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Appraisal and coping as mediators of the effects of cumulative risk on preadolescent adjustment

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Abstract

This study examined the concurrent and longitudinal relations among cumulative risk, appraisal, coping, and adjustment. Longitudinal path models were tested in a community sample of 316 children in preadolescence to examine hypotheses that threat appraisal and avoidant coping mediate the effects of cumulative risk on child adjustment, whereas positive appraisal and active coping were hypothesized to predict better adjustment independently. Children and their mothers were assessed during in-home interviews at three time points at one-year intervals. Children reported on appraisal and coping strategies. Mothers and children reported on child adjustment problems and positive adjustment. Rank-order changes in appraisal and coping predicted rank-order changes in adjustment. Cumulative risk was concurrently related to higher threat appraisal and avoidant coping at each time point. Threat appraisal and avoidant coping mediated the relations of cumulative risk to rank-order changes in adjustment. There is specificity in the relations of cumulative risk to threat appraisal and avoidant coping, whereas positive appraisal and active coping are independent of risk and operate as individual resource factors.

Keywords

cumulative risk; appraisal; coping; preadolescence; adjustment problems; positive adjustment

Introduction

Child development occurs within multiple contexts, including individual, interpersonal, and environmental domains (Bronfenbrenner, 1979). Studies of multiple or “cumulative” risk have proposed an additive effect of risk factors, where factors across these domains have a dose-dependent relation to child adjustment problems. Simultaneously, bioecological and stress models have proposed that individual factors may mediate or explain the relation between adversity and psychopathology. Reviews in the field of stress and psychopathology have called for research identifying mediators of the relation between stressors and psychopathology, in part due to the implications of environmental stressors in the etiology and maintenance of psychopathology in children and adolescents (Grant et al., 2003). Yet, there is relatively little research examining the child factors that may help to explain how

experiencing multiple risk factors in childhood contributes to the development of psychological problems.

Grant et al. (2003) offered a general conceptual model of the relations between stressors and psychopathology that considers both mediating and moderating influences. The relations among stressors, moderators, mediators, and psychopathology in the model were conceptualized as reciprocal and dynamic. Additionally, the model contended that there was specificity in relations among particular stressors, moderators, mediators, and psychological outcomes. However, few studies have examined the possibility that stressors differentially relate to specific appraisal and coping strategies.

Little is known about how experiences of risk, and cumulative risk in particular, might shape children's appraisal and coping styles. The cumulative risk context is unique, usually representing pervasive stress. While other unique stressors, such as children facing cancer (for review, see Aldridge & Roesch, 2007), have been the subject of appraisal and coping research (and indeed, shown to influence appraisal and coping in ways distinct from other forms of stress), the influence of the experience of cumulative on preadolescent appraisal and coping has not been adequately examined in the current literature. Cumulative risk might be particularly relevant in shaping children's appraisal and coping, particularly tendencies toward threat appraisal and avoidant coping, given that children experiencing multiple risk factors may be faced with overwhelm and unrelenting stress.

While appraisal and coping processes have not been studied as mediators of *cumulative risk*, a small literature has studied and suggests appraisal and coping mediate the effect of implicated, but *singular stressors* on children's adjustment. In particular, avoidant coping has been found to mediate the relations of stress to depression, anxiety, and conduct problems among parentally divorced children (Sandler, Kim-Bae, & MacKinnon, 2000). A composite of "negative coping" including avoidance was found to mediate the relations of community violence to posttraumatic stress symptoms, depression, as well as anxiety (Dempsey, 2002). Positive and threat appraisals mediated the relations of marital problems to child adjustment problems (Cummings, Davies, & Simpson, 1994) and similarly, positive and threat appraisals mediated the relations of interparental conflict on child internalizing and externalizing symptoms in a second study (Grych, Harold, Miles, 2003). The most recent meta-analysis of coping as a mediator of child psychopathology concluded that there was a small, but consistent body of literature, well-grounded in theory, suggesting that coping is on child mediator of stress and adjustment.

Studies of multiple or cumulative risk indicate that an increase in the number of risk factors experienced by a child results in an increased likelihood of that child developing adjustment problems (Rutter, 1979) and that increases in experiences of risk result in a dose-dependent relationship with behavior problems and poor adjustment outcomes (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Atzaba-Poria, Pike, & Deater-Deckard, 2004). Several studies have affirmed the need to consider risk factors across demographic, psychosocial, and environmental domains, as multi-risk indexes are able to better predict child adjustment and reflect effects that could not be accounted for by any particular subset of the risk factors (Greenberg et al., 1999; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987).

A crucial component of a stressful event is an individual's appraisal that the event is in fact stressful, or in the words of Lazarus and Folkman (1984, p. 19), that the event is "taxing or exceeding his or her resources and endangering his or her wellbeing." A stressful event may be a loss, where a stressful event has already occurred, a threat, where there is an anticipation of harm in the future, or a challenge, where an event, although stressful, presents the possibility of positive outcome. In addition, individuals evaluate whether they have the resources to deal with a stressor. Threat appraisals include critical self-judgments, rejection, and criticism appraisals, whereas positive appraisals include viewing the stressor as a challenge and viewing oneself as having the resources to deal with it.

Appraisal has been linked with a myriad of positive and negative adjustment outcomes. The tendency to appraise events negatively or as threats has been related to increased child adjustment difficulties including psychological distress, depression, anxiety, and conduct and adjustment problems (e.g. Gamble, 1994; Grych & Finchman, 1990; Lengua, Sandler, West, Wolchik, & Curran, 1999; Sheets, Sandler, & West, 1996). In contrast, children who report life events as positive or endorse positive appraisals have been found to have fewer internalizing and externalizing problems (Jackson & Warren, 2000; Lengua & Long, 2002).

Coping has been generally defined as the "cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984). It has been more recently defined as conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stress (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). Active coping approaches are problem-focused and involve thinking about solving the problem or thinking more positively about the problem. Avoidant coping strategies involve trying to stay away from the problem or repressing thoughts about it. Overall, active coping strategies are related to lower levels of psychological symptoms and higher self-esteem (Ayers, Sandler, West, & Roosa, 1996; Eisenberg et al., 2000; Sandler, Tien, & West, 1994). These relations are consistent with research linking problem-solving strategies and more favorable adjustment (Causey & Dubow, 1992; Compas, Malcarne, & Fondacaro, 1988; Ebata & Moos, 1991). Alternatively, studies have found avoidant strategies to be related to higher levels of internalizing and externalizing problems (Causey & Dubow, 1992; Eisenberg et al., 2000).

There is some research to support differential relations between coping and adjustment among certain types of stressors or contexts. Specifically, active coping has been found to predict positive adjustment outcomes when coping with controllable, but not uncontrollable, events among college students (Valentiner, Holahan, & Moos, 1994). In contrast, avoidant coping was associated with positive adjustment outcomes in the context of uncontrollable stressors. When considering the uncontrollable and unavoidable stressors commonly faced by children growing up in high cumulative risk environments, it is plausible that there are differential relations among coping and adjustment as a function of risk.

Research supports an association between cumulative risk and appraisal. Cumulative risk has been related to lower perceptions of self-worth and higher learned helpless behavior among children (Evans, 2003). Evans proposed that the lives of children at high levels of cumulative

risk can be characterized by a quality of uncontrollability, which in turn has been found to threaten feelings of mastery and control and promote helpless behaviors (Landis et al., 2007; Petterson & Albers, 2001; Repetti, Taylor, & Seeman, 2002). Living in high-risk environments increases one's sense of danger, which in turn contributes to children becoming vigilant and predisposed to making threat interpretations, particularly in ambiguous situations (Taylor & Shumaker, 1990; Wandersman & Nation, 1998).

Threat appraisals appear to mediate the relation between risk and adjustment. In a prospective longitudinal study, threat appraisals mediated the relation between interparental conflict and child adjustment (Grych, Harold, & Miles, 2003) and between interpersonal conflict and children's internalizing symptoms (Grych, Finchman, Jouriles, & McDonald, 2000). Thus, cumulative risk may predict increases in threat appraisals over time, and in turn, threat appraisal may mediate the relation between cumulative risk and adjustment problems.

While we expected threat appraisals would be shaped by cumulative risk exposure, we found very little evidence to hypothesize about the relation between stress and positive appraisals, particularly in childhood. A study comparing distressed and healthy adolescents found no differences across groups in positive re-appraisals of stressors (Ebata & Moos, 1991). Relatedly, one study reported that cumulative stress was unrelated to the positive reappraisal of sad stimuli among adult women (Troy, Wilhelm, Shallcross & Mauss, 2010). There is some research to suggest dispositional self-efficacy drives positive appraisal (Jerusalem & Schwarzer, 1992), and conjecture that individuals high in temperamental positive emotionality or positive affect might demonstrate consistently high levels of positive appraisal (Folkan, 2008; Lengua & Long, 2002). Therefore, positive appraisals may be unrelated to cumulative risk and to predict adjustment independently of risk.

No studies were found that examined the longitudinal relations of cumulative risk and coping. However, studies of individual risk or stress factors often included in cumulative risk composites were identified to inform hypotheses, generally pointing to a positive association between risk and avoidant coping. High chronic economic strain and high family conflict (Wadsworth & Compas, 2002) as well as stressful life events (Seiffge-Krenke, 2000) have been associated with the greater use of avoidant coping among adolescents. High maternal depressive symptoms have been found to positively correlate with avoidant coping among adolescents (Kliewer et al., 2006) as well as adolescent's involuntary disengagement such as escape or inaction (Jaser et al., 2005). Additionally, negative coping (including asocial, antisocial, and avoidant coping strategies) was found to mediate the relation between exposure to community violence and psychological symptoms among inner-city African American adolescents (Dempsey, 2002). A recent review concluded that studies which examined child-based mediators such as coping found they accounted for the relation between stressful events and symptoms in children (Grant et al, 2006).

The literature has not consistently identified a relation between risk and active coping. Wadsworth and colleagues found poverty and family related stress negatively related to problem-solving coping in two studies (Wadsworth & Berger, 2006; Wadsworth & Compas, 2002), but failed to replicate this negative relation in a third study, where economic strain

and stressful events were unrelated to problem solving coping among adolescents (Wadsworth, Raviv, Compas, & Connor-Smith, 2005). In contrast to the two studies suggesting a negative relation between risk and active coping, two studies have found evidence for a positive relation between stress and active coping, suggesting that individuals use more active coping when levels of stress are higher. Sandler, Tein, & West (1994) found a positive association between stress and the use of active coping among children of divorce. An additional study found a positive relation between frequency and severity of daily hassles and the use of problem solving coping and among adolescents (Dumont 1999). While the literature has not established a consistent relation between risk and active coping, active coping may predict adjustment independently of cumulative risk.

Developmental abilities in cognitive processing, metacognitive skills, planning, and agency may contribute to preadolescents' appraisal and coping (Band & Weisz, 1990; Kopp, 1989; Seiffge-Krenke, Aunola, & Nurmi, 2009). In particular, the ability to understanding one's internal state coupled with the ability to regulate emotions is thought to influence the utilization of coping (Eisenberg, Fabes, & Guthrie, 1997). Empirically, studies and literature reviews of coping in preadolescence and adolescence point to a general increase in active coping approaches (Ebata & Moos, 1994; Seiffge-Krenke et al., 2000, 2009; Skinner & Zimmer-Gembeck, 2007), with mixed findings about reliance on avoidant strategies (Ebata & Moos, 1994; Lengua & Long, 2002; Seiffge-Krenke et al., 2000, 2009; Skinner & Zimmer-Gembeck, 2007). Although no longitudinal or developmental study of child appraisals have been conducted, appraisals may be impacted by these same developmental processes, which would lead to predictions of increased positive appraisal with development.

There is some evidence to suggest that while coping is malleable during childhood, it becomes more stable and trait-like in adulthood (Wadsworth et al., 2005). Models of coping such as the Responses to Stress Model (Compas et al., 1999) acknowledge stability in coping via stable characteristics of temperament, personality, and stable aspects of the environment. With regard to stable aspects of the environment, the persistent and pervasive adversity faced by children experiencing high levels of cumulative risk may shape and promote stable coping responses (Grant et al., 2003). Recursive influences of contexts and life experiences are thought to lead to acquired and patterned cognitive processing (Dodge & Pettit, 2003). Pervasive risk, or cumulative risk, might therefore lead to a style of appraisal and coping. Extant research supports stability of appraisal among at-risk children (Grych et al., 2003; Sheets et al., 1996) and continuity in coping responses to poverty related stressors (Wadsworth & Berger, 1996). Nonetheless, there is a pronounced paucity of research examining the developmental effects of chronic stress on children's appraisal and coping. It is important to examine predictors of children's appraisal and coping processes over time, as such response styles may lead to more or less adaptive developmental trajectories. These processes are aptly studied in preadolescence, a developmental period of high autonomy and independent problem solving, and also a period during which adjustment problems may mark an greater likelihood for developing serious psychopathology during adolescence (Merikangas, Nakamura, & Kessler, 2009).

This study tested whether exposure to cumulative risk predicted changes in appraisal and coping over time, and whether appraisal and coping might in turn mediate the relations

between risk exposure and child adjustment outcomes. These relations were tested using longitudinal data and a developmental model to determine whether cumulative risk shapes appraisal and coping to be more or less adaptive, whether there is specificity in the relations between cumulative risk and appraisal /coping strategies, with cumulative risk shaping some, but not all, forms of appraisal and coping, and whether appraisal and coping concurrently and prospectively account for the effects of cumulative risk on children's adjustment. We hypothesized specifically that: (1) threat appraisal and avoidant coping would increase in the presence of cumulative risk (2) cumulative risk would not shape positive appraisals and active coping, (3) threat appraisal and avoidant coping would mediate the effects of cumulative risk on child adjustment (4) positive appraisals and active coping would contribute to better adjustment independently of risk. We used longitudinal modeling to test whether cumulative risk concurrently or prospectively predicted relative changes in appraisal and coping over time, and whether these mediated later adjustment. We tested these relations in a community sample of preadolescent children, who were recruited to represent the full range of family income and a broad range of risk experiences.

Method

Participants

Participants were a community-based sample of 316 children and their mothers who were assessed during in-home interviews at three time points, each separated by one year. Time 1 interviews began when child participants were in the 3rd through 5th grades (mean age, $M = 9.6$ years, range = 7.8 – 12 years). Participants were recruited through children's public school classrooms. Schools were selected to represent a variety of sociodemographic characteristics of the Pacific Northwest urban area. Children with developmental disabilities (except learning disabilities) and families who were not fluent in English were excluded from the study to ensure adequate comprehension of the questionnaire measures. A female primary caregiver was required to participate, whereas a male primary caregiver's participation was optional. Only data from the interviews of female caregivers and children were used in order to retain the majority of the sample for analyses. Seventy-two percent of families consisted of two-parent households.

Children in the study were 53% female. Annual family income was evenly distributed with approximately 12% less than \$20,000; 23% \$21,000 to \$40,000; 18% \$41,000 to \$60,000; 14% \$61,000 to \$80,000; 16% \$81,000 to \$100,000, and 17% over \$100,000. Mothers' modal level of educational attainment was college/university graduate, and ranged from 9 individuals with less than a high school diploma to 20 individuals with advanced degrees. The sample included 29% African American, 2% Asian/Pacific Islander, 59% European/White, 2% Hispanic, 1% Native American, and 7% multiple or other ethnicities.

Procedure

Structured 2.5-hour interviews were conducted in the family's home during which questionnaire measures were administered. Home-based interviews were used in order to encourage the participation of difficult-to-recruit families. After confidentiality was explained, mothers signed informed consent forms, and children signed assent forms. The

assent forms indicated that children's responses would not be shared with their mothers unless there was concern about child safety. Mother and child participants were individually administered questionnaires by trained interviewers. The interviewers read instructions and all items on the questionnaires to the participants in order to minimize errors in interpretation and address potential problems with literacy in parents and children. Dyads were scheduled for their subsequent assessments approximately one year after the initial assessment. Families received \$40 compensation for participating at Time 1, with the compensation increasing by \$10 each additional year the families participated.

Measures

When both mother and child reports on a measure were available, a cross-reporter measure was created to partially address the impact of shared method variance and reporter bias on the observed associations. The patterns of results reported did not vary from those of models run utilizing only mother or child report and this allowed for a more parsimonious analytic approach.

Cumulative Risk

Cumulative risk consisted of 11 indices designed to represent demographic, psychosocial, and environmental risk factors. Demographic risk factors included educational risk (mothers who had not completed high school), poverty (families at or below the 1998 federal Health and Human Services Poverty Guidelines—a function of income and family size), single-parent status, adolescent parent status (mother less than 19 at the target child's birth), racial or ethnic minority status, and family density (the ratio of number of people in the home to the number of rooms in the home).

Psychosocial risk factors included negative life events, maternal depression, and family history of problems. Negative life events were assessed using mother and child report on the General Life Events Schedule for Children (Sandler, Ramirez, & Reynolds, 1986). Mothers and children reported on the number of negative life events that had occurred over the previous year. The negative life events score was the average of mother and child report. Mothers reported on their depression over the previous month using the 20-item Center for Epidemiological Studies-Depression Scale (Radloff, 1977). Internal consistency for the depression scale was .84, .82, and .90 across the time points.

Environmental risk factors included the quality of the home environment and the quality of the neighborhood environment. The quality of the home environment was assessed using interview ratings on the Post-Visit Inventory (PVI; Dodge, Bates, & Pettit, 1990). The PVI was completed by both the mother and the child and assesses the cleanliness, safety, amenities, and size of the house. Internal consistency for mother report of quality of the home was .74, .69, and .64 across time points. Internal consistency for child report was .72, .70, and .66 across time points. A scale was calculated as the mean of the items on the scale, and risk scores were the average of both interviewers' scale scores. Neighborhood conditions were assessed by parent report on the Neighborhood Questionnaire (NQ), which assesses neighborhoods safety, social involvement, and services (Conduct Problems Prevention Research Group, 1995), and interviewer ratings on the PVI, which assesses the

apparent safety of the neighborhood. Internal consistency for the NQ was .76, .79, and .77. and for the PVI was .76, .69, and .68 across time points. Risk scores were the average of the standardized NQ and PVI Scores (Greenberg et al., 1999).

Although indices of cumulative risk have been organized as demographic, psychosocial, and environmental risk factors, the concept of cumulative risk rests on the additive nature of risk factors. The cumulative risk score was calculated as the sum of the 11 standardized risk indicators, with higher scores reflecting greater exposure to risk. Descriptive statistics for this and other study variables can be found in Table 1.

Threat appraisal

Threat appraisal style was measured using an adaptation of the 24-item “What I Felt Scale” (Sheets et al., 1996). The scale assesses six dimensions of negative thoughts about life events (four items each): negative self-evaluation, negative evaluation by others, rejection, criticism of others, harm to others, loss of desired objects or activities. For this study, children were prompted to think about three of the “biggest problems” they have had during the past month and rate how much they thought each of the thoughts when thinking about their problems (0 = not at all to 3 = most of the time). Problems children generated included stressors ranging from moderate (e.g., sibling, family, peer, and school-related problems) to major life events (e.g., move, parents’ separation, and death of a loved one). The measure of threat appraisal style was the mean-weighted sum of the items across the six threat dimensions, and the internal consistency reliability was .88, .88, and .83 across time points.

Positive appraisal

Challenge and resource appraisal styles were measured using a scale written for this study. The format of the items and scale is parallel to that of the threat appraisal measure. Seven items assessed challenge appraisals, that is, children’s appraisal that they can cope with their problems (e.g. “You thought that you would be able to figure the problem out”) and six items assessed resource appraisals, that is, children’s appraisal that they had resources to bring to bear on the problem (e.g. “You thought about all the people and things in your life that could help with the situation”). Children rated how much they thought each of the thoughts when thinking about their problems (0 = not at all to 3 = most of the time). The internal consistency for the challenge and resource appraisal subscales were .66, .69, .79 and .74, .73, .78, respectively, for time 1–3. The subscales were correlated .76, .75, and .83 within each time point. A total positive appraisal style subscale was calculated as the mean-weighted sum of the 13 items on the scale, and the internal consistency was .83, .84, and .89 across time points.

Coping styles

Coping styles were assessed using the Children’s Coping Strategies Checklist (CCSC; Ayers et al., 1996). Children rated how often they used each coping behavior when they had a problem during the previous month using a four-point Likert scale (0 = *not at all*, 1 = *sometimes*, 2 = *often*, and 3 = *most of the time*). Previous studies have shown that the coping dimensions factored into four domains: active strategies (cognitive decision making, control, direct problem solving, positive cognitive restructuring, optimism, seeking understanding),

avoidant strategies (cognitive avoidance, avoidant actions), distraction strategies (distracting actions, physical release of emotions), and support seeking strategies (problem-focused support, emotion focused support; Ayers et al., 1996; Sandler et al., 1994). The dimensions of active and avoidant coping were used in the present study because of their relation to adjustment symptoms. The reliabilities for time 1 – 3 active and avoidant coping were .88, .89, .92 and .76, .82, .86 respectively.

Child Adjustment

Both mother and child report of adjustment problems and positive adjustment were obtained. Mothers reported on children's adjustment problems using the Child Behavior Checklist (Achenbach, 1991). The total problems score, which combined internalizing and externalizing problems, was used. The internal consistency for the present sample was .85, .88, and .86 for mother's report across time points. Children reported on their own depression and conduct problems. Depression was assessed using the 27-item Child Depression Inventory (CDI; Kovacs, 1981). Child-report conduct problems were assessed using the delinquent and aggressive behavior subscales (28 items) of the Youth Self Report (YSR; Achenbach, 1991). A child-report total problems score was calculated as the sum of CDI and YSR scores (the items from both measures are scored on 0 to 2 response scale, and both have roughly the same number of items). The α for this composite child-report total problems scale was .84, .83, and .88 across time points.

Positive adjustment included measures of social competence and internal well-being. Social competence was assessed using mother and child report of the 34-item Social Skills Rating System (SSRS; Gresham & Elliot, 1990) which assesses cooperation, assertion, responsibility, empathy, and self-control. The α 's for the SSRS were .80, .84, and .85 across time points for mother report and .72, .75, and .76 across time points for child report. Children reported on their own self-worth using the global self-worth subscale of the Perceived Competence Scale for Children (Harter, 1982), which assesses the extent to which children are happy with the way they are leading their lives, are generally happy with the way they are, and like themselves. The α 's for the scale were .70, .71, and .71 across time points. Children reported on a life satisfaction measure, which was adapted from the 11-item general positive affect scale of the Mental Health Inventory (Veit & Ware, 1983). Items were reworded with age-appropriate language for the use in this study. Questions included, "During the past month, how often have you felt that the future looks hopeful and promising?" The α 's for this sample were .81, .88, and .89, suggesting reasonable reliability for this scale when used with children 8 to 14 years of age. A child self-report positive adjustment score was calculated as the sum of the standardized child-report social competence, global self-worth, and life satisfaction scales. The α 's for this combined scale were .85, .89, and .92 across time points.

Mother and child reports of the dimensions were combined by averaging the standardized mother- and child-report scores. Mother- and child-report adjustment problems scores were correlated .29, .20, and .30. The composite α for the two measures of adjustment problems combined across reporter was .88, .88, and .90. Mother- and child-report positive adjustment scores were correlated .30, .37, and .42. The composite α 's for the measure of positive

adjustment combined across reporter were .81, .92, and .94. A previous confirmatory factor analyses support combining these mother and child report measures of adjustment (Lengua, Bush, Long, Kovacs, & Trancik, 2008).

Data analyses

First, correlations among the study variables were examined to identify covariates and assess the plausibility of the hypothesized associations. Next, path analyses were conducted to test the mediating effects of appraisal and coping in the relation of cumulative risk to adjustment. We tested whether a) cumulative risk predicted relative changes in appraisal and coping over time, b) whether appraisal and coping at a given time point mediated the concurrent effects of cumulative risk on adjustment problems and positive adjustment at that time point, and c) whether appraisal and coping at subsequent time points mediated the prospective relation of cumulative risk and adjustment at those later time points. The hypothesized relations among cumulative risk, appraisal, coping, positive adjustment, and adjustment problems were tested via path models in Mplus 6.11 (Muthén & Muthén, 2010). Measures of skew did not indicate significant concern with deviations from normal distributions; as such, maximum likelihood estimation was employed.

Separate models were tested for appraisal and coping, resulting in two models. For each model, cumulative risk and appraisal/coping were concurrent and prospective predictors of adjustment at each time point. To evaluate the appraisal and coping variables as potential mediators, an indirect path of risk predicting adjustment through appraisal/coping was tested using the Sobel test. Further, to examine how risk predicted changes in appraisal and coping, we examined if concurrent and prior cumulative risk predicted appraisal/coping, controlling for prior levels of appraisal/coping.

Results

Correlations among the study variables are presented in Tables 2 and 3. Children's sex was significantly associated with all adjustment measures, with boys exhibiting higher levels of problems and lower levels of positive adjustment. Sex was included as a covariate in models predicting adjustment. Age differences in appraisal and coping were generally not supported. There was a significant correlation between avoidant coping and age at the first and third time points, with older children endorsing less avoidant coping. Age was covaried in the prediction of appraisal and coping.

Appraisal and coping were moderately stable across time points ($M_{stability} = .43$ and $.34$, respectively), suggesting the potential to explain rank-order changes over time. There were positive inter-correlations among the appraisal and coping strategies. The pattern of correlations is consistent with those in previous studies and reflects the increased employment of appraisal and coping when experiencing stress (Ayers et al., 1996; Sandler et al., 1994). In the current study, cumulative risk was consistently positively associated with threat appraisal and avoidant coping. In turn, threat appraisal and avoidant coping were related to higher adjustment problems and lower positive adjustment. Consistent with our hypotheses, cumulative risk was largely unrelated to positive appraisal and active coping. Positive appraisal and active coping were not related to adjustment problems. However, they

were related to higher positive adjustment. The pattern of correlations suggested possible specificity in the associations of positive appraisal, threat appraisal, active and avoidant coping with adjustment problems and positive adjustment.

Cumulative risk as a predictor of appraisal and coping

In the path models, we examined whether cumulative risk predicted relative changes in children's appraisal and coping by examining both prospective and concurrent effects of cumulative risk on T2 and T3 appraisal and coping, controlling for prior levels of appraisal or coping (see Table 4). The only significant prospective effect was T1 cumulative risk on T2 threat appraisals. Concurrent levels of cumulative risk were related to higher threat appraisal and avoidant coping at T2 and T3 above the effects of prior levels of risk and prior levels of appraisal or coping. Cumulative risk did not predict changes in positive appraisal and active coping.

Direct effects of cumulative risk, appraisal and coping

Cumulative risk was prospectively related to higher adjustment problems across time points after controlling for prior adjustment levels, suggesting that cumulative risk was related to relative increases in adjustment problems. Cumulative risk was related concurrently to lower positive adjustment at T1. In addition, at each time point, positive appraisal and active coping were related concurrently to lower adjustment problems (except positive appraisal at T2) and higher positive adjustment. Also at each time point, threat appraisal and avoidant coping were related concurrently to higher adjustment problems and lower positive adjustment (except avoidant coping at T3). With only 3 of 16 significant prospective associations, on balance, appraisal and coping did not prospectively predict adjustment. Note that all of the associations at T2 and T3 involve appraisal and coping variables residualized on prior levels of those variables. In sum, results suggest that rank-order changes in appraisal and coping predict concurrent rank-order changes in adjustment, with positive appraisal and active coping relating to more favorable adjustment outcomes and threat appraisal and avoidant coping relating to unfavorable adjustment outcomes.

Appraisal and coping as mediators of the effects of cumulative risk

In support of mediation, there were several significant indirect effects of cumulative risk on adjustment through threat appraisal and avoidant coping. There was an indirect effect of T1 cumulative risk on T2 adjustment problems ($\beta = 0.05$, $p < .001$) and positive adjustment ($\beta = -0.04$, $p = .001$) through T1 and T2 threat appraisal. T1 cumulative risk also predicted T2 adjustment problems ($\beta = -0.11$, $p = .03$) and positive adjustment ($\beta = 0.08$, $p = .03$) through T2 threat appraisal. In the appraisal models, the direct effect from T1 cumulative risk to T2 adjustment problems remained significant ($\beta = -.21$, $p = .01$), whereas the direct effect to positive adjustment was nonsignificant ($\beta = -.06$, ns). This pattern of indirect effects was repeated at the subsequent time point, in which there was a significant indirect effect of T2 cumulative risk on T3 adjustment problems ($\beta = 0.04$, $p = .02$) and on positive adjustment ($\beta = -0.02$, $p = .05$) through T2 and T3 threat appraisal. The direct effects from T2 cumulative risk to T3 adjustment problems ($\beta = -.07$, ns) and to positive adjustment were nonsignificant ($\beta = -.03$, ns). There was support for mediation of the effect of cumulative risk on adjustment through avoidant coping. The indirect effects of T1 cumulative risk on T2

adjustment problems ($\beta = 0.02$, $p = .01$) and positive adjustment ($\beta = -0.01$, $p = .02$) through T1 avoidant coping and T2 avoidant coping were significant. There was no evidence of mediation for positive appraisal or active coping, indicating that these processes did not account for the effects of cumulative risk on adjustment.

Discussion

An important predictor of children's adjustment to risk lies in their appraisal and coping strategies for managing stress. Our findings align with previous studies' findings that in general, greater use of positive appraisal predicts lower adjustment problems and higher positive adjustment, whereas greater reliance on threat appraisal predicts higher adjustment problems and lower positive adjustment (e.g. Jackson & Warren, 2000; Lengua & Long, 2002; Sandler et al., 2000). Again consistent with previous findings (e.g. Causey & Dubow, 1992; Eisenberg et al., 2000; Sandler et al., 1994), we found that greater use of active coping predicted higher positive adjustment and lower adjustment problems, whereas greater use of avoidant coping predicted higher adjustment problems and lower positive adjustment. These patterns of relations were found longitudinally, when appraisal and coping variables had been residualized on prior levels of these variables. Therefore, rank-order changes in children's appraisal and coping predicted rank-order changes in adjustment within the one-year interval between assessments. This finding points to the centrality of appraisal and coping to adjustment and the potential benefit from interventions that reduce maladaptive appraisal and coping in children.

Although researchers have found cumulative risk to be a better predictor of adjustment than any single risk or subset of the risk factors (Greenberg et al., 1999; Sameroff et al., 1987), prior studies of appraisal and coping have generally focused on children's response to a single sources of stress (e.g. parental divorce or low income) and have not examined the relations among cumulative risk, appraisal and coping. Our findings support the hypothesis that the accumulation of multiple risk factors and their associated burden of stress plays a role in shaping children's styles of coping. Our results suggest that when the burden of stress associated with cumulative risk consistently taxes or overwhelms a child's coping resources, he or she might resort to greater reliance on threat appraisals and avoidant coping. Cumulative risk was related to higher threat appraisal and avoidant coping at each time point, concurrently predicting relative changes in threat appraisal and avoidant coping compared to the prior time point. These findings support the proposition that living in stressful environments leads to a heightened vigilance and sense of danger, which in turn engenders increased threat interpretation (Chen et al., 2004; Taylor & Shumaker, 1990). However, we found evidence of specificity among the relations of cumulative risk to appraisal and coping. Whereas cumulative risk was related to threat appraisals and avoidant coping, it was unrelated to children's use of positive appraisals and active coping, which instead contributed independently to children's adjustment. Therefore, these forms of appraisal and coping may reflect a promotable resource factor even for children living with stress or chronic adversity.

Finally, we examined for potential mediating effects of appraisal and coping, finding that threat appraisal and avoidant coping mediated the relations of cumulative risk to adjustment.

These findings align with prior studies that have found threat appraisals or avoidant coping to mediate the relation between a single stressor and both biological and psychological indicators of adjustment (Chen et al., 2004; Grych et al., 2003; Sandler et al., 1994). Mediation was generally not prospective. Rarely were the effects of cumulative risk mediated through later appraisal/coping. Rather, mediation was predominately characterized by a pathway from cumulative risk through concurrent appraisal/coping and subsequent appraisal/coping to preadolescent adjustment. This might suggest the emergence of a style of threat appraisal or avoidant coping that is consistent over time and accounts for effects of earlier risk on later adjustment.

The finding that prior levels of cumulative risks were generally unrelated to rank-order changes in appraisal and coping could suggest that relative changes in appraisal and coping responses were specific to concurrent experiences of risk; this is inconsistent with the hypothesis that cumulative risk would shape appraisal and coping styles over time. More developmental research examining the factors that contribute to appraisal and coping styles in middle-childhood through early adulthood is needed to clarify the development of appraisal and coping styles, particularly in high-risk contexts.

In summary, appraisal, coping, and cumulative risk are important predictors of adjustment problems and positive adjustment in preadolescence. Further, relative changes in appraisal and coping accounted for relative changes in adjustment over time. Greater exposure to cumulative risk predicted more threat appraisal and avoidant coping. Threat appraisals and avoidant coping, in turn, were found to mediate the relation between cumulative risk and adjustment. These mediated pathways emerged through concurrent relations of cumulative risk and appraisal/coping rather than the prospective prediction of appraisal/coping from prior cumulative risk. Levels of threat appraisal and avoidant coping following cumulative risk exposure mediated the relation between cumulative risk and subsequent adjustment, raising the possibility that by preadolescence, children in cumulative risk contexts may have developed a style of threat appraisal or avoidant coping that is consistent over time and accounts for earlier effects of risk on later adjustment.

There are several strengths of the present study including the large, diverse community sample. This allowed sufficient power to detect effects, as well as the ability to draw inferences about the effects of risk, appraisal, and coping on preadolescence adjustment within communities. The conceptualization of stress as cumulative, with sensitivity to the additive nature of stress, is a unique contribution to the appraisal and coping literature. The focus on a preadolescent sample is also a strength of the study, as this is often recognized as a period in which children develop the resourcefulness, independence, and agency that will serve them as coping skills through the challenges of adolescence and later life. There are limitations of the study design that lead to caution in interpreting its findings. In particular, the decision to aggregate parent-report and child-report adjustment measures reduced the number of analyses by half and reduced common reporter variance, but simultaneously may obscure differences in these relations across reporters.

Implications

There are several meaningful implications of this study, particularly with regard to our understanding of the development of appraisal and coping. This study was among the first to study the longitudinal relations of children's appraisal and coping to cumulative risk. Rank-order changes in children's appraisal and coping predicted rank-order changes in positive adjustment and adjustment problems, highlighting the importance of appraisal and coping to the understanding of adjustment within the context of cumulative risk. With regard to cumulative risk's role in appraisal and coping processes, higher levels of cumulative risk were found to predict higher levels of threat appraisal and avoidant coping. However, prior levels of cumulative risk were generally unrelated to rank-order changes in appraisal and coping, indicating that, in preadolescence, there was little evidence of risk shaping appraisal and coping style over time. Generally, as predicted, cumulative risk did not predict children's positive appraisal and active coping, though these appraisal and coping processes were related to adjustment. As such, positive appraisal and active coping appear to contribute to children's adjustment and may serve as promotable child characteristics that can be the target of preventive interventions for children experiencing multiple-risk contexts, potentially mitigating the detrimental effects of such contexts. Deleterious appraisal and coping styles, perhaps prompted by experiences of cumulative risk contexts, may engender adjustment problems, and therefore, reflect targets for corrective intervention. Future studies should build upon this longitudinal work to identify developmental periods in which appraisal and coping styles might be most susceptible to environmental influences of risk to inform the timing of intervention efforts.

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Figure 1a.

Figure 1b.

Figure 1.

Figure 1a. Path model of the relations among cumulative risk, appraisal, and adjustment. (Note: Child age and sex were included as a covariate of adjustment in all analyses. Only significant paths are depicted for simplicity of presentation.)

Figure 1b. Path model of the relations among cumulative risk, coping, and adjustment. (Note: Child age and sex were included as a covariate of adjustment in all analyses. Only significant paths are depicted for simplicity of presentation.)

Table 1

Descriptive statistics for variables included in this study

	<i>Mean</i>	<i>SD</i>	<i>Range</i>	<i>Skew</i>
Age T1	9.63	0.97	8.00 – 12.00	0.14
Positive Appraisal T1	21.21	7.59	0.00 – 37.00	–0.16
Positive Appraisal T2	16.96	6.24	1.00 – 29.00	–0.07
Positive Appraisal T3	15.47	6.90	1.00 – 30.00	0.28
Threat Appraisal T1	9.80	7.10	0.00 – 34.00	1.06
Threat Appraisal T2	6.02	5.89	0.00 – 26.00	1.28
Threat Appraisal T3	4.93	4.71	0.00 – 21.00	1.19
Active Coping T1	39.19	13.40	4.00 – 69.00	–0.11
Active Coping T2	24.01	9.10	0.00 – 45.00	–0.20
Active Coping T3	25.59	9.71	1.00 – 45.00	–0.04
Avoidant Coping T1	18.71	6.50	1.00 – 36.00	–0.12
Avoidant Coping T2	16.99	6.96	2.00 – 36.00	0.16
Avoidant Coping T3	15.93	7.29	0.00 – 36.00	0.39
Cumulative Risk T1	–0.03	5.27	–9.86 – 18.52	0.80
Cumulative Risk T2	0.00	4.20	–6.52 – 20.82	1.37
Cumulative Risk T3	0.00	5.29	–9.94 – 22.16	1.27
Adjustment Problems T1	0.01	0.82	–1.29 – 4.37	1.31
Adjustment Problems T2	0.00	0.77	–1.42 – 2.98	0.88
Adjustment Problems T3	–0.00	0.80	–1.13 – 4.09	1.54
Positive Adjustment T1	–0.00	0.81	–2.44 – 1.56	–0.56
Positive Adjustment T2	0.00	0.81	–2.37 – 2.71	–0.45
Positive Adjustment T3	0.00	0.83	–2.85 – 1.85	–0.63

Table 2

Correlations among appraisal and coping variables

	SEX	API	AP2	AP3	THT1	THT2	THT3	ACT1	ACT2	ACT3	AVD1	AVD2	AVD3
Age	0.08	-0.08	-0.01	-0.08	-0.08	-0.04	-0.08	-0.03	0.03	-0.03	-0.19 [*]	-0.10	-0.16 [*]
Sex	-	0.05	-0.08	-0.02	-0.04	0.01	-0.04	0.07	-0.05	-0.10	0.06	-0.03	-0.04
PosAp1		-	0.29 [*]	0.29 [*]	0.31 [*]	0.17 [*]	0.08	0.73 [*]	0.25 [*]	0.25 [*]	0.49 [*]	0.10	0.14 [*]
PosAp2			-	0.51 [*]	0.10	0.19 [*]	0.04	0.24 [*]	0.71 [*]	0.47 [*]	0.12	0.42 [*]	0.19 [*]
PosAp3				-	0.07	0.08	0.08	0.27 [*]	0.36 [*]	0.80 [*]	0.18 [*]	0.21 [*]	0.47 [*]
ThtAp1					-	0.38 [*]	0.22 [*]	0.14 [*]	0.05	0.04	0.44 [*]	0.30 [*]	0.24 [*]
ThtAp2						-	0.54 [*]	0.06	0.24 [*]	0.08	0.14 [*]	0.49 [*]	0.23 [*]
ThtAp3							-	-0.06	0.03	0.03	-0.02	0.30 [*]	0.35 [*]
Active1								-	0.26 [*]	0.26 [*]	0.56 [*]	0.08	0.07
Active2									-	0.41 [*]	0.06	0.52 [*]	0.15 [*]
Active3										-	0.07	0.14 [*]	0.52 [*]
Avoid1											-	0.27 [*]	0.24 [*]
Avoid2												-	0.42 [*]
Avoid3													-

Note.

^{*} $p < .05$

Table 3

Correlations of appraisal and coping variables with risk and adjustment

	RISK1	RISK2	RISK3	PROB1	PROB2	PROB3	POS1	POS2	POS3
Age	-0.07	-0.05	-0.09	-0.01	0.06	0.15*	-0.03	-0.10	-0.12
Sex	0.04	0.03	-0.03	0.12	0.13*	0.19*	-0.15*	-0.14*	-0.16*
PosAp1	0.12	0.01	0.05	0.07	0.07	0.04	0.14*	-0.05	0.03
PosAp2	0.07	0.08	0.09	-0.02	0.06	-0.04	0.10	0.14*	0.14*
PosAp3	0.14*	0.11	0.10	-0.03	0.01	-0.10	0.12	0.19*	0.30*
ThtAp1	0.32*	0.24*	0.24*	0.47*	0.26*	0.22*	-0.38*	-0.32*	-0.31*
ThtAp2	0.05	0.16*	0.14*	0.34*	0.55*	0.37*	-0.23*	-0.36*	-0.31*
ThtAp3	0.11	0.17*	0.22*	0.28*	0.32*	0.43*	-0.28*	-0.31*	-0.34*
Active1	0.03	-0.04	0.00	-0.07	-0.01	-0.02	0.26*	0.04	0.13*
Active2	-0.09	-0.03	-0.04	-0.03	0.04	-0.06	0.19*	0.23*	0.19*
Active3	0.04	0.01	0.04	-0.06	0.03	-0.10	0.19*	0.27*	0.36*
Avoid1	0.23*	0.17*	0.17*	0.18*	0.11	0.04	-0.03	-0.10	-0.02
Avoid2	0.16*	0.18*	0.13*	0.16*	0.28*	0.21*	-0.09	-0.15*	-0.15*
Avoid3	0.27*	0.20*	0.28*	0.18*	0.22*	0.17*	-0.05	-0.06	0.00

Note.

* $p < .05$

Table 4

Path coefficients predicting appraisal, coping, and adjustment

	Positive Appraisal	Threat Appraisal	Active Coping	Avoidant Coping	Adjustment Problems	Positive Adjustment
Time 1 Outcomes						
Sex	-	-	-	-	0.13**	-0.17***
Age	-0.07	-0.06	-	-	0.03	-0.03
Cumulative Risk T1	0.11	0.32***	-	-	0.25***	-0.17**
Positive Appraisal T1	-	-	-	-	-0.10*	0.28***
Threat Appraisal T1	-	-	-	-	0.42***	-0.41***
OR						
Sex	-	-	-	-	0.11*	-0.14**
Age	-	-	-0.03	-0.18***	0.04	-0.06
Cumulative Risk T1	-	-	0.03	0.21***	0.33***	-0.24***
Active Coping T1	-	-	-	-	-0.22***	0.36***
Avoidant Coping T1	-	-	-	-	0.22***	-0.17**
Time 2 Outcomes						
Sex	-	-	-	-	0.05	-0.12**
Age	-0.01	-0.07	-	-	0.07	-0.04
Adjustment T1					0.58***	0.53***
Cumulative Risk T1	0.06	-0.28*	-	-	-0.21**	-0.06
Positive Appraisal T1	0.26***	-	-	-	0.07	-0.13*
Threat Appraisal T1	-	0.40***	-	-	-0.15***	0.02
Cumulative Risk T2	0.04	0.26*	-	-	0.27***	-0.02
Positive Appraisal T2	-	-	-	-	-0.05	0.17**
Threat Appraisal T2	-	-	-	-	0.39***	-0.29***
OR						
Sex	-	-	-	-	0.06	-0.04
Age	-	-	0.02	-0.04	0.07	-0.12**

	Positive Appraisal	Threat Appraisal	Active Coping	Avoidant Coping	Adjustment Problems	Positive Adjustment
Adjustment T1					0.61***	0.54***
Cumulative Risk T1	-	-	-0.08	0.01	-0.33***	0.04
Active Coping T1	-	-	0.27***	-	0.10	-0.19**
Avoidant Coping T1	-	-	-	0.27***	-0.08	0.05
Cumulative Risk T2	-	-	0.07	0.15*	0.34***	-0.09
Active Coping T2	-	-	-	-	-0.12*	0.31***
Avoidant Coping T2	-	-	-	-	0.25***	-0.27***
Time 3 Outcomes						
Sex	-	-	-	-	0.12*	-0.08 ^t
Age	-0.10	-0.03	-	-	0.13**	-0.05
Adjustment T2					0.63***	0.57***
Cumulative Risk T2	0.10	-0.11	-	-	-0.03	-0.04
Positive Appraisal T2	0.49***	-	-	-	0.00	-0.05
Threat Appraisal T2	-	0.52***	-	-	-0.13**	-0.01
Cumulative Risk T3	-0.04	0.24*	-	-	0.13*	-0.03
Positive Appraisal T3	-	-	-	-	-0.11*	0.26***
Threat Appraisal T3	-	-	-	-	0.30***	-0.18**
OR						
Sex	-	-	-	-	0.11*	-0.07
Age	-	-	-0.06	-0.12 ^t	0.14**	-0.06
Adjustment T2					0.61***	0.58***
Cumulative Risk T2	-	-	-0.04	-0.12	-0.07	-0.03
Active Coping T2	-	-	0.39***	-	-0.05	-0.01
Avoidant Coping T2	-	-	-	0.39***	0.05	-0.06
Cumulative Risk T3	-	-	0.08	0.31**	0.19*	-0.09
Active Coping T3	-	-	-	-	-0.14*	0.26***
Avoidant Coping T3	-	-	-	-	0.09	-0.05

.100 > *p*

,10 > *p*

,05 > *p*
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Note.

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