambiguously provoked the child and three for which an adult authority figure ambiguously causes a bad outcome for the child (What Do You Think [WDYT]; CPPRG, 1995). After each story, the child was presented with a statement proposing the peer had acted with hostile intent, and the child was asked to rate on a 5-point scale how definitely (from No, definitely not; to Yes, definitely) the child had acted in that manner. The child was then presented with a statement proposing the peer had acted

with benign intent or accidentally, and the child was asked to make the same 5-point likelihood rating. The response for benign intent was subtracted from the response for hostile intent to yield a net hostile intent response. A hostile attribution score was calculated as the mean response score across the six stories ( $\alpha = .54$  and  $.53$  at ages 10 and 11, respectively).

At age 14, the child was presented each of six hypothetical situations in which the child experiences a provocation as a result of a peer's ambiguous behavior (Adolescent Stories [AS]; CPPRG, 1991). For each situation, the child rated how likely the peer had acted with hostile intent (on a 5-point scale, from not at all likely to very likely). A HAB score was calculated by averaging responses across six stories ( $\alpha = .71$ ).

*Step 3: Reactive aggressive response generation.* The HIWC also assessed aggressive response generation. For each story, the interviewer asked what he/she would do in response, which the interviewer was trained to code as “don't know,” “do nothing,” “ask why/ask again,” “make a command,” “threaten adult punishment or make a threat,” or “retaliate/be aggressive”. Interviewers were trained to over 90% agreement. An aggressive response generation score was created as the proportion of responses that were coded as threatening punishment or retaliate aggressively ( $\alpha = .84, .78, .72$ , and  $.68$  at ages 6, 7, 8, and 9, respectively).

For the WDYT instrument at ages 10 and 11, the child was also asked an open-ended question regarding how he/she would react in this situation. The interviewer coded the response into one of eight categories (aggressive, assertive/competent, authority-punish, authority-intervene, passive/avoidant, self-control, other, irrelevant/unable to respond). An aggressive response generation score was created by calculating the proportion of responses that were coded as aggressive or punishment by authority ( $\alpha = .67$  and  $.71$ , at ages 10 and 11, respectively).

For the AS instrument at age 14, the child was also asked to select a behavioral response to the provocation from a competent behavior or a reactive aggressive behavior. An aggressive response generation score was created as the proportion of stories for which adolescent selected the aggressive response ( $\alpha = .65$ ).

*Step 4: Positive evaluation of reactive aggressive responses.* At ages 8 and 9, the interviewer presented each of eight stories in which the child was asked to imagine being thwarted or provoked by a peer (Things that Happen to Me; CPPRG, 1993). The interviewer then asked the child to imagine engaging in an assertive response and asked the child whether it would achieve each of three outcomes: a selfish instrumental outcome, a friendship with the other child outcome, and a general social acceptance by peers outcome. Each response was scored 0 for no and 1 for yes, and the three responses

were summed to yield a total positive evaluation of assertiveness score. Then the interviewer asked the child to imagine engaging in an aggressive response and asked the same questions. Responses were scored 0 or 1 and summed. The order of presentation of assertive and aggressive responses was randomly varied across stories. Fontaine et al. (2009) were among the first to report positive correlations between endorsement of assertive responses and endorsement of aggressive responses, reflecting a general disposition to endorse any response (or not) among elementary school children that diminishes only in adolescence. Because scores for endorsement of assertive and aggressive responses were positively correlated ( $r = .31$ ) in this dataset, the summed score evaluating the assertive response was subtracted from the summed score evaluating the aggressive response. A highly reliable score for net positive evaluation of reactive aggression was calculated by summing the difference scores across all stories ( $\alpha = .90$  and  $.87$  at ages 8 and 9, respectively).

For the WDYT instrument at ages 10 and 11, for each of the six stories described above, the child was asked to imagine engaging in: (1) a nonaggressive response; and (2) a reactively aggressive response (presented in random order). For each response, the child was asked how likely the behavior would be effective in getting (a) a desired instrumental outcome; and (b) peer acceptance/respect (each coded from 1 = yes, definitely, to 5 = no, definitely not). Responses were later reverse-coded so that higher scores indicated greater endorsement. For each story and outcome, the score evaluating the nonaggressive response was subtracted from the score evaluating the aggressive response. A score for net positive evaluation of reactive aggression (higher = greater endorsement of aggression) was calculated by summing the difference scores across stories and outcomes ( $\alpha = .76$  and  $.78$ , at ages 10 and 11, respectively).

#### *Adult outcomes*

At age 32, we measured 20 maladjustment outcomes (4 in each of 5 domains). The sample sizes and grand means and standard deviations (or proportions) are listed in Table 1.

*Violent behavior.* Four outcomes indicated aggressive and violent behavior. First, *ever incarcerated* was the self-report of whether the respondent had ever spent time in jail or prison. Second, *days incarcerated* was the self-reported number of days incarcerated over one's lifetime. Third, the Adult Self Report (Achenbach & Rescorla, 2003; each item coded 0 = not true to 2 = true), was completed by the participant. Thirty-five items were summed to yield a raw total score for *externalizing problems* ( $\alpha = .93$ ). Fourth, *assault in romantic relationships* was a self-report of ever committing violence toward a romantic partner in the past year, based on five items including pushing/slapping, hitting, beating up, threatening with a weapon,

and using a weapon against a partner. A “yes” response to any item led to a score of 1 (otherwise, 0).

*Education and economic self-sufficiency.* Four outcomes indicated education and economic self-sufficiency. First, participants reported whether they had earned a *high school diploma or general education diploma*. Second, participants reported whether they had completed a *college degree*. Third, participants reported their current annual *household income* using a 12-point scale (1 = less than \$5000 to 12 = more than \$150,000). Fourth, participants reported whether they had received any *government assistance* (including TANF, WIC, food stamps, housing assistance, or disability benefits) in the last 12 months.

*Mental health and well-being.* Four outcomes indicated mental health and well-being. First, the participant completed the adult Self Report (Achenbach & Rescorla, 2003; each item coded 0 = not true to 2 = true). Thirty-nine items were summed to yield a raw total score for *internalizing problems* ( $\alpha = .94$ ). Second, a diagnosis of any *mental disorder* was based on responses to the Adult Self Report and recommended criteria Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM–V) criterion for indicators for meeting the clinical range for the following DSM diagnoses: antisocial personality, attention deficit/hyperactivity, avoidant personality, somatic, anxiety, and depression disorders (Achenbach & Rescorla, 2003). Third, a continuous scale capturing *happiness* was created by summing across 16 Adult Self Report items (Achenbach & Rescorla, 2003), such as “I feel happy” and “I enjoy being with people” ( $\alpha = .87$ ). Fourth, an indicator of *problematic substance abuse* (0 = no, 1 = yes) was created by scoring whether the participant met criteria for high level of alcohol problems by the Alcohol Use Disorders Identification Test (total score >15; World Health Organization, 2001); possible cannabis use disorder by the Cannabis Use Disorder Identification Test (total score >12; Adamson et al., 2010); or any use of illegal drugs (excluding cannabis) or abuse of prescription drugs (Drug Abuse Screening Test; Skinner, 1982).

*Social relationships.* Four variables indicated social relationship outcomes. First, the respondent reported if he/she was *married* (0 = no, 1 = yes). Second, the respondent reported whether he/she had a *close friend* (not a parent or romantic partner; 0 = no, 1 = yes). Third, the respondent responded to 11 items (each coded on a 5-point scale of increasing positive quality) about the *quality of peer experiences* ( $\alpha = .76$ ). Fourth, *victimization by peers* (Zelli, 1992) was a measure of how much the participant observed others aggressing toward the self in one's social world (seven items, each coded as 0 = never to 3 = frequently; e.g., “People are mean to me more than they are to others;” “People get angry at me more than they do at others;”  $\alpha = .92$ ).

*Health.* Four outcomes indicated health. First, participants completed the Short-Form Health Survey (Ware & Sherbourne, 1992; 4 items: overall health, presence of chronic conditions, magnitude of bodily pain, and presence of physical health issues that infringe upon work;  $\alpha = .70$ ), to yield a *general health* index. Second, participants' self-reported height and weight were used to create a measure of *obesity* defined as body mass index >30 (0 = not obese, 1 = obese). Third, respondents reported whether they had ever had a STI, coded 1 if yes and 0 otherwise. Fourth, respondents reported whether they had chronic pain and had taken *prescription painkillers* (Fentanyl, Oxycodone, Hydrocodone, or Buprenorphine) during the past year, coded 1 if any yes, 0 otherwise.

## Results

### Descriptive statistics and data-analytic plan

Missing data varied across variables. Little's Test (Little & Rubin, 2014) indicated that cases were not missing completely at random ( $p < .05$ ); thus, we employed multiple imputation to adjust for missing data. A two-stage procedure was applied to calculate the number of imputations needed, following Von Hippel (2020). One hundred imputed data files were created for this study and subject to statistical tests, and estimates were merged (Garson, 2015; Little & Rubin, 2014). Means, standard deviations, and bivariate correlations among indicator variables within each SIP step are included in Tables S1 and S2.

Structural equation models were measured to test hypotheses. Measurement model statistics tested empirical fit of the data to the hypothesized nested model, for which each of four SIP latent constructs indicated a fifth, higher-order latent construct of a defensive mindset. A five-latent-variable SEM model was applied (Figure 1). The first latent variable was indicated by three variables measuring hyper-vigilant selective attention. The second latent variable was indicated by four HIWC variables and three WDYT variables measuring HAB. The third latent variable was indicated by seven variables measuring aggressive response generation. The fourth latent variable was indicated by four variables measuring positive aggressive response evaluation. We then introduced the fifth latent variable, overall defensive mindset, which was indicated by the four latent SIP variables.

Similar model coefficients tested the relations between early adverse experiences and the development of a defensive mindset, controlling for gender, race, and age at adult interview. We tested mediation of the relation between early adversity and adult outcomes through the intervening development of a defensive mindset by fitting a single-mediator path

TABLE 1 Prediction of adult outcomes from early defensive processing: Fast Track and Child Development Project

Measures	Fast Track (N = 463)					Child Development Project (N = 585)				
	n	M (SD)/n (%)	Range	Reg coef. w/ out controls	Model coefficient (SE) w/controls	n	M (SD)/n (%)	Range	Reg coef. w/ out controls	Model coefficient (SE) w/controls
Crime and violent behavior										
Ever incarcerated	374	119 (31.8%)	0-1	0.41 <sup>***</sup>	0.33 (0.15) <sup>**</sup>	449	72 (16.0%)	0-1	0.31 <sup>***</sup>	0.08 (0.13)
Mean number days incarcerated	374	395.3 (1148.4)	0-5840	0.79 <sup>***</sup>	0.58 (0.21) <sup>***</sup>	449	102.8 (532.7)	0-6935	0.27 <sup>***</sup>	0.09 (0.02) <sup>***</sup>
Externalizing	376	9.8 (8.8)	0-51	1.15 <sup>***</sup>	0.68 (0.56)	448	8.8 (7.8)	0-42	1.33 <sup>***</sup>	0.79 (0.38) <sup>***</sup>
Any romantic partner violence	326	36 (11.0%)	0-1	0.01	-0.03 (0.23)	400	38 (9.5%)	0-1	0.19	0.14 (0.16)
Economic well-being										
High school graduation	367	309 (84.2%)	0-1	-0.59 <sup>***</sup>	-0.52 (0.18) <sup>***</sup>	449	423 (94.2%)	0-1	-0.27 <sup>*</sup>	0.05 (0.21)
College degree	367	69 (18.8%)	0-1	-0.89 <sup>***</sup>	-0.78 (0.18) <sup>***</sup>	449	197 (43.9%)	0-1	-0.52 <sup>***</sup>	-0.26 (0.12) <sup>**</sup>
Current income	369	6.0 (3.4)	1-12	-1.31 <sup>***</sup>	-0.85 (0.17) <sup>***</sup>	441	8.1 (3.0)	1-12	-0.74 <sup>***</sup>	-0.37 (0.13) <sup>***</sup>
Government assistance	372	134 (36.0%)	0-1	0.33 <sup>***</sup>	0.31 (0.14) <sup>**</sup>	445	81 (18.2%)	0-1	0.20 <sup>*</sup>	0.03 (0.13)
Mental health										
Internalizing	376	14.0 (12.1)	0-67	0.61	0.69 (0.72)	448	13.6 (11.5)	0-56	1.15 <sup>**</sup>	0.85 (0.57)
Any DSM diagnosis	376	77 (20.5%)	0-1	0.07	0.19 (0.21)	448	76 (17.0%)	0-1	0.08 <sup>*</sup>	0.07 (0.14)
Happiness	376	25.0 (5.2)	5-32	-0.28	-0.29 (0.31)	449	25.0 (5.4)	8-32	-0.33	-0.24 (0.27)
Substance abuse	374	52 (13.9%)	0-1	-0.01	-0.13 (0.20)	447	59 (13.2%)	0-1	0.14	0.04 (0.15)
Social relationships										
Married	375	171 (45.6%)	0-1	-0.41 <sup>***</sup>	-0.16 (0.13)	447	291 (65.1%)	0-1	-0.42 <sup>***</sup>	-0.32 (0.11) <sup>***</sup>
Peer experience score	249	3.7 (0.7)	1-5	-0.04	-0.05 (0.05)	335	3.7 (0.7)	1-5	-0.02	-0.01 (0.04)
Victimization by others	375	3.3 (4.74)	0-21	.23 <sup>**</sup>	0.09 (0.07)	447	2.3 (3.8)	0-17	0.25 <sup>***</sup>	.16 (0.03) <sup>**</sup>
Has a close friend	376	250 (66.5%)	0-1	-0.05 <sup>***</sup>	-0.03 (0.03)	446	335 (75.1%)	0-1	-0.02	-0.01 (0.02)
General health and well-being										
General Health Index	376	40 (74.1%)	0-1	-0.01	-0.01 (0.01)	449	40 (73.3%)	0-1	0.00	0.01 (0.01)
Obese	367	134 (36.5%)	0-1	0.16	0.06 (0.14)	438	140 (32.0%)	0-1	0.22 <sup>**</sup>	0.16 (0.11)
Ever STD	364	84 (23.1%)	0-1	0.23	0.18 (0.16)	440	68 (15.5%)	0-1	0.16	0.04 (0.14)
Prescribed painkillers	373	129 (34.6%)	0-1	0.15	0.10 (0.13)	443	99 (22.3%)	0-1	0.19 <sup>*</sup>	0.16 (0.12)

Note: Probability weights applied for Fast Track analysis. Regression coefficient with processing indicates bivariate correlation between defensive processing and outcome. Model coefficient adjusts for gender, race, age at adult interview, and early aggressive behavior problems.

Abbreviation: DSM, Diagnostic and Statistical Manual of Mental Disorders.

\* $p < .10$ ; \*\* $p < .05$ ; \*\*\* $p < .01$ .

model within structural equation modeling. We report the total effect, indirect effect, and Sobel test of the probability of the mediation effect. We recognize the merit of testing mediation through confidence intervals with bootstrap but would be impeded if we apply 5000 replicates for each of 100 imputed datasets for each of 40 variables ( $n = 20,000,000$  tests). Given our plan to test replication in an independent dataset from the CDP, we concluded the Sobel test is sufficient.

### Hypothesis 1: Defensive processing patterns in childhood have strong psychometric support

We tested the hypothesis of a nested pattern of defensive mindset and SIP, for which each of four processing steps (i.e., hyper-vigilance, HAB, reactive aggressive response generation, and positive aggressive response evaluation) was reliably indicated by relevant variables and the higher-order latent construct of defensive mindset was reliably indicated by the four latent processing-step constructs.

Kline (2011) recommends testing fit of the data for a hypothesized latent construct model by using multiple statistics, with empirical support found if at least three of four criteria hold: (1) a non-significant chi-square test of model fit; (2) a comparative fit index (CFI)  $\geq .95$ ; (3) a root mean square error of approximation (RMSEA)  $\leq .06$ ; and (4) a standardized root mean squared residual (SRMR)  $\leq .08$ . Model fit statistics for all four tests supported the hypothesized nested model: (1) a non-significant chi-square test of model fit was found:  $\chi^2(2) = 4.49, p = .11$ ; (2) a CFI  $> .95$  was found: CFI = .993; (3) an RMSEA  $< .06$  was found: RMSEA = .052; and (4) an SRMR  $< .08$  was found: SRMR = .021.

We conclude that the hypothesized nested model with a higher-order latent construct of a defensive mindset has strong psychometric support.

### Hypothesis 2: A defensive mindset predicts violent behavior and other adult outcomes

Generalized linear regression model coefficients tested the relations between the defensive mindset latent construct and each adult outcome, controlling for gender, race, age at adult interview in months, and early aggressive behavior problems (MacKinnon et al., 2007). Model coefficients with standard errors and significance levels are listed on the left side of Table 1.

#### Violent behavior

Table 1 shows that, as hypothesized, a defensive mindset in childhood was significantly associated with a higher

probability of incarceration as an adult and a larger mean number of days of incarceration, both in models without covariates and in models controlling for early aggressive behavior problems and other covariates. A defensive mindset also predicted higher externalizing psychopathology scores, but not when covariates were controlled. A defensive mindset did not significantly predict romantic partner violence.

For descriptive purposes only, the manifest defensive mindset score was divided into quartiles. Figure 2 depicts the relation between quartile of defensive mindset and the probability of adult incarceration. It can be seen the relation is linear and strong: the highest quartile group is over 2 times as likely as the lowest quartile group to have ever been incarcerated.

#### Education and economic self-sufficiency

A higher defensive mindset latent score was significantly associated with all four outcomes in this domain: not receiving a high school diploma, not receiving a college diploma, lower current income, and higher dependency on government assistance, both when covariates were not controlled and when they were controlled. The highest quartile group in the manifest defensive mindset score was over four times as likely as the lowest quartile group to not have a high school diploma (.35 vs. .08), 17 times less likely to earn a college degree (.02 vs. .35), and over twice as likely to be public-dependent than the lowest quartile group (.47 vs. .23). The highest quartile group had a mean current income of \$16,250, in contrast with \$35,600 for the lowest quartile group.

#### Mental health and well-being

A defensive mindset was not associated with mental health or well-being outcomes.

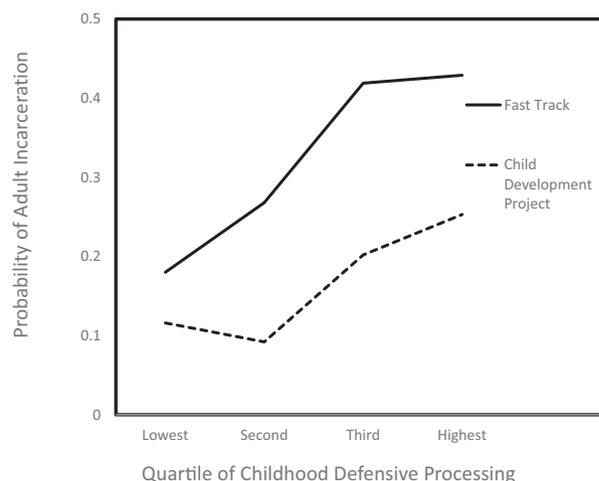


FIGURE 2 Relation between early defensive processing and the probability of adult incarceration: Fast Track and the Child Development Project

### Social relationships

A higher defensive mindset was significantly associated with a lower probability of being married, a lower probability of having a close friend, and more victimization by others, but these associations became non-significant when covariates were controlled.

### Health

A higher defensive mindset was not associated with any health outcome.

## Hypothesis 3: Early adverse events predict the development of a defensive mindset

As shown in Table 2, the experience of physical abuse in the first 5 years of life significantly predicted later acquisition of a defensive mindset, and this relation held even after including covariates. Figure 3 shows that abused children had a standardized mean defensive processing score that was 0.31 *SDs* higher than for non-abused children.

Table 2 shows the experience of peer social rejection also significantly predicted a later defensive mindset, even after covariates were controlled. Figure 3 shows that children who had experienced one or more years of peer rejection had a mean defensive mindset score that was 0.44 *SDs* higher than for children who had never experienced peer rejection.

## Hypothesis 4: A defensive mindset mediates the impact of early adversity on adult outcomes

### Physical abuse

Table 3 reports models testing the mediating effect of a defensive mindset on the relation between early physical abuse and each of 20 adult outcomes. Defensive mindset significantly or marginally mediated the effect of physical abuse on the primary outcome of days of adult incarceration, on two of four violent behavior outcomes, on all four economic well-being outcomes, and on one outcome in social relationships.

### Peer social rejection

Table 4 shows that defensive mindset significantly or marginally mediated the effect of childhood peer rejection on the primary outcome of days of adult incarceration, on one of four violent outcomes, and on three economic well-being outcomes.

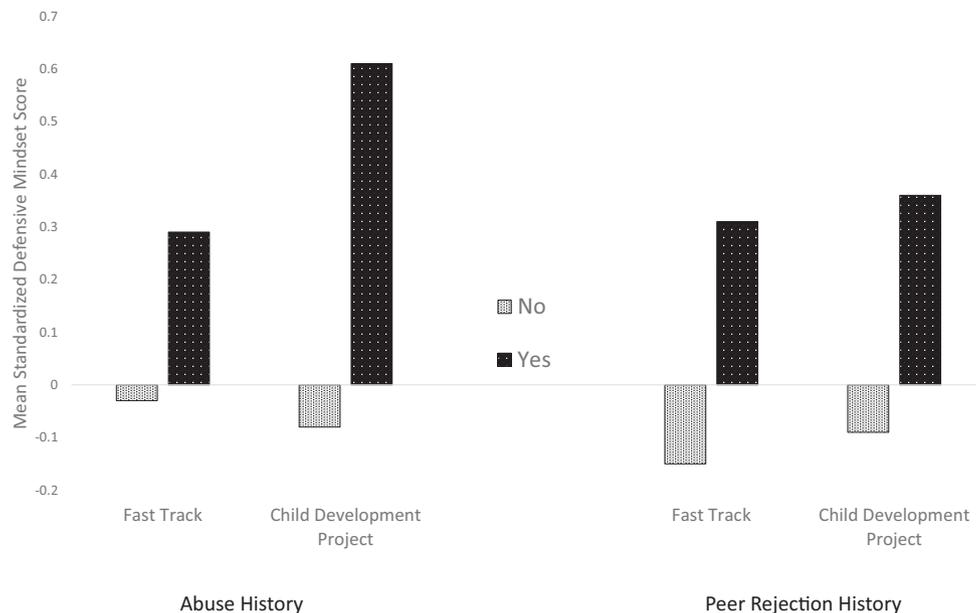
## Discussion

The findings, in general, provide support for each hypothesis. First, measurement models validated a defensive mindset as a higher-order latent construct that

**TABLE 2** Prediction of defensive processing from early physical abuse and peer social rejection: Fast Track and Child Development Project

Measure	Fast Track (N = 463)				Child Development Project (N = 585)				
	<i>n</i>	<i>M (SD)/n (%)</i>	Range	Model coefficient w/defensive processing	<i>n</i>	<i>M (SD)/n (%)</i>	Range	Model Coefficient w/defensive processing	Model coefficient (SE) controlling for early aggressive behavior
Early adversity									
Physical abuse	460	59 (12.8%)	0–1	0.59***	581	69 (11.9%)	0–1	0.64***	0.47 (0.12)***
Peer rejection	420	0.17 (0.30)	0–1	0.60***	581	0.11 (0.23)	0–1	1.02***	0.80 (0.18)***

Note: Probability weights applied for Fast Track analysis. Multiple imputation (*m* = 100 for Fast Track; *m* = 200 for Child Development Project). Models control for gender, race, and age at adult interview. \*\*\**p* < .05; \*\*\*\**p* < .001.



**FIGURE 3** Defensive mindset scores for non-abused and abused children and non-rejected and ever-rejected children: Fast Track and Child Development Project

guides each of four validated steps of SIP. Second, a higher defensive mindset significantly predicted more violent adult outcomes (ever incarcerated, days of incarceration, and externalizing psychopathology), even when controlling for early aggressive behavior problems. A higher defensive mindset also predicted poorer outcomes in education and economic well-being and social relationships. Third, experiences of child physical abuse and peer social rejection were associated with the development of a defensive mindset; and fourth, a defensive mindset partially mediated the relation between early experiences and the primary adult outcomes of days of adult incarceration.

These findings go beyond any previous study in at least three ways. First, the defensive mindset construct is novel to the field as a way to bring together discrete patterns of SIP. It is asserted as the child's way of representing in memory adverse experiences so that they guide the child to approach-and-respond to future social encounters in a defensive manner. Second, the current study followed 5-year-old children farther into mid-adulthood than any previous study of social cognition, demonstrating the lifelong impact of a defensive mindset in childhood. Third, the current study showed that acquisition of a defensive mindset is a psychological mechanism through which early adverse experiences have an impact on violent outcomes in adulthood, as well as cascading to outcomes in education and economic well-being.

A major limit of this study is the need to test generalization to other populations and other measurement instruments. Study 2 offers an independent test of the same hypotheses but with more average-risk community samples and different (but overlapping) measures of SIP.

## STUDY 2: CHILD DEVELOPMENT PROJECT

The goal of this study was to test the same hypotheses as in Study 1 with a very different sample of children and different measures of defensive processing, but similarly followed from preschool through mid-adulthood. Whereas the FT sample intentionally recruited families from high-risk communities, the CDP followed a population-representative sample in three middle-class communities through age 34 with identical outcome variables. We did not conceptualize Study 2 as a direct attempt at replication but rather a test of whether the findings would replicate with different measures and generalize to a different population and context.

### Methods

#### Participants

The CDP (Dodge et al., 1990) recruited a sample from three geographic areas: Knoxville, TN; Nashville, TN; and Bloomington, IN. Parents were approached at random during kindergarten registration in 1987 and 1988 and asked to participate in a longitudinal study of child development; approximately 75% of those approached agreed to participate ( $n = 585$ ; 48% girls; 81% European Americans, 17% African Americans, 2% other ethnicity; 29% lived in single-parent households; Mean Hollingshead SES score = 39.53,  $SD = 14.01$  [range = 8–66]). Kindergarteners were selected to represent a range of socioeconomic backgrounds in each community. The

**TABLE 3** Structural models testing mediation of the relation between physical abuse and adult outcomes by defensive mindset

Adulthood outcomes	Fast Track ( <i>N</i> = 463)			Child Development Project ( <i>N</i> = 585)		
	Total effect	Indirect effect	<i>p</i>	Total effect	Indirect effect	<i>p</i>
Crime and violent behavior						
Ever incarcerated	0.16	0.06	.08	0.17	0.01	.57
Mean number days incarcerated	0.16	0.06	.01	0.07	0.02	.00
Externalizing	0.38	0.17	.16	0.55	0.13	.05
Any romantic partner violence	-0.08	0.00	.92	0.20	0.02	.48
Economic well-being						
High school graduation	-0.04	-0.11	.01	-0.23	0.01	.70
College degree	-0.19	-0.16	.01	-0.25	-0.04	.06
Current income	-0.21	-0.18	.00	-0.47	-0.06	.02
Government assistance	-0.02	0.07	.06	0.2	0.00	.82
Mental health						
Any DSM diagnosis	0.51	0.19	.30	0.99	0.17	.25
Internalizing	0.60	0.14	.33	1.17	0.13	.16
Happiness	-0.32	-0.06	.35	-0.48	-0.04	.36
Substance abuse	0.00	-0.03	.50	0.04	0.01	.70
Social relationships						
Married	-0.02	-0.03	.25	-0.15	-0.05	.02
Peer experience score	-0.08	-0.01	.48	-0.03	0.00	.97
Victimization by others	-0.06	0.03	.08	0.06	0.03	.00
Has a close friend	-0.01	-0.01	.25	-0.03	0.00	.68
General health and well-being						
General Health Index	-0.01	0.00	.60	-0.03	0.00	.59
Obese	-0.03	0.01	.63	0.04	0.02	.19
Ever STD	0.03	0.03	.28	0.18	0.00	.88
Prescribed painkillers	-0.01	0.03	.34	-0.13	0.03	.11

Note: Probability weights applied for Fast Track analysis. Multiple imputation ( $m = 100$  for Fast Track;  $m = 200$  for Child Development Project). Models control for gender, race, and age at adult interview. *p*-Value comes from Sobel test and represents the test of the indirect effect.

Abbreviation: DSM, Diagnostic and Statistical Manual of Mental Disorders.

present analyses included data from assessments when the participants were ages 5, 6, 7, 8, 13, 16, and 34.

At age 34, data were available from 78% of the still-living original participants. Participants who provided data at age 34 did not differ from those without age 34 data on time-1 variables, except they scored higher on year 1 SES and were more likely to be female.

## Procedures and measures

### Early adversity

**Physical abuse.** Like the FT study, when children were 5 years old, parents completed face-to-face interviews about children's problem behaviors, techniques parents used to address these behaviors, and details about physical punishment used by parents. Interviewers then privately rated the probability that the child was physically abused between the ages of 1 and 4 on a 5-point scale (extremely unlikely, probably not, suspected/

possible, probably occurred, and authorities involved, based on the criterion of having bruises or marks that lasted more than 24 h). They repeated scoring for the age period 4–5. *Physical abuse* was coded 1 if, based on the parent's report, the interviewer rated the likelihood of physical abuse as suspected/possible, probably occurred, or authorities involved for either age period, and 0 otherwise (Dodge et al., 1990), with 11.9% being classified as ever-abused.

**Peer social rejection.** Sociometric interviews following the protocol described by Coie et al. (1982) were conducted in all classrooms when children were in kindergarten and grades 1, 2, and 3 (ages 5–8). Interviews were conducted individually and orally. Children viewed a class roster, either of pictures or names depending on age, and named up to three peers they especially liked and up to three peers they especially disliked. A social preference score was created by taking the standardized difference between the standardized like most nomination score

**TABLE 4** Structural models testing mediation of the relation between peer social rejection and adult outcomes by defensive mindset

Adulthood outcomes	Fast Track ( <i>N</i> = 463)			Child Development Project ( <i>N</i> = 585)		
	Total effect	Indirect effect	<i>p</i>	Total effect	Indirect effect	<i>p</i>
<b>Crime and violent behavior</b>						
Ever incarcerated	0.25	0.03	.18	0.27	0.01	.63
Mean number days incarcerated	0.28	0.04	.04	0.29	0.02	.00
Externalizing	1.09	0.09	.26	1.47	0.12	.10
Any romantic partner violence	0.05	0.01	.79	0.29	0.02	.56
<b>Economic well-being</b>						
High school graduation	-0.48	-0.06	.07	-0.18	0.01	.82
College degree	-0.66	-0.10	.03	-0.27	-0.04	.08
Current income	-0.72	-0.11	.03	-0.53	-0.06	.03
Government assistance	0.33	0.04	.12	0.08	0.01	.70
<b>Mental health</b>						
Any DSM diagnosis	0.99	0.09	.32	1.34	0.34	.19
Internalizing	1.77	0.08	.41	1.65	0.14	.20
Happiness	-0.62	-0.03	.44	-0.7	-0.04	.46
Substance abuse	-0.03	-0.01	.62	-0.27	0.02	.55
<b>Social relationships</b>						
Married	0.05	-0.02	.24	-0.41	-0.05	.04
Peer experience score	-0.04	0.00	.49	-0.04	0.00	.96
Victimization by others	0.30	0.01	.19	0.13	0.03	.00
Has a close friend	-0.01	0.00	.24	-0.02	0.00	.53
<b>General health and well-being</b>						
General Health Index	-0.04	0.00	.68	0.00	0.00	.86
Obese	0.32	0.01	.72	0.11	0.02	.23
Ever STD	-0.27	0.02	.31	0.07	0.01	.82
Prescribed painkillers	0.29	0.01	.46	0.14	0.03	.21

Note: Probability weights applied for Fast Track analysis. Multiple imputation ( $m = 100$  for Fast Track;  $m = 200$  for Child Development Project). Models control for gender, race, and age at adult interview. *p*-Value comes from Sobel test and represents the test of the indirect effect.

Abbreviation: DSM, Diagnostic and Statistical Manual of Mental Disorders.

and the standardized dislike most nomination score. Children met criteria for being rejected by peers if their social preference score was  $<1$ , standardized like the most score was  $<0$ , and standardized like least score was  $>0$ . Based on these criteria, 11.7%, 9.3%, 10.1%, and 12.2% of children were rejected by peers in kindergarten, first, second, and third grade, respectively. We constructed a variable reflecting the proportion of non-missing years a child was rejected by peers. The mean was .11 ( $SD = 0.23$ ), with 23.9% being rejected in at least 1 year.

#### Early aggressive behavior problems

When children were 6, parents reported the frequency of each of 10 child aggressive problem behaviors, including breaking the rules, hitting other children, and destroying others' and own things (coded 0 = never to 4 = a lot).

#### SIP Assessment

All instruments, response options, and scoring details can be found at [childdevelopmentproject.net](http://childdevelopmentproject.net). Annually at ages 5, 6, 7, and 8, children were presented with 24

video vignettes that depicted situations in which child protagonists were rebuffed from entry into a peer group or encountered provocations from peers. In each vignette, children were told to imagine being the protagonist and were asked a series of questions after watching each vignette. Children also were presented with a series of eight cartoon pictures and brief verbal descriptions of the cartoon events and were asked questions to assess their processing of the cartoon stimuli. Inter-rater agreement alphas on all open-ended SIP questions described below were above .80 (Weiss et al., 1992).

At ages 13 and 16, participants were shown six video vignettes that started with a social interaction and culminated in an ambiguous provocation by peers or adults directed toward a protagonist adolescent. Participants were asked to imagine being the protagonist. Three vignettes depicted provocations that were relevant to both boys and girls and were presented to all participants; the remaining three vignettes were gender-specific. Each provocation segment was followed by two segments that presented an aggressive and a non-aggressive response

to the provocation, respectively. After each video segment, questions were asked to assess defensive processing; the questions differed in format for ages 13 and 16, but the constructs were the same. At age 13, adolescents were also shown nine drawings and presented with brief verbal descriptions of the drawn events and were asked questions to assess their processing of these stimuli. At age 16, after the video presentations were completed, participants were shown six illustrations one at a time as an audio-recorded narrator read a related story about a hypothetical provocation directed toward the participant. After each story, the narrator read several questions as the text of the questions appeared on the screen. Participants were asked to follow along in a printed version of the questions and circle their answers.

*Step 1: Hyper-vigilant selective attention.* The first step of processing was assessed by asking children to describe what happened in each video vignette. Responses were coded according to how much relevant information the child encoded (1 = a fully relevant response with clear attention to appropriate cues, 2 = a partially relevant response, 3 = a non-relevant response). Responses were averaged across vignettes to create a single encoding deficits score at each age ( $\alpha$  ranged from .66 to .91). Within-age scores were standardized.

*Step 2: Hostile attributional bias.* At ages 5, 6, 7, and 8, attributions were assessed by asking children why they thought the peers in 8 cartoon stories behaved as they did in ambiguous situations. At age 13, hostile attributions were assessed by asking why each of the events depicted in the video vignettes and drawn stories occurred. Each attribution was coded as non-hostile (0) or hostile (1), and a composite hostile attributions score was created by taking the proportion of the stories in which children interpreted the peers' intentions as hostile ( $\alpha = .88, .84, .80, .75,$  and  $.54$  within ages 5, 6, 7, 8, and 13, respectively). At age 16, hostile attributions were assessed through questions regarding the perceived intent of the provocateurs in the six videos and six stories (whether the actor intended to be mean) and how angry the participants would be if the depicted provocation happened to them ( $\alpha = .86$ ).

*Step 3: Reactive aggressive response generation.* Response generation was assessed by asking children how they would respond if each situation had happened to them. Each response was coded as being aggressive, withdrawn or inept, or assertive and competent. The proportions of aggressive responses generated for the video vignettes and cartoon stimuli were calculated, and scores were standardized and combined to create a single variable reflecting aggressive response generation ( $\alpha$  ranged from .61 to .71 at ages 5, 6, 7, 8, and 13). Instead of open-ended response generation questions used in the earlier assessments, at age 16 participants were asked to choose

between an aggressive and non-aggressive behavioral response to the provocations depicted in the videos and stories. This score reflected the proportion of times that participants chose aggressive responses to the video provocations and illustrated stories ( $\alpha = .75$ ).

*Step 4: Positive aggressive response evaluation.* After each video vignette, children were shown alternative strategies (competent, aggressive, and inept) for dealing with the situation. Response evaluation was assessed by asking children to rate whether each alternative strategy was a good or bad thing to say or do (1 = very bad, 2 = bad, 3 = good, 4 = very good). Aggressive response evaluation was scored as the average of this item following the aggressive response across the 24 vignettes ( $\alpha = .86, .82, .71,$  and  $.63$  at ages 5, 6, 7, and 8, respectively). At age 13, response evaluation was assessed by asking adolescents to respond on the same four-point scale whether aggressive responses to the video vignettes would lead to desired instrumental outcomes, how they would feel about themselves if they acted aggressively, and how much other people would like them if they acted aggressively. Scores were averaged across items and vignettes to form an age-13 response evaluation score ( $\alpha = .83$ ). At age 16, response evaluation was assessed through four questions that followed the videos depicting aggressive responses to the provocations. The questions concerned how good or bad the aggressive response was, how well one could achieve interpersonal goals by responding this way, how well one could achieve instrumental goals by acting this way, and how the participants would feel about themselves if they acted this way. These four variables were averaged across vignettes to create the response evaluation measure ( $\alpha = .88$ ).

#### *Adult outcomes*

Adult outcomes were measured identically as in the FT sample.

## Results and discussion

### Descriptive statistics and data-analytic plan

The data-analytic plan followed that of Study 1, including procedures for managing missing data (Von Hippel, 2020 algorithm indicated 200 imputations should be conducted for this study) and testing hypotheses by using a five-latent-variable SEM model (Figure 4). Means and standard deviations for each variable are presented in Table 1.

### Hypothesis 1: A defensive mindset in childhood has strong psychometric support

We used the same approach as in Study 1. Model fit statistics for all four tests supported the hypothesized

nested model: (1) a chi-square test of model fit was non-significant:  $\chi^2(2) = 3.25, p = .197$ ; (2) the CFI was  $>.95$ : CFI = .985; (3) the RMSEA was  $<.06$ : RMSEA = .033; and (4) the SRMR was  $<.08$ : SRMR = .020. We conclude the hypothesized nested model with a higher-order latent construct of a defensive mindset has strong psychometric support.

## Hypothesis 2: A defensive mindset predicts violent behavior and other adult outcomes

### *Violent behavior*

Table 1 shows that a defensive mindset in childhood was significantly associated with adult incarceration, the mean number of days incarcerated, and the externalizing psychopathology score, and the latter two relations were robust to inclusion of covariates. Figure 2 shows the relation between quartile of defensive processing (measured by manifest scores) and the probability of incarceration. Although the base rate of incarceration in the CDP is lower than that in the FT sample, the relation is the same. The highest quartile group is over two times as likely as the lowest group to have ever been incarcerated (.25 vs. .12). A defensive mindset did not predict romantic relationship violence.

### *Education and economic self-sufficiency*

A higher defensive mindset score was associated with not having a high school diploma, not having a college diploma, lower current income, and being a recipient of government assistance. Associations with not having a college degree and lower current income were robust to inclusion of covariates. The highest quartile

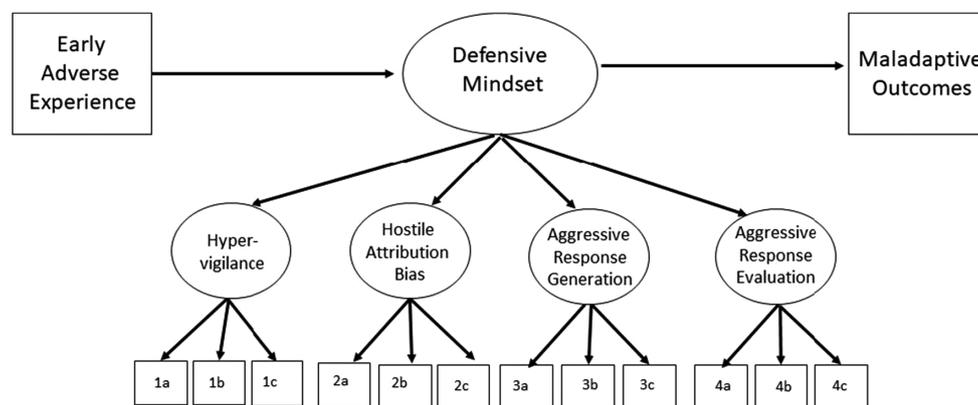
defensive mindset group had poorer outcomes than the lowest quartile group on each measure: highest and lowest quartile means were, respectively, .95 and .97 for high school diploma, .27 and .57 for college diploma, \$29,600 and \$49,700 for current income, and .23 and .12 for government dependency.

### *Mental health and well-being*

The defensive mindset score was associated with higher internalizing psychopathology, but the relation was not robust to controlling for covariates. Associations between a defensive mindset and any DSM diagnosis, happiness, and substance use were not significant. The highest quartile group in defensive mindset had poorer outcomes than the lowest quartile group on each measure: highest and lowest quartile means were, respectively, 15.7 and 11.2 for internalizing problems, .22 and .13 for any DSM diagnosis, 24.5 and 26.0 for happiness, and .18 and .11 for a substance abuse problem.

### *Social relationships*

The defensive mindset score was associated with a lower probability of being married and a higher score for victimization by others, both when covariates were not controlled and when they were controlled. The relations between a defensive mindset and having a close friend and the quality of peer experience were not significant. The highest quartile group had poorer outcomes than the lowest quartile group on each measure: highest and lowest quartile means were, respectively, .49 and .76 for being married, .77 and .75 for having a close friend, 3.89 and 1.60 for victimization by others and 3.71 and 3.76 for quality of peer experience.



**FIGURE 4** Hypothesized model of the role of a defensive mindset in the development of maladaptive adult outcomes for Child Development Project analysis. *Note:* Variables in squares are observed, and those in circles are latent. The measurement model shows the relations between latent variables and their indicators. The first latent variable was created by hypervigilant selective attention measured annually at age 5, 6, 7, 8, and 13. The second latent variable was created by hostile attribution assessed annually at age 5, 6, 7, 8, 13, and 16. The third latent variable was built by aggressive response generation evaluated annually at age 5, 6, 7, 8, 13, and 16. The fourth latent variable was made by aggressive response evaluation measured annually at age 5, 6, 7, 8, 13, and 16. The fifth latent variable, defensive mindset, was measured by the four latent variables described above. All the latent variables are continuous. Model fit statistics: (1)  $\chi^2(2) = 3.25, p = .197$ ; (2) comparative fit index = .985; (3) root mean square error of approximation = .033; and (4) standardized root mean squared residual = .020

### Health

The defensive mindset score was associated with a higher probability of adult obesity and a higher likelihood of taking prescribed painkillers. Neither relation held after controlling covariates. The relations between general health and having an STI were not significant. The highest quartile group in defensive mindset had poorer outcomes than the lowest quartile group on each measure: highest and lowest quartile means were, respectively, .71 and .75 for the general health index, .37 and .25 for obesity, .18 and .14 for an STD, and .28 and .17 for taking painkillers.

### Hypothesis 3: Early adverse events predict the development of a defensive mindset

As shown in [Table 2](#), the experience of physical abuse in the first 5 years of life significantly predicted later acquisition of a pattern of defensive processing, and this relation held even after including covariates. Abused children had a standardized mean defensive mindset score of .61, in contrast with  $-.08$  for the non-abused group, a difference of  $0.69$  *SDs*.

The experience of peer social rejection also significantly predicted later defensive mindset, even after controlling for covariates. Children who had experienced at least 1 year of peer rejection had a mean standardized defensive processing score of .37, in contrast with  $-.12$  for non-rejected children, a difference of  $0.49$  *SDs*.

### Hypothesis 4: A defensive mindset mediates the impact of early adversity on adult outcomes

#### Physical abuse

[Table 3](#) shows that the defensive mindset score significantly mediated the effect of physical abuse on the primary outcome of number of days incarcerated and significantly or marginally mediated the effect of physical abuse on two of the four violence variables, two of the four education and economic outcomes, none of the mental health outcomes, two of the four social relationships outcomes, and none of the four health outcomes.

#### Peer social rejection

[Table 4](#) shows that the defensive mindset score significantly or marginally mediated the effect of physical abuse on the primary outcome of the number of days incarcerated, on two of the four violence variables, two of the four education and economic outcomes, none of the mental health outcomes, two of the four social relationships outcomes, and none of the four health outcomes.

## GENERAL DISCUSSION

This study enhances our theoretical understanding of children's social cognition and our empirical

understanding of the etiology of chronic violent problems across the life course. Beyond previous understanding that aggressive behavior occurs through discrete mental processes in responding to social cues (e.g., hypervigilance, hostile attribution bias), the current study integrates a wide body of theory and empirical findings by proposing and empirically supporting the hypothesis that a major psychological mechanism for aggressive behavior occurs through the development of a higher-order construct called a defensive mindset.

A strength of this study is that the hypothesized empirical model was tested across two independent longitudinal samples of children assessed through two independent protocols to measure defensive mindset and then followed from early childhood into mid-adulthood at ages 32–34. The FT and CDP samples are community-representative but come from seven very different communities that include rural and urban areas, north and south geography, and white-majority and Black-majority communities. The FT sample is at higher risk for violence and government dependency, and the CDP sample is more representative of middle-class communities. The measures of SIP in the two studies are conceptually similar and based on the same theory but are operationally different and measured at different ages. Because the major findings held for both studies, the differences in the samples and measures enhance the generalizability of conclusions.

We tested and found support for each of four hypotheses.

### Hypothesis 1: We find replicated psychometric support for a defensive mindset

Findings from each study provided empirical support for a latent construct called defensive mindset that guides the processing of information in social situations, particularly, hyper-vigilant attention to threat cues and inaccurate recognition of others' emotions; hostile attributional biases; quick access of reactive aggressive behaviors from memory; and evaluation that reactive aggression is justified and is likely to lead to desired interpersonal, intrapersonal, and instrumental outcomes. These processes are modestly inter-related within each age beginning in kindergarten and coherently integrated through the latent construct of a defensive mindset.

Although prior studies have conceptualized and found empirical support for independent processing actions in response to social cues (Dodge et al., 1995; Dodge & Price, 1994), the current evidence also supports their aggregation into a personality-like mindset. It appears that both elemental and aggregated constructs have theoretical and empirical support. Elemental constructs explain momentary mental processes in specific situations that differ in type of

provocation, stressful context, and relationship between the child and provocateur. Elemental constructs also provide the most accurate prediction of aggressive behavior in a particular situation and the most exhaustive theoretical account of the processes leading from a stimulus to a behavioral response (Crick & Dodge, 1994).

The aggregation of individual mental operations into a less situation-dependent personality-like characteristic called defensive mindset affords a heuristically useful life course perspective that enables an understanding of how early adverse life events lead a child to behave aggressively in a wide variety of new situations and to experience maladaptive outcomes across the life course. The idea that knowledge structures act like acquired situation-dependent personality-like characteristics has a basis in personality theory as posited by Huesmann (2017) and Mischel (Cervone & Mischel, 2002; Mischel & Shoda, 1995). Dweck (1999, 2006) based the construct of a “growth mindset” on this theory. We contribute a novel mindset called defensive processing. This approach to personality theory complements traditional personality theories (e.g., the Big Five, Goldberg, 1993; temperament, Merenda, 1987; genetics, Eysenck, 1967) which postulate traits (such as extraversion and neuroticism) that guide behavior. We speculate that traits (particularly temperament) might interact with a defensive processing mindset to refine the prediction of outcomes, and that traits might influence the acquisition of mindsets in response to environmental experience.

The defensive mindset construct joins other knowledge structures that have been found to guide processing operations and behavior, including general understanding about emotions (Ribordy et al., 1988), normative beliefs about aggression (Huesmann & Guerra, 1997), beliefs about the base rate of social rejection (Downey et al., 1998), and negative conceptions about peers (Burks et al., 1999).

## **Hypothesis 2: A defensive mindset in childhood predicts serious violence and other outcomes in adulthood**

Although prior studies had shown the impact of individual components of SIP on growth in aggressive behavior during childhood (e.g., Weiss et al., 1992), the findings of this study show the impact of a defensive mindset on outcomes well into mid-adulthood, predicting serious outcomes of aggression and violent criminal behavior resulting in incarceration. These effects hold in both studies even when an early level of aggressive behavior problems is controlled. The effect sizes are relatively strong: children in the top quartile of defensive processing are more than twice as likely to be incarcerated in adulthood as are children in the bottom quartile of defensive processing.

These findings support the hypothesis that a defensive mindset when approaching social situations is a psychological mechanism that explains how individual acts of aggressive behavior occur and account for the growth of these problems across childhood into adulthood. The findings provide the longest temporal study of these processes yet: a defensive mindset assessed as early as age 5 predicts violent outcomes through age 34.

A developmental cascade model (Dodge et al., 2008; Masten & Cicchetti, 2010) posits that a defensive mindset could spread into problems in other domains across development because of the limits in friendship and other opportunities afforded children who approach situations defensively. Consider the child who has a defensive (rather than open) mindset entering novel social situations such as the beginning of a new grade in school. This child might not approach peers at the lunch table or on the playground because of the perceived risk to one's self-preservation. This child loses out on opportunities to learn what peers think, how peer interaction enhances one's own sense of worth, and concrete details about school-related activities such as the date of an upcoming test. This child thus cascades deeper into social isolation, which only reinforces the child's preconceptions about peer threat and precludes the child from disavowing her or his defensive mindset. The pernicious nature of defensive processing (Dodge, 2006) is resistant to intervention, self-reinforcing, and thus self-perpetuating.

We find robust evidence to support a cascade into life course failure in educational attainment, economic self-sufficiency, and social relationships. A defensive mindset robustly predicts lower earnings in adulthood and poorer quality adult social relationships. Not all empirical outcomes from an early defensive mindset were found to be robust across both studies. We are unsure whether the lack of consistency is due to the tenuousness of the relation or to reliable differences due to sample differences. The samples differ in SES and neighborhood risk characteristics, and these differences could account for some of the seeming inconsistencies. For example, the more middle-class CDP sample had a lower base rate of government dependency that could account for a lack of relation between defensive processing and this outcome.

We also note several consistent non-significant relations. An early defensive mindset was not related to adult romantic partner violence. It is not clear why this pattern holds, although we note that the measure of romantic partner violence requires the participant to have a romantic partner. In addition, we note we measured defensive mindset in peer and authority domains but not in a romantic domain. It is plausible that measures of defensive mindset in a romantic domain might be related to later romantic partner violence. We found that a defensive mindset predicted internalizing psychopathology and any mental disorder in the middle-class sample of the CDP (but not the FT sample), but these relations

were accounted for by a child's early aggressive behavior problems. Also, a defensive mindset was consistently not predictive of substance abuse problems, general health, and obesity. Given that Barefoot et al. (1987) had found that a measure related to defensive mindset from the Cook-Medley Hostility Scale predicted later mortality among adult lawyers, we were somewhat surprised that in our studies of defensive mindset measured in childhood the dynamic cascade that grows from a defensive mindset did not spread to health outcomes. Specifically, the mortality measure used by Barefoot et al. included all causes of mortality; perhaps defensive mindset predicts mortality as a result of homicide and automobile accidents but not cancer. Perhaps a different mental orientation would better predict health outcomes or our measures of health outcomes were too general to be sensitive to defensive mindset. Regarding other mental disorders, it is possible our measure was overly general. We hypothesize a defensive mindset that accrues from early maltreatment would predict Post-Traumatic Stress Disorder but perhaps not Depressive Disorder. Future studies should disaggregate general outcomes such as overall health and other mental disorders.

### **Hypothesis 3: Early adverse events predict a childhood defensive mindset**

How does a defensive mindset arise in early life experiences? We find evidence from both studies that the experience of physical abuse in the first several years of life increases a child's risk of developing a defensive mindset. The difference in school-aged defensive mindset scores between groups of children who had or had not experienced physical abuse in the first 5 years of life is sizeable, about a third of a standard deviation in the FT sample and three-fifths of a standard deviation in the CDP sample. These findings extend those from prior studies showing the relation between abuse and components of SIP (Dodge et al., 1990; Heleniak & McLaughlin, 2020).

We also find evidence from both studies that the experience of chronic peer social rejection during early elementary school increases a child's risk of developing a defensive processing mindset. The effect sizes are close to a half standard deviation in each study, extending a body of findings on individual processing patterns that grow from peer rejection (McDonald & Asher, 2018). We note a caveat that overlapping temporal periods of measurement of SIP and peer rejection in these studies allow for the opposite causal path. We considered parsing measures into age-specific constructs to examine cross-lagged patterns, but we had a higher priority here on creating the most robust, cross-age measure of defensive mindset possible. We defer the question of cross lags to future studies, noting that Dodge et al. (2003) have found empirical support for reciprocal relations.

### **Hypothesis 4: A defensive mindset mediates the relation between early adversity and adult outcomes**

Not only does a defensive mindset contribute to the growth of aggressive behavior across development, it also partially accounts for the effects of early adverse life experiences on adult outcomes in violence, educational attainment, income, government dependence, and social relationships. A defensive mindset does not account for all effects of early experiences: the effect of rejection on internalizing problems was not mediated by a defensive processing mindset, nor was the effect on health and happiness.

The current findings are consistent with a narrative that early threatening life events instill in children a mindset to approach and respond to the social world in a self-defensive manner. This pattern is understandable and perhaps adaptive within situations in which the threat is ongoing and real. Unfortunately, problems arise when these children carry over this processing pattern to new encounters with other adults and peers, when a defensive mindset is not warranted by objective stimuli and serves instead to create conflicts rather than self-protect. Others start acting toward the child in ways that reinforce the child's mindset, and the child's problems grow into more severe violence and cascade into other domains. The child creates a new reality in which self-defense guides many interactions. Unfortunately for the child, this mindset creates new problems and leads to failure in many domains.

### **Limitations**

The findings presented here are based on correlational analyses which are subject to alternate interpretations. There might be an unmeasured fourth variable that accounts for the relations among early adversity, defensive mindset, and adult outcomes, such as a genetic factor or a community factor of neighborhood advantage or culture.

In our creation of a defensive mindset construct, we are limited by the measures that we had collected when our participants were young children. They are variables that the literature at that time suggested would be important in social development. Today, researchers might identify new variables that are germane to this construct and more accurately reflect the more specific processing actions that reflect this construct (e.g., processing step 1 includes both vigilant attention to cues and recognition of those cues), and we encourage further empirical analyses.

Not all findings were observed in both studies, suggesting either that some of them are not reliable or are limited by undefined characteristics of sample and context. Although it is obvious to suggest that more studies

are needed, we recognize that few samples exist to afford the long-term analyses described here.

## Implications and next steps

These studies offer an exciting advance in the study of personality development. They contribute to SIP theory and developmental psychopathology. They help us understand how early minor aggressive behavior problems can grow through cascading mental and behavioral processes into major problems of violence and adult maladaptive outcomes.

One important implication of this work is the need to explicate further the theoretical distinctions among cognitive schemas, mindset, and processing, and non-overlapping methods for measuring these constructs. From these measurements, developmental associations can be traced.

The findings also offer insight to the creation of a new approach to intervention for aggressive children. Rather than, or in addition to, focusing on discrete SIP skills and biases, the findings suggest that a defensive mindset should be targeted for intervention, whether the intervention comes in the form of guided instruction, dialogue, policy change, or parents' campaigns. Changing a child's mindset has the potential to cascade into changes in the way a child processes social cues without the tedious challenge of changing each processing component individually.

Several interventions have targeted discrete component SIP patterns, with modestly promising results. Hudley and Graham (1993) developed an attributional intervention to reduce aggression in African-American boys, with favorable impact. The FT group (CPPRG, 2019) has shown a positive impact on reducing violence in high-risk aggressive children through a comprehensive intervention that includes, among other components, social-cognitive skills training to address SIP patterns. Further, mediation analyses show that FT's positive impact on reducing aggression is partially mediated by the positive impact on reducing social cognitive problems such as hostile attributions (Sorensen et al., 2016). But these findings show only modest-size impact, perhaps because changing the underlying defensive mindset may be a pre-requisite for long-lasting change on SIP and behavior.

The current study suggests existing interventions could be augmented with a broader focus on the general mindset that a child carries into new social situations. Whereas interventions that address specific SIP steps involve repetition and practice (e.g., generating competent solutions to interpersonal problems), a novel intervention that addresses a defensive mindset might involve discussion of past experiences and "testing" of one's current assumptions, such as found in cognitive therapy for depression.

Finally, our description of a defensive mindset has been one-tailed, that is, at the problematic end of a dimensional continuum. What is the opposite of a defensive

mindset? Is it an openness to influence by others in social relationships, with no fear of harm? Is it defined by willingness to suffer modest affronts because of a larger belief in the goodness of others? The question of the positive end of this dimension awaits further theoretical and empirical inquiry.

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