


## Special Issue Article

# The Future of Developmental Psychopathology: Honoring the Contributions of Dante Cicchetti

## How a defensive mindset develops from early adverse experiences and guides antisocial outcomes

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### Abstract

Dante Cicchetti has had a lasting impact on our understanding of the development of externalizing psychopathology through at least two seminal contributions, including establishment of the field of developmental psychopathology and assertion of the hypothesis that early physical abuse and neglect trigger a cascade of maladaptive outcomes across the life course. These ideas have guided a program of research on children's deviant social information processing and defensive mindset as the psychological mechanisms through which early physical abuse leads to long-term psychopathology. Longitudinal studies following children from early life through mid-adulthood show that physical abuse in the first five years of life leads children to adopt a defensive mindset that, in turn, cascades into long-term outcomes of externalizing psychopathology, incarceration, and dysfunction. Cicchetti's ideas have also guided the development of preventive interventions to interrupt this life course.

**Keywords:** Aggression; defensive mindset; psychopathology

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Dante Cicchetti has made numerous seminal contributions to psychology, including two that have guided our understanding of the development of conduct disorder in children. First, he asserted that psychopathology can be understood as normal development gone awry; that is, the processes that rule psychopathological behavioral development are the same as those that rule normal behavioral development. This concept established the field of developmental psychopathology (Cicchetti, 1984). Second, Cicchetti asserted that early adverse life experiences, particularly child maltreatment, can have devastating impact that lasts across the life course and reverberates across diverse domains of adjustment (Cicchetti & Toth, 1995). In this article, I summarize these concepts and then describe how they have guided my program of research on children's development of aggressive behavior.

### Cicchetti's legacy: two seminal contributions to the study of children's conduct disorder

#### *Developmental psychopathology*

In the early 1980s, Cicchetti (1984) made the astute observation that, historically, the study of normative behavior and the study of psychopathology had followed independent, siloed, paths, with the study of normative behavior deriving from academic science and the study of psychopathology deriving from a medical model. He asserted we can learn more about psychopathology by understanding normal

behavior and, reciprocally, we can learn more about normal behavior by studying psychopathology. Further, he added that we can learn about the *development* of normal behavior and psychopathology from cross-study. He cited the example of cognition and emotion, noting that scholars of normal development had traditionally emphasized cognition and cognitive development, whereas scholars and clinicians of psychopathology had emphasized emotion and emotional development. Cross-study would lead to important discoveries in both fields and would define the new field of developmental psychopathology.

In his typical modest manner, Cicchetti cited the origins of this new field in the works of Thomas Achenbach, E. James Anthony, Norman Garmezy, Alan Sroufe, Michael Rutter, and Edward Zigler. He encouraged empirical inquiry by editing a special issue of *Child Development* that highlighted the works of others in the field.

Several principles have emerged from this cross-study (Cicchetti & Pogge-Hesse, 1981; Cicchetti & Schneider-Rosen, 1984). First is the idea that psychopathological behavioral development can be understood as following the rules of the trajectory of normal behavioral development (e.g., later skills build upon early skills, later behavior is predictable from a history of earlier behavior moderated by a current ecological context) but following a deflection that sends the individual "off course." The deflection might be due to a single major life event (e.g., traumatic abuse, death of a parent) or a context of chronic adversity (e.g., poverty, neglect) that leads the individual to respond to the ecological context in a way that is adaptive given the extraordinary context but becomes maladaptive if the individual carries that behavioral pattern into new, non-aversive, contexts. Also, a pattern of adaptive response to a chronic adverse context might appear

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to an outside observer as abnormal if the observer fails to take into account the ecological circumstances driving the behavior.

An example comes from the study of the stress response, in which an individual responds with heightened activation of the endocrine system followed by system shutdown as an adaptive, self-preserving, coping response. This response pattern is adaptive in that specific context but becomes maladaptive (e.g., anxiety disorder or depressive disorder) if brought to new contexts or could be called maladaptive if the stressful context and response pattern become chronic.

A second set of principles is equifinality and multifinality (Cicchetti & Rogosch, 1996). These principles are adapted from general systems theory to refer to the observations that multiple diverse pathways may lead to the same outcome and one causal factor may lead to diverse outcomes depending on the context and other interactive factors. These principles refute prior assumptions that each diagnostic category of psychopathology had one cause and one outcome. Prior theories had implied a medical disease model for which genetic causes took prominence. The developmental psychopathology framework asserted that the difference between normal and abnormal is often blurred or dimensional, life course events push individuals toward or away from psychopathological behavior, and intervention could alter trajectories. Masten and Cicchetti (2010) extended these ideas to propose that patterns of early modest deviance could cascade over time into a broader array of maladaptive outcomes through a child's interaction with ecological systems that reinforce behavior patterns.

A third principle is resilience, defined as “*a dynamic process encompassing positive adaptation within the context of significant adversity*” (p. 543, Luthar et al., 2000). The notion that individuals at risk for psychopathology might follow distinct courses toward or away from maladaptive outcomes depending on context, life events, and the individual's coping response was ground-breaking. It opened fields of study of high-risk children and gave hope to preventive intervention designers.

### *Child abuse in ecological context*

Cicchetti followed the principles of developmental psychopathology to search for major events in early life that would play prominent roles of the development of psychopathology, and he identified early child maltreatment (Cicchetti & Olsen, 1990). The phenomenon of child abuse had been hidden from public discourse until the 1960s when C. Henry Kempe made an enormous contribution by identifying children with physical injuries as suffering from “battered child syndrome.” The immediate effect, however, was to continue a medical model that assumed a psychiatrically disturbed parent was solely responsible for harming an innocent child (Cicchetti & Aber, 1980). This narrow etiological view allowed society to avoid responsibility for the occurrence of abuse or its remedy. Instead, intervention focused solely on the abusing parent and ignored intervention for the child or the ecological context. Cicchetti's developmental psychopathology framework afforded insights that have guided subsequent research and moved the field to identify preventive interventions.

One insight for science was that not all abusive parents started out intending to engage in violent behavior, and a dynamic parent-child relationship might be a focus of inquiry. Cicchetti invoked attachment theory and added an understanding that the broader ecological context might play an etiological role.

A second insight was that abused children often follow a distressing life course that cascades through diverse maladaptive

outcomes that might be prevented through intervention to help abused children get back “on course” for positive development.

A third insight was that preventive intervention based on an understanding of how abuse develops within families might ward off the possibility of abuse in high-risk families and contexts.

### **Social information processing and aggressive behavioral development in children**

During the period Cicchetti was making major theoretical contributions, I was toiling to understand how some children develop chronic aggressive behavior that gets labeled as conduct disorder. The emerging notion that psychopathology might be normal behavioral patterns gone awry led me to assert the hypothesis that perhaps aggressive children are developmentally delayed in learning the skill of role-taking (Selman, 1976), that is, they could not “see” the perspective of another child, which would lead them into peer conflicts if they failed to recognize accidental actions by others and interpret behaviors from the perspective of another.

To test the hypothesis, I (Dodge, 1980) exposed aggressive and nonaggressive boys to provocations (e.g., having one's puzzle destroyed by a peer) that I manipulated to occur through the hostile, benign, or ambiguous actions of a peer. In contradiction to the hypothesis, the two groups similarly recognized the hostile act as hostile and the benign act as benign. Instead, the behavior of aggressive boys followed Axelrod and Hamilton's (1981) pattern of “tit for tat,” that is, an evolved normative behavior in humans to respond in-kind to experiences of intended provocation. This normative pattern went awry to the extent that aggressive boys were 50 percent more likely than nonaggressive boys to attribute hostile intent to the peer when the provocation was ambiguous and consequently were more likely to respond with retaliatory aggression. It seemed the aggressive boys had become biased in their processing of social information in a direction of presumed hostility from others under ambiguous circumstances.

This initial finding led to a decade of studies that more formally specified the circumstances in which aggressive children displayed hostile attributional biases and also identified other patterns of processing biases by aggressive children. Together, the studies led to a general model of social information processing (Crick & Dodge, 1994; Dodge, 1986). The model followed Cicchetti's assertions by positing both normative processes and how usual development could go awry in abnormal responding. Normatively, children learn to respond to a social stimulus in real time in a sequence of steps that starts with attention to relevant cues, followed by accurate interpretation of those cues, experience of proportional emotional response to the interpreted cues, generation of possible competent behavioral responses to the cues, accurate evaluation of the merits and consequences of each possible behavioral response, and a rational decision to enact a particular response. The model also asserted that, in contrast, chronically aggressive children display biases in responding at each of these steps that lead to reactively aggressive behavior. Studies generally supported these hypotheses, as follows.

### *Hyper-vigilance to hostile cues*

When presented with a social stimulus, children respond in real time by attending to the stimulus. Dodge et al. (1995) found that aggressive children identified by combined teacher Child Behavior Checklist ratings and classroom peer nominations for aggression were less likely than nonaggressive children to attend to relevant

cues presented through videorecorded stimuli and instead attended to hostile cues reflective of their past experiences. Dodge and Price (1994) replicated these findings with an independent sample and extended them to show the effect size increased with advancing age of children.

Similar findings have been reported by numerous other investigators. For example, Gouze (1987) presented videorecorded vignettes to children and measured latency to respond to questions and found that a child's hyper-attention to aggressive cues was associated with a higher rate of observed playground aggression.

### *Hostile attributional bias*

As the cues are encoded through attentional processes, they are given meaning through interpretation. Dodge (1980) presented hypothetical cartoon stimuli depicting ambiguous provocations to aggressive and nonaggressive boys and asked them to imagine being the object of a provocation and to attribute intention to the peer provocateur and generate their likely behavioral response. They found that both groups displayed a strong correlation between their attributions and behavior: when a child attributed hostile intent, that child retaliated aggressively over two thirds of the time, whereas when a child attributed benign intent, that child rarely retaliated. The difference between groups could be found with the attributions boys made. Aggressive boys had a .25 probability of interpreting the cue as hostile-intended, in contrast with a .17 probability for nonaggressive boys. These two phenomena were replicated by Dodge et al. (2015) with samples from 12 diverse cultures around the world.

Since then, three meta-analyses of over 400 published reports have concluded these findings are robust and apply across ages, genders, socioeconomic status groups, and cultural groups. Creative investigators have tested the general hypothesis with other instruments and designs. For example, Schwenck et al. (2014) created a morphing task in which 9-second film clips of neutral faces gradually morphed into faces depicting an emotion and found that conduct-disordered girls were slower than control girls to recognize happy, sad, and fearful faces but not slower to recognize anger.

### *Emotional experience and goals*

As children interpret social cues, the interpretations trigger a variety of internal responses that include psychophysiological activity, endocrine activity, and emotional feelings. In response to provocations, aggressive children have been found to respond with heightened activation. In our lab, Crozier et al. (2008) tracked children's heart rate while imagining themselves as a character in a video vignette and found that when their character was the object of an ambiguous provocation, aggressive children responded with greater psychophysiological reactivity (higher spikes in heart rate) followed by a longer period before return to baseline.

Carré et al. (2014) examined the effects of ambiguous provocation on the endocrine system. They asked aggressive young male adults from the Fast Track study (control group participants) to play a competitive computer game with a (fictitious) peer who "stole" points from them in the middle of the game. They measured testosterone release from saliva samples collected intermittently throughout the game. As hypothesized, following the peer's provocation, testosterone levels increased; further, the magnitude of testosterone release was correlated with the participant's subsequent reactive aggressive behavior (stealing the peer's points).

At this same step in real-time processing, children form goals that guide their behavioral responding. Upon presenting hypothetical social conflict situations, Rose and Asher (1999) found that children respond with large individual differences in goals. Children who responded with goal of revenge toward others had the most problems in getting along with peers, including aggression.

### *Response generation*

The next step in processing is to generate one or possible behavioral responses to the stimulus, often called social problem solving. Many studies show that aggressive children have trouble generating competent nonaggressive solutions to social challenges and instead generate incompetent and aggressive responses (Dodge, 2024). Dodge et al. (1986) presented children with hypothetical scenarios in which they were to try to enter a group of peers who were already at play. They found that the proportion of a child's generated responses that were aggressive predicted a low likelihood of actual success in joining a group of unacquainted peers when given the opportunity in a later situation. They also found that children who generated a high proportion of reactive aggressive responses to hypothetical peer provocations were more likely to react aggressively when actually provoked in a later laboratory setting.

Bookhout et al. (2021) has recently replicated and extended these findings by showing that the number of aggressive responses a child generated to hypothetical peer provocations was positively correlated with the rate of aggressive rule-breaking behaviors observers recorded on the playground.

### *Response evaluation*

Fortunately, not all impulsively generated behavioral responses are enacted. Across development, children learn to apply an evaluation at the next step of processing. Fontaine and Dodge (2006) formulated a model of response evaluation and decision-making (RED) that proposes a minimal acceptability threshold that acts as a brake on behavior. A generated response may be evaluated on multiple dimensions, and if the sum of that evaluation is below the threshold, the response is rejected and a search continues for an alternative. Fontaine and Dodge (2006) hypothesized that aggressive children might differ from other children in the minimum threshold and/or in the way they evaluate responses. The former problem is one of impulsivity and could be affected by temporary contextual factors such as stress, blood alcohol level, fatigue, or angry mood, or a general dispositional propensity to act quickly. The latter is a function of both the evaluation a child makes on dimensions of instrumental, interpersonal, and intrapersonal outcomes, and the valuation the child applies to that expected outcomes. A child might evaluate that a reactively aggressive response will lead to a positive intrapersonal outcome (e.g., "it feels good to hit someone") or perhaps a modestly negative interpersonal outcome (e.g., "someone might not like me") that is discounted because it has no value anyway.

Fontaine et al. (2002) reported that high levels of aggressive behavior problems in school were significantly related both to evaluating aggressive responses positively and to valuing self-serving (rather than other-serving) consequences. Fontaine et al. (2008) replicated these patterns and found that aggressogenic RED processes predict growth in aggressive behavior problems across adolescence.

Yechiam et al. (2006) exposed children to laboratory "go-no-go" passive avoidance tasks to conclude that children with



externalizing behavior problems (in contrast with controls) display a pattern of overvaluing the positive rewards of a possible behavior and ignoring the punishment consequences, and responding more quickly without full consideration, suggesting a lower acceptability threshold. Further, they valued immediate consequences over deferred consequences, consistent with Belsky's (2014) hypothesis that aggressive children from early adverse environments discount long-term consequences partly because they may never live long enough to experience the long-term.

### *Integration in a primal construct of defensive mindset*

An important question is whether the multiple social information processing patterns displayed by aggressive children are redundant with each other or, alternately, provide unique increments in predicting aggressive behavior problems. The latter principle would suggest that some aggressive children display one pattern (e.g., hostile attributional biases), whereas other aggressive children display a different pattern (e.g., overvaluing immediate intrapersonal outcomes), such that a comprehensive understanding would require measurement of all patterns to develop child-specific profiles. Numerous studies have supported this hypothesis. Dodge et al. (1986) found that children's responses at each of four steps of processing uniquely increased the prediction accuracy of children's aggressive behavior problems. Dodge and Price (1994) replicated these findings with a different sample. One implication of these findings is that each processing pattern might have its own unique etiology requiring its own intervention. This is a daunting proposition that would lead to the design of very complex interventions.

Dodge et al. (2022) accepted this diversity of profiles but learned from Huesmann (1988) to propose a prior process that the processing patterns might be unified by a common cognitive antecedent called a defensive mindset. That is, if a child has stored in memory a set of schemas, scripts, and knowledge that presume impending threat (even before a stimulus is presented), that child may be likely to attend selectively to hostile cues, interpret ambiguous provocations as hostile, experience emotions of anger with goals of retaliation, generate retaliatory aggressive responses, and evaluate those responses as favorable. Dodge et al. (2022) found empirical support for a tiered model that incorporates reliable distinct processing factors nested within a broader latent construct of defensive mindset. We validated this model with the children in the Child Development Project (CDP) and replicated it with an independent sample of children from the Fast Track (FT) Project.

### *Life course outcomes of early defensive mindset*

Masten and Cicchetti (2010) hypothesized that an early pattern of even modest deviance could cascade across development into more serious and diverse maladaptive outcomes. The developmental cascade hypothesis is particularly pertinent for aggressive behavior problems because a pattern of defensive mindset may become self-perpetuating. That is, if a child enters a benign or ambiguous social situation with a defensive mindset, that child will process information in a way that leads the child to react aggressively. The child believes their behavior is rational and justified, whereas peers perceive the child's behavior as unwarrantedly aggressive and respond in kind with aggressive behavior toward the aggressive child. The aggressive child's defensive mindset, unfortunately, gets reinforced with each tragic social exchange and may become stronger across development.

We tested the hypothesis of a developmental cascade from early defensive mindset into long-term maladaptive outcomes by following the 585 five-year-old children of the CDP through age 34. Structural equation models aggregated measures of social information processing across childhood into a reliable latent construct of defensive mindset, which was used to predict adult outcomes controlling for a child's childhood level of aggressive behavior problems, gender, and race. Children with higher defensive mindset scores suffered an array of maladaptive adult outcomes, including a greater likelihood of being incarcerated, more days of incarceration, more externalizing psychopathology, higher rates of victimization by others, a greater likelihood of depending on governmental financial assistance, lower educational attainment (high school graduation and college degree), lower adult income, and a lower likelihood of being married. The magnitude of these effects was often large. For example, children in the highest quartile of defensive mindset in elementary school were more than twice as likely to be incarcerated as an adult 20 years later than were children in the lowest quartile (rates of .25 versus .12) and had an average income substantially lower than that for lowest-quartile children ( $M$ 's = \$29,600 versus \$49,700).

We replicated every one of these findings by following the 463 five-year-old children from FT through age 32. The highest quartile group of defensive-mindset children was more than twice as likely to be incarcerated as an adult than was the lowest quartile group (rates of .43 versus .18) and had an average income that was less than half of that for lowest-quartile children ( $M$ 's = \$16,250 versus \$35,600).

The unfortunate life course of persons with a defensive mindset extend well beyond these dimensions to premature mortality. Three independent studies have identified one aspect of defensive mindset in young adults using scores from the Cook-Medley Hostility Scale of the Minnesota Multiphasic Personality Inventory (MMPI) and followed them into later middle age. Barefoot et al. (1989) followed a sample of law students in the 1950s through age 50 in the 1980s using publicly available death records to find that students in the highest quartile of Cook-Medley scores were more than five times as likely to have died as adults as were students in the lowest quartile of scores (21% had died versus 4%). Barefoot et al. (1983) replicated this phenomenon with medical students, showing that students in the top half of scores were more than six times as likely to die as were students in the bottom half of scores. Shekelle et al. (1983) found a similar pattern among Western Electric employees. The causes of death for defensive minded person in these samples were diverse but primarily from cardiovascular disease (suggesting a stress response) and automobile accidents (suggesting a reckless lifestyle).

### *Development of chronic antisocial behavior from early child abuse*

Once again, Cicchetti and Toth (1995) provided the conceptual basis for searching for origins of antisocial behavior in early adverse life experiences, particularly child abuse and neglect. In the CDP, our team relied on interviews with mothers and fathers at child age 5 to identify an early history of physical abuse in 12% of the sample of 585 children. Lansford et al. (2007) followed the full sample into adulthood to show that 34% of the early abused group had been arrested, in contrast with 20% of the non-abused group. We found the early-abused group had worse outcomes in many domains, including a higher rate of violence in romantic relationships, both as perpetrator and victim (Pettit et al., 2010),

a lower rate of college graduation (Lansford et al., 2007), and a lower rate of being employed (Lansford et al., 2021).

At age 34, the early-abused group was more likely than the non-abused group to have been incarcerated, show externalizing psychopathology, be dependent on government assistance, and have low income, and likely to have graduated from high school, have a college degree, be married, and have been victimized by others (Dodge et al., 2022).

We replicated each of these findings by following the children of the Fast Track project through age 32. In that study, 13% of the sample had been identified as having experienced physical abuse in the first five years of life. This early-abused group showed the same pattern of dysfunctional adult outcomes as had been found in the CDP.

### Deviant social information processing as an outcome of early abuse

The next task in this program of research was to identify mechanisms that mediate the relation between early abuse and adult antisocial outcomes. The National Research Council (Petersen et al., 2014) borrowed Cicchetti's term "cascading effects" to assert that the early experience of physical maltreatment would have an enduring effect on long-term maladaptive outcomes by altering children's social cognition, which would cascade into maladaptation at school, with peers, and across the life course.

Cicchetti and his former star student Seth Pollak have shown through elegant methods that abused children do indeed develop biased patterns of processing social information. Curtis and Cicchetti (2011) showed that abused children display enhanced processing of angry faces as measured through event-related potentials (ERPs). Pollak has shown that abused children identify angry facial expressions with relatively less perceptual information (Pollak and Sinha, 2002) and fewer expressive cues (Pollak et al., 2009). Pollak and Kistler (2002) presented abused and non-abused children with images of facial expressions that gradually morphed from ambiguity to a clearly expressed emotion and found that children who had experienced physical abuse over-identified morphed faces as displaying anger. They concluded, *We view the effects observed in the present study as reflecting an adaptive process for maltreated children, allowing them to better track emotional cues of anger in the environment. The cost of such a process may be, unfortunately, to over-interpret signals as threatening and perhaps make incorrect judgments about other facial expressions.* (Pollak & Kistler, 2002, p. 9075).

In the CDP, we used structural models to assess a latent construct of childhood defensive mindset, following the same analysis plan as described earlier. The early-abused group of children had a standardized mean defensive mindset score of .61, whereas the non-abused group had a mean score of  $-.08$ , a difference of .69 standard deviations. We replicated this finding in FT, where the early-abused group had a defensive mindset latent construct score that was .31 standard deviations higher than the score for the non-abused group.

### Defensive mindset as a mediator of the long-term impact of early abuse

The final assertion of the defensive mindset model is that the effect of early abuse on long-term antisocial outcomes will be at least partially mediated by the child's development of a defensive mindset. In the CDP, structural models showed that the latent construct of defensive mindset accounted for a significant portion

of the effect of early abuse on adult incarceration. This effect was replicated in FT, where defensive mindset accounted for the effect of abuse on antisocial outcomes.

### Implications for intervention

Cicchetti's insights and the program of empirical studies described here have inspired the creation and testing of interventions to change children's social information processing patterns and defensive mindset. Hudley and Graham (1993) tested an intervention to reduce hostile attributional bias in African American boys and found positive impact on reducing peer-directed aggressive behavior. Fraser et al. (2005) created a program called the Making Choices: Social Problems Solving Skills for Children (MC) program found the program improved 8-year-old children's social information-processing skills and reduces their aggressive behavior. Van Bockstaele et al. (2020) created an intervention to train adolescents to make more benign interpretations of ambiguous provocations and found through a randomized trial that it reduced hostile attribution bias and decreased levels of reactive aggressive behavior.

The Fast Track intervention was a comprehensive effort to prevent long-term serious violence in high-risk five-year-old children through multiple avenues, including social-cognitive skill training. Random assignment to Fast Track led to improvement in social information processing and reduction in defensive mindset, including recognition and coping with difficult emotions, reduced hostile attributional bias, improvement in social problem solving, and better evaluation of the consequences of aggressive behavior (Conduct Problems Prevention Research Group, 1999; 2002; 2004). As hypothesized, these less biased and more skillful processing patterns significantly accounted for about 25% of the effect of the Fast Track intervention on antisocial behavior in adolescence (Dodge & Godwin, 2013).

### Future directions

Cicchetti's legacy is obvious in its impact on our understanding of the development of externalizing psychopathology, particularly through his establishment of the field of developmental psychopathology and pointing scholars toward early abuse and neglect as paving the way toward long-term maladaptive outcomes. This work has led to numerous intervention programs that have shown positive impact on interrupting the maladaptive life course for high-risk children.

Cicchetti's ideas have also had tremendous impact on other domains and will guide scholarship and intervention into the future. The application of these ideas has already occurred in the study of depression and could well guide understanding of the development of anxiety disorders, somatic disorders, and developmental delays. Preventive interventions in these domains will surely follow. Finally, Cicchetti's work will guide scholars to understand how some children who are at high risk for these disorders are able to deflect otherwise-inevitable trajectories toward more favorable outcomes through resilience.

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