Contextual Factors in Risk and Prevention Research

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This paper reviews how cascading levels of contextual influences, starting with family factors and extending to neighborhood and school factors, can affect children's behavioral and emotional development. The ability of contextual factors to trigger or to attenuate children's underlying temperament and biological risk factors is emphasized. Recognition of the powerful effects of an array of contextual factors on children's development has clear implications for preventive interventions as well. Intervention research can explore the effects of multicomponent interventions directed at children's family and peer contextual influences, can examine how contextual factors predict children's responsivity to interventions, and can examine how contextual factors have effects on how, and how well, interventions are delivered in the real worlds of schools and community agencies.

Efforts to understand the development of childhood psychopathology have placed growing emphasis on contextual factors that influence children's developmental trajectories leading to antisocial outcomes. A child's developmental course is set within the child's social ecology, and an ecological framework is needed to understand these effects (Conduct Problems Prevention Research Group, 1992; Greenberg, Lengua, Coie, Pinderhughes, & Conduct Problems Prevention Research Group, 1999; Tolan, Gorman-Smith, Huesmann, & Zelli, 1997). Children not only have important interactions in their microsystems of growing social fields of child-family, child-peer, and teacher-student interactions, but these social fields also relate to each other in

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important ways (e.g., the home-school exosystem; Bronfenbrenner, 1979). The influence of neighborhood context on the individuals, and on the other school and family contextual factors, can also be pivotal. In this article, the important role of contextual factors in developmental psychopathology is briefly reviewed, and four implications of contextual factors on the development, implementation and evaluation of preventive interventions are discussed.

Contextual Effects Within Risk Models

This emphasis on ecological effects has led to the creation of comprehensive developmental models that indicate how contextual factors can have direct effects on children's outcomes (e.g., Conduct Problems Prevention Research Group, 1992). Neighborhood risk factors and family risk factors evident in maternal psychopathology, maternal life stress, and low socioeconomic status can directly influence young children's externalizing and internalizing behaviors and their academic achievement, although different contextual factors have been found to affect varying child outcomes (Greenberg et al., 1999). In addition, the effects of growing up in a problematic neighborhood have still been found to be present even after controlling for other family and child risk factors (Greenberg et al., 1999).

A Contextual Social-Cognitive Model

This growing understanding of contextual effects can produce refined risk prediction models and lead to more comprehensive preventive interventions. As an illustrative example, existing research suggests that a contextual social-cognitive model, as illustrated in Figure 1, can account for the development of aggressive behavior problems during the preadolescent and early adolescent years (Lochman & Wells, 2002). This model indicates that two relevant sets of potential mediators of adolescent substance abuse include (a) child-level factors (e.g., Tremblay & LeMarquand, 2001), including their poor social-cognitive and decision-making skills, poor self-regulation, negatively perceived peer context, and poor ability to resist peer pressure, and (b) contextual factors, including poor parental caregiver involvement with, and discipline of, the child (e.g., Wasserman & Seracini, 2001). Broader contextual risk factors, such as the level of neighborhood violence (Luthar, 1999), presumably impact these mediational processes and children's subsequent behavior.

Child Factors. The conceptualization of the child-level factors within this contextual social-cognitive model began as a model of

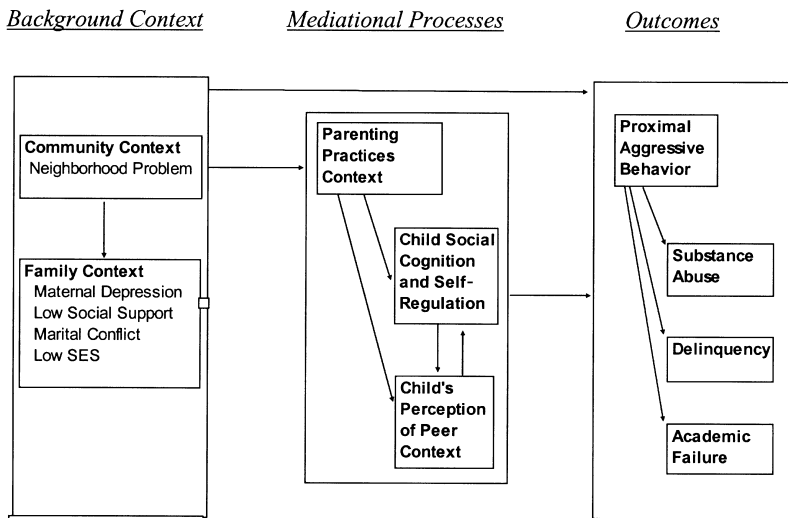Background Context   Mediational Processes   Outcomes

Figure 1. Contextual social-cognitive model.

anger arousal (Lochman, Nelson, & Sims, 1981) derived from Novaco's (1978) work with aggressive adults. In this conceptualization of anger arousal, which stressed sequential cognitive processing and concomitant physiological arousal, the child responded to problems such as interpersonal conflicts or frustrations with environmental obstacles (i.e., difficult schoolwork). However, it was not the stimulus event itself that provoked the child's response but rather the child's cognitive processing of and about that event. This first stage of cognitive processing (appraisal) was similar to Lazarus's (Smith & Lazarus, 1990) primary appraisal stage, and consisted of labeling, attributions, and perceptions of the problem event. The second stage of processing (problem solution), similar to Lazarus's (Smith & Lazarus, 1990) secondary appraisal, consisted of the child's cognitive plan for his or her response to the perceived threat or provocation. The anger arousal model indicated that the child's cognitive processing of the problem event and of the child's planned response led to physiological arousal and to the child's actual behavioral response and its positive or negative consequences. Children have co-occurring physiological arousal and attributional distortions in response to perceived provocation, in this model (Williams, Lochman, Phillips, & Barry, 2003). Because of research on children's social information-processing (Crick & Dodge, 1994; Dodge, Laird, Lochman, Zelli, & Conduct Problems Prevention Research Group, 2002), the contextual social-cognitive

model of children's aggression evolved and the nature of the social-cognitive deficiencies and distortions and of the schemas that affect processing became more differentiated and refined (Lochman, Whidby, & FitzGerald, 2000; Lochman & Wells, 2002). Aggressive children have cognitive distortions at the appraisal stage of social-cognitive processing because of difficulties in encoding incoming social information and in accurately interpreting social events and others' intentions, and they have cognitive deficiencies at the problem solution stage of social-cognitive processing by generating maladaptive solutions for perceived problems and having nonnormative expectations for the usefulness of aggressive and nonaggressive solution to their social problems.

Parent and Peer Factors. These child-level social-cognitive processes are shaped by children's experience from the layers of social contexts that surround them. Most proximal, and most influential, are the effects of parents and the family context. As articulated by Patterson (Patterson, Reid, and Dishion, 1992), child aggressive behavior arises most fundamentally out of early contextual experiences with parents who provide harsh or irritable discipline, poor problem solving, vague commands, and poor monitoring of children's behavior. In an extensive review of the risk factors for adolescent antisocial behavior, Hawkins, Catalano and Miller (1992) identified several parental risk factors that are also directly linked to childhood aggression, including deficient family management practices involving lack of maternal involvement and inconsistent parenting (e.g., Kandel & Andrews, 1987). Other, more family-level factors impact parents' abilities to provide consistent, effective expectations and consequences for their children, within a warmly involved relationship, including parental psychopathology, the level of social support that parents receive, interparent conflict, and the socioeconomic status of the family.

Children's social-cognitive processes are also proximally affected by their peer group. Children's level of acceptance or rejection from their peers, their ability to form close friendships, and in the adolescent age period, their involvement in deviant peer groups contribute to children's maintenance and escalation of problem behaviors (Conduct Problems Prevention Research Group, in press). Similar to bidirectional relations evident between the degree of parental positive involvement with their children and children's aggressive behavior over time (Bry, Catalano, Kumpfer, Lochman, & Szapocznik, 1999), children's aggressive behavior and their rejection by their peers both reciprocally affect each other (Conduct Problems Prevention Research Group, in press).

Neighborhood and Classroom Factors. Neighborhood problems, as perceived by children's caretakers, have a direct impact on the children's reactive aggressive behaviors (Lochman, Barry, Barth, & Wells, 2001) and on children's general levels of aggressive, antisocial behaviors (Greenberg et al., 1999; Schwab-Stone et al., 1995), above and beyond the effects of poor parenting practices. Neighborhood contextual factors appear to have heightened effects on the development of antisocial behavior during the middle childhood, preadolescent years (Ingoldsby & Shaw, 2002). Neighborhood factors have been found to contribute to children's risk for substance use (Dembo, Blount, Schmeidler, & Burgos, 1986; Luthar & Cushing, 1999; Schwab-Stone et al., 1995) and to have direct effects on parenting behaviors (Pinderhughes, Nix, Foster, Jones, & Conduct Problems Prevention Research Group, 2001). Neighborhoods can adversely influence children's development in part because of the deviant social influences that are apparent in problematic, crime-ridden neighborhoods.

Similar adverse effects due to deviant social influences are also possible in other out-of-home contexts, such as the children's classrooms. Children's aggressive behaviors have been found to be enhanced when the children have been placed in a classroom with a high percentage of aggressive children, as children's aggressive behavior increases in those years when they are in more toxic classrooms with a higher density of behavior problem students (Barth, Dunlap, Dane, Lochman, & Wells, in press). Thus, neighborhood and school contexts influence children's behavioral and social development.

Contextual Effects as Moderators

In addition to having direct and mediated effects on outcomes, contextual factors can moderate how other risk factors predict to later negative child and adolescent outcomes. Despite possessing identifiable risk factors, some children can be observed to shift out of a developmental trajectory that would ordinarily be expected to lead to an antisocial outcome. Person-oriented research strategies can assist us in identifying important subtypes of children who may have these varying developmental paths. Thus, children can display certain systematic patterns of fluctuation or desistance in problematic behavior over time, and contextual factors can contribute to these shifts.

Interactions between contextual factors and child-level risk factors can identify buffering or protective factors that can insulate a child from the effects of their natural level of risk (Masten, Best, & Garmezy, 1990) and indicate which children at risk will be most likely to experience a negative, antisocial outcome. Consistent with diathesis-stress

models, contextual factors can be identified that are capable of triggering the underlying risk. Examples of these diathesis-stress models abound in the literature on child-level risk factors. Birth complications involving pre-eclampsia, umbilical cord collapse, forceps delivery, or fetal hypoxia increase the risk of later violence among children, but only when the infants subsequently experience adverse family environments or maternal rejection (Arseneault, Tremblay, Boulerice, & Saucier, 2002; Raine, Brennan, & Mednick, 1997). Higher levels of testosterone among adolescents and higher cortisol reactivity to provocations are associated with more violent behavior, but only when the children or adolescents live in families where they experience high levels of parental abuse or low socioeconomic status (Dabbs & Morris, 1990; Scarpa & Raine, 2000). Children who have a gene that expresses only low levels of the enzyme MAOA (monoamine oxidase A) have a higher rate of adolescent violent behavior, but only when they have experienced high levels of parental maltreatment (Caspi et al., 2002). Similar patterns of findings have been obtained when children's temperament characteristics have been examined as child-level risk factors. Highly active children (Colder, Lochman, & Wells, 1997), children with levels of emotional reactivity (Scaramella & Conger, 2003), and infants with difficult temperament (Coon, Carey, Corley, & Fulker, 1992) are at risk for later aggressive and conduct problem behavior, but only when they have parents who provide poor monitoring or harsh discipline. The children's family context can serve as a key moderator of children's underlying propensity for an antisocial outcome.

Implications of Contextual Factors for Preventive Intervention

The field's increasing understanding of the role of contextual factors in the development of psychopathology has at least four key implications for intervention development and intervention research. Consideration of contextual factors can affect the construction of intervention components, an intervention may serve to moderate the effects between risk factors and later antisocial outcomes, contextual factors may predict who benefits from interventions, and contextual factors may predict how effectively interventions can be disseminated.

Intervention Development. If contextual factors have clear direct effects on children's outcomes, then those parental and peer contextual factors that are malleable and that are potentially able to be influenced by an intervention should be considered as intervention targets. An

intervention model should reflect the developmental model that describes the emergence of the problem behavior (Conduct Problems Prevention Research Group, 1992). If certain parenting practices are key aspects of the model describing the development of conduct problems, then a component addressing those parenting practices should logically be included in the intervention. Consistent with this premise, multicomponent interventions that include parent training directed at improving parenting skills and child training directed at their social problem solving skills have been found to have stronger and more sustained effects on children's behavior than have single-component interventions (Kazdin, Siegel, & Bass, 1992; Webster-Stratton & Hammond, 1997). In research on the Coping Power program, based on the contextual social-cognitive model described previously, the full program, with child and parent components, had more significant effects at a one-year follow-up on adolescents' delinquency and substance use than did the child component alone (Lochman & Wells, in press).

Because children's peers and their classroom environment are contextual effects that influence children's behavioral problems, a broader universal intervention directed at whole classrooms can be appropriate. Classroomwide preventive interventions can lead to notable changes in children's interpersonal relations and behavior in the classroom as a whole (Conduct Problems Prevention Research Group, 1999), and they can reduce the likelihood of high-risk children's later substance use (Lochman & Wells, 2003). In conjunction with targeted interventions directed at high-risk children, classroomwide interventions can assist these children's improvements in school behavior at later follow-ups (Lochman & Wells, 2003). The combination of targeted and universal interventions can be particularly powerful because (a) as the targeted intervention produces social and behavioral changes in the high risk child, those changes can produce positive radiating effects on the surrounding children's behavior (Allen, Chinsky, Larcen, Lochman, & Selinger, 1976; Kelly, 1971); (b) the classroom intervention can affect the peer groups' social behaviors in positive ways, creating a less toxic, more accepting peer environment for the target high risk child; and (c) the targeted and universal programs can have additive effects on the high-risk child's behavior through repeated exposure and practice on key intervention concepts.

Intervention as a Moderator Variable. One result of an intervention may be to alter the relation between a risk variable and the later behavioral outcome. If intervention status influences the relationships between predictor variables and outcomes, then predictor risk variables may relate to the outcome variables in different ways within the

intervention and control conditions. Thus, we could consider intervention to have an environmental effect on the risk-to-outcome relationship. In such analyses, significant interaction effects would suggest that the intervention has altered children's distribution on an outcome variable and, thus, altered the relationship between predictor variables and outcome.

In analyses of Fast Track program effects, control parents who had little initial social support from friends were found likely to rate their children as having increasing problems with aggression three years later and to have children who were more likely to be involved in special education (Conduct Problems Prevention Research Group, 2002). In contrast, intervention parents who had similar low levels of social support from friends at the baseline were more likely to report lower rates of aggression by their target children after three years of intervention and to have lower rates of special education involvement by their children. Prior research had suggested that low levels of social support from friends contribute to parental "insularity" and irritability, increasing parents' tendency to provoke aversive behavior from their children and reducing parents' responsivity to interventions (Wahler, 1980; Wahler & Graves, 1983). After three years of intervention, the Fast Track intervention program appeared to have reversed some of the negative sequelae resulting from parents having low initial social support and high parental insularity, possibly because these parents with little initial social support were able to obtain needed social support from intervention staff and other intervention parents. Whatever the cause, this particular risk factor, low initial social support, no longer was an indicator of increasing problems for the intervention parents.

Contextual Factors as Predictors of Individual Responsivity to Interventions. Previously, intervention was discussed as a variable that might moderate the relation between a risk variable and an outcome. In an alternate approach, which would involve prediction of outcomes, the intervention researcher is engaged in the relatively straightforward task of determining if certain baseline risk characteristics predict which children will have better or worse outcomes on the defined outcome and, hence, whether these variables predict intervention effects. The prediction literature on parental context risk factors is relatively mixed (Kazdin, 1995), as children of depressed mothers and single parents have been found to have poorer response to intervention in some studies (e.g., Dumas & Albin, 1986; McMahon, Forehand, Griest, & Wells, 1981; Webster-Stratton & Hammond, 1997) but not in others (Dumas & Wahler, 1983; Holden, Lavigne, & Cameron, 1990; Webster-Stratton, 1985). Similarly, children living in families with low socio-

economic status and with socioeconomic disadvantage have not bene-
fited as much from intervention in some studies (Dumas & Albin,
1986; Holden, Lavigne, & Cameron, 1990; Webster-Stratton, 1985) as
in others (Serketich & Dumas, 1996). These results indicate that spe-
cific parental and family context risk factors are important to assess as
potential predictors of intervention outcome but that the particular risk
predictors may vary from one intervention program to another, depend-
ing on the format and characteristics of the intervention. The results
also indicate that a certain risk predictor (such as maternal depression)
can predict lack of intervention responsivity on certain outcomes (such
as teacher ratings of school behavior) but not on other outcomes within
the same intervention (such as parent ratings of children's aggression;
Conduct Problems Prevention Research Group, 2002).

   *Contextual Factors as Predictors of Adequacy of Dissemination of
Interventions.* Contextual factors can also affect the way in which
interventions are disseminated to new service sites and can impair the
likelihood of successful dissemination. A factor that increases the diffi-
culty of detecting the effects of interventions in intervention research is
that the interventions are typically implemented at a number of sites
(Raudenbush & Willms, 1991). The degree to which the intervention is
implemented fully, and the context in which the intervention is embed-
ded, can vary markedly from site to site. With school interventions,
contextual factors such as the characteristics of the schools and the
school climate can be markedly different across schools. As a result, the
effectiveness of an intervention could vary markedly from site to site.
Raudenbush and Willms (1991) argue that this variation, rather than
being a nuisance that must be controlled in analyses, can provide criti-
cal information and is more important than the overall average effec-
tiveness of the intervention. Variations in the adoption, success, and
maintenance of interventions across sites can have major implications
for the effective dissemination of preventive interventions.

   New interventions and programs need organizational support to
be adequately disseminated and implemented (Forman, 1995). The
characteristics of work environments—such as relationships to
supervisors, openness of communication, and the supportiveness of
the environment—can affect individuals' efforts to create change in
the work setting (Moos & Moos, 1983), to be innovative in work set-
tings (Anderson & West, 1998; Turnipseed, 1994), and potentially to
influence the implementation of preventive interventions (Vincent &
Trickett, 1983). School personnel who perceive that their school envi-
ronment is negative have been found to think that innovations in their
schools are burdens (McClure, 1980). In contrast, positive perceived

school climate has been found to lead to successful implementation of reforms in schools (Bulach & Malone, 1994). Furthermore, collegiality, shared authority among colleagues, and positive leadership by principals have been linked to the ability to facilitate change in schools and to continue school improvements (Peterson, 1997). Thus, factors such as organizational structure and organizational climate should be considered as important contextual factors that can influence the delivery of new interventions in work settings such as schools, and these contextual factors should be central constructs in prevention dissemination research.

Summary of Role of Context in Risk and Preventive Research

When research on children's risk factors focuses on contextual factors, attention begins with the children's immediate social environment involving their parents and peers. These early and ongoing experiences with parents and peers form children's developing social-cognitive processes and influence how the children acquire enduring patterns of perceiving others and thinking about how to respond to social problems. The immediate parent and peer environmental effects on children's functioning are augmented by broader contextual factors evident in the children's neighborhoods and classrooms. The density of deviant peers and adults within the children's community can substantially increase their immediate risks for antisocial behavior. However, family and neighborhood risk factors may not only directly add to a child's risks for negative outcomes but may also moderate the effect of early child-level risk factors, such as difficult temperament, on these outcomes. Thus, children's inherent risk factors may predict later negative outcomes, but only for those at-risk children who have experienced certain forms of family disadvantage or harsh parenting. These contextual factors can be conceptualized as either triggering or buffering the underlying risk.

Complementing the growing, rich understanding of how contextual factors can influence children's developmental trajectories leading to serious conduct problems, contextual factors have a clear role in the planning, evaluation, and dissemination of preventive interventions. First, when the growth of children's conduct problems is at least partially promoted by the family and peer contexts in which they reside, then multicomponent interventions are necessary to address the malleable child, parent, and peer risk factors. To produce durable, generalizable effects on children's behavior, interventions should modify the

immediate family and peer contexts surrounding the child. Second, as interventions are implemented and evaluated, we need to understand how the children's family, neighborhood, and school contexts may moderate the effects of intervention, which makes it likely that some children will benefit more than others from the intervention and which may in some cases actually reverse the direction of effect of the initial baseline risk factor (e.g., low social support for parents). Finally, as preventive interventions and prevention research moves seriously to the next level of widespread dissemination of empirically supported programs, understanding how contextual factors within school and work settings can enhance or impair the implementation of interventions will be increasingly necessary. Contextual factors not only impact the individuals in their settings but also impact how staff can attempt to deploy preventive interventions. Ignoring contextual factors can substantially impair and undermine the effectiveness, durability, and sustainability of empirically supported preventive interventions designed to promote children's adaptive behavioral and emotional development.

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