

Stressors and child and adolescent psychopathology: Evidence of moderating and mediating effects

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Abstract

This paper reviews studies that have tested for moderators or mediators of the relation between stressors and child and adolescent psychopathology. Many studies have tested for moderation, but results of research studying moderators have been inconclusive. There have been few theory-based studies and there have been few consistent findings. Far fewer studies have tested for mediation effects, but these studies have generally been theory-driven, have more often built upon one another in an incremental fashion, and have yielded consistent results. In particular, there is substantial evidence for the mediating role of family relationship in the relation between stressors and child and adolescent psychological symptoms. Future studies should integrate moderator and mediator research by testing for specific mediators in relation to particular moderating contexts, so that we can better understand the complex ways in which stressful life experiences affect the well-being of children and adolescents. © 2005 Elsevier Ltd. All rights reserved.

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The construct of stressors is fundamental to the field of developmental psychopathology. At the theoretical level, most prevailing models of child/adolescent psychopathology recognize the potential importance of environmental stressors in the etiology and maintenance of both internalizing and externalizing disorders in youth (e.g., Cicchetti & Toth, 1991, 1997; Haggerty, Sherrod, Garmezy, & Rutter, 1994; Rutter, 1989). Stressors represent the environmental contribution of risk, which interacts with genetic predisposition, to lead to psychological problems in children and adolescents (Mash & Barkley, 1996).

In spite of the potential significance of stressors, reviews of the child/adolescent stress literature published in the past two decades present a picture of a field early in its development (e.g., Cohen & Park, 1992; Compas, 1987; Johnson, 1986; Johnson & Bradlyn, 1988). These reviews (Cohen & Park, 1992; Compas, 1987; Johnson, 1986; Johnson & Bradlyn, 1988) called for clarity in conceptualization and measurement and more research examining:

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(1) prospective associations between stressors and psychopathology, (2) moderators of the relation between stressors and psychological problems (including the need for research examining changes in the association between stressors and psychopathology across development), (3) mediating processes in the relation between stressors and psychopathology, and (4) specificity in the relation between particular types of stressors and particular types of psychopathology (Cohen & Park, 1992; Compas, 1987; Johnson, 1986; Johnson & Bradlyn, 1988).

To evaluate progress that has been made in the last 15 years, we have examined the stress literature in a series of four articles. These include reviews of conceptualization and measurement of stressors (Grant, Compas, Stuhlmacher, Thurm, McMahon, & Halpert, 2003), evidence of prospective effects (Grant, Compas, Thurm, McMahon, & Gipson, 2004), and evidence of specificity in the relations between stressors and child/adolescent psychopathology (McMahon, Grant, Compas, Thurm, & Ey, 2003). The present paper focuses on evidence of moderation and mediation in the relation between stressors and child and adolescent psychopathology.

To conduct these reviews, we completed both computer (PsychLit and PsychInfo) and manual searches (tracking citations). The computer-generated search was conducted using the following key words: stress (or events or hassles), psychopathology (or psychological symptoms or psychological disorder), and child (or adolescent), and was limited to empirical studies published in scientific journals in English since 1987 (i.e., since the last comprehensive reviews; Compas, 1987; Johnson, 1986). This search was repeated with specific additional stressors substituted for the stress term: abuse, divorce (or marital conflict), violence, poverty (or low income or low socioeconomic status), illness, and death. Results of these additional searches were combined with the original search and duplicates removed, yielding over 1500 original empirical articles on the relation between stressors and psychological symptoms during childhood or adolescence published in scientific journals from 1987 to the present. Approximately 30% of these studies (approximately 500 studies) met criteria for inclusion in the broader review. These studies all moved beyond examination of simple cross-sectional associations between stressors and psychological symptoms by meeting one or more of the following criteria: (1) tested the prospective association between stressors and psychological symptoms, controlling for prior symptoms; (2) tested for specific associations between particular stressors and particular outcomes; (3) examined moderators in the association between stressors and psychological outcome; and/or (4) used the series of regression analyses recommended by Baron and Kenny (1986) or structural equation modeling to examine mediating processes in the relation between stressors and psychological symptoms.

1. Moderational hypotheses

A moderator has been defined as “a variable that affects the direction and/or strength of the relation between a predictor and a criterion variable” (Baron & Kenny, 1986, p. 1174). Research on moderators in the relation between stressors and psychopathology is concerned with identification of variables that accentuate or reduce the association between stressors and psychological symptoms (Holmbeck, 1997). The determination that particular variables influence the relation between stressors and psychopathology among children and adolescents would provide important theoretical and practical information. With regard to theory, knowledge of individual/group/environmental characteristics, which place subgroups of youth at heightened risk for psychopathology would help clarify the mechanisms by which stressors lead to psychopathology. In terms of practical applications, knowledge of individual/group/environmental characteristics that protect subgroups of youth from the negative effects of stressors would be helpful in designing effective prevention and intervention programs for youth exposed to stressors.

Baron and Kenny (1986) outline specific statistical strategies for examining moderation hypotheses. Although these methods vary somewhat across specific research designs, the general approach is to include an interaction term (e.g., stress $\times$ age) in ANOVA or regression analyses to determine whether the association between stressors and symptoms varies as a function of group membership (e.g., age, gender; Rudolph & Hammen, 1999). In addition, it is possible to address the theory behind moderation (i.e., the impact of stressors on mental health varies across particular groups), by examining the relation between stressors and symptoms separately for specific sample subgroups (e.g., boys versus girls) and comparing these results (e.g., Rudolph et al., 2000). A newer method that has been used considerably less frequently is multiple group comparison analyses using structural equation modeling. This method tests for moderation by comparing the fit of two models: one which constrains the relation between independent and dependent variables to be equal across groups that differ on the hypothesized moderator and one which does not (e.g., Rudolph, Lambert, Clark, & Kurlakowsky, 2001). Results of a chi-square difference test can be used to

determine whether the two models differ, and results of analysis of the unconstrained model provide information about the size and significance of the relevant path in each group (Rudolph et al., 2001).

2. Evidence from studies testing moderational hypotheses

Over 200 studies have examined moderators of the relation between stressors and psychopathology since the last comprehensive reviews. For most of these studies, however, testing for moderation was not central to research aims and specific moderation hypotheses were not guided by developmental psychopathology theory. Rather, researchers included variables, such as age or sex, in more general analyses focused on other research questions. Nonetheless, these studies provide preliminary data on moderating effects and, for this reason, are briefly reviewed below.

Specific variables that have been examined as moderators of the relation between stressors and symptoms include age, sex, race/ethnicity, cognitions, competence, coping, social support, family environment, peer environment, activities, and positive events. Age and sex are the two variables that have most frequently been tested as moderators. Both represent “fixed” individual characteristics in that neither is likely to be influenced by stressors. Race/ethnicity is a third fixed individual characteristic that has been examined in a smaller number of studies.

Moderators such as cognitions, coping, and competence represent relatively malleable individual characteristics, relative to age, sex, and race/ethnicity. Variables such as these have more frequently been the focus of theory-based moderator research. For example, a handful of studies (Abela & Sullivan, 2003; Chang & Sanna, 2003; Cole & Turner, 1993; Hilsman & Garber, 1995; Nolen-Hoeksema, Girgus, & Seligman, 1992; Panak & Garber, 1992; Robinson, Garber, & Hilsman, 1995; Shirk, Boergers, Eason, & Van Horn, 1998; Southall & Roberts, 2002; Tram & Cole, 2000; Turner & Cole, 1994) have built on cognitive models of depression to examine the moderating function of specific depressogenic attributions.

Environment-based contextual variables (e.g., social support, family environment, peer environment, activities/positive events) have also been examined as moderators. Studies examining environment-based moderators have frequently been concerned with discovering variables, which buffer or protect youth from the negative effects of stressors.¹ Unfortunately, in spite of the importance of contextual influences on the relation between stressors and psychopathology in youth, studies in this area have been characterized by variability in conceptualization and measurement of central moderating constructs, thus limiting the conclusions which may be drawn.

2.1. Fixed individual characteristics

2.1.1. Age

Age has been examined as a moderator of the association between stressors and symptoms in over 60 studies, but few consistent findings have emerged. (Note: studies that examined age as a moderator are designated with a single asterisk in the reference section.) A little over half of these studies found age to moderate the association between stressors and symptoms. Discrepancies in whether or not age was found to serve a moderating function are not readily explained by apparent methodological differences across studies. Studies examining broad (e.g., Reinherz et al., 1993; Smith, Howard, & Monroe, 1998) and narrow age spans (e.g., Larson & Ham, 1993; Sandler, Tein, & West, 1994) have both reported positive (e.g., Larson & Ham, 1993; Smith et al., 1998) and negative (e.g., Reinherz et al., 1993; Sandler et al., 1994) findings for moderation. Although the average sample size for the studies reporting a moderating effect was larger (average of 595 participants versus an average of 382 for studies that did not find an effect), this difference appears to be accounted for by three studies that were exceptionally large (over 2500 participants each; Chandy, Blum, & Resnick, 1996; Kliewer, Murrelle, Mejia, de G., & Angold, 2001; Patton et al., 1996). With these three studies removed, the average sample size of studies finding a moderating effect was actually smaller (278) than the average sample size of studies that did not find an effect. Unfortunately, variability in study designs (e.g., measures used, sample composition) precluded any additional comparisons.

Among those studies that found age to moderate the association between stressors and symptoms, one pattern emerges across several studies (Black, Dubowitz, & Harrington, 1994; Chandy et al., 1996; DiGallo, Barton, & Parry-

¹ For the purpose of this review, neither environmental characteristics of the stressful experience itself (e.g., whether force was used in sexual abuse) nor variables which are commonly viewed as stressors (e.g., socioeconomic status) were considered suitable candidates for moderation to avoid confounding of moderation with the additive effects of stressors (Rutter, 1989).

Jones, 1997; Fitzpatrick, 1993; Hibbard & Hartman, 1992; Johnston, 1990; Larson & Ham, 1993; Masten, Miliotis, Graham-Berman, Ramirez, & Neemann, 1993; O'Keefe, 1994a; Patton et al., 1996; Seidman et al., 1998; Yule, 1992). Stressors appear to be more strongly associated with *parent*-report symptoms among *younger* children and more strongly associated with *self*-report symptoms among *older* youth.² This pattern of findings was not accounted for by possible differences in the validity of parent versus self-report for internalizing versus externalizing symptoms (i.e., parents may be better able to identify externalizing symptoms and youth better able to identify internalizing symptoms), as the pattern emerged across studies that examined parent and self-report of internalizing symptoms and parent and self-report of externalizing symptoms.

There are several possible interpretations of this pattern. First, it may be that parent perceptions are accurate and younger children do exhibit heightened symptoms in response to stressors but are unable to report these symptoms due to cognitive limitations and/or mismatch between available assessment tools and development. Alternatively, parents may be more knowledgeable about symptoms experienced by younger children (due to the greater amount of time typically spent with younger children) and less knowledgeable about symptoms experienced by adolescents (because they have fewer opportunities to observe adolescent distress and/or because adolescents are better able and more motivated to hide their distress). Development of valid and reliable assessment tools for use with younger children is necessary to fully address these alternative hypotheses. In the meantime, observational measures should be combined with parent and self-report data to test these hypotheses.

2.1.2. Sex

Sex has been examined as a moderator in over 100 studies. (Note: studies that examined sex as a moderator are designated with a double asterisk in the reference section; studies that examined both sex and age are designated with a triple asterisk.) A little over half of these studies found sex to moderate the association between stressors and symptoms. As with studies examining age as a moderator, the average sample size of studies that reported significant moderating effects (1290) was larger than the average sample size of studies that did not find such effects (465), but again these differences disappeared when studies that included more than 2500 participants were excluded. None of the studies that failed to find a moderating effect had a sample larger than 2500, whereas six studies that found a moderating effect had samples sizes larger than 2500, including samples as large as 42,568 (Luster & Small, 1997). Once these studies were removed from the comparison, the average sample size of the studies that did find effects was actually smaller (369) than the average sample size of those studies that did not find effects. As with the age studies, additional comparisons were precluded due to variability in design (i.e., it was not possible to compare differences across measures as there were insufficient numbers of studies using the same measures).

Among those studies that did find moderating effects for sex, findings highlight the interrelationship of moderators with specificity of outcome (McMahon et al., 2003). Over half the studies (39 of 68) reporting a moderating effect for sex reported that girls were more likely to respond to stressors with internalizing symptoms and/or boys were more likely to respond with externalizing symptoms. Examining those studies that included only internalizing outcomes and reported a moderating effect for sex, 18 of 19 (95%) reported a stronger association between stressors and symptoms for girls. Four of the six (67%), which included only externalizing outcomes and reported a moderating effect for sex, reported a stronger association between stressors and symptoms for boys.

In addition to this pattern, however, it appears that risk for negative outcomes for boys versus girls may also vary as a function of the specific stressor experienced. For example, 80% of poverty studies, 71% of divorce studies, and 60% of abuse studies (which reported greater vulnerability for a particular sex) found boys to be at heightened risk. On the other hand, 86% of exposure to violence studies, 67% of exposure to disaster studies, and 60% of cumulative stressor studies (which reported greater vulnerability for a particular gender) found girls to be at heightened risk.

This pattern may reflect specificity between particular stressors and particular outcomes more common for a particular sex. For example, poverty, divorce, and abuse may all involve heightened exposure to conflict, which may

² This pattern is less consistent for abuse studies. The method in which age was operationalized in several of these studies (i.e., age of onset, age at termination), however, is likely to be confounded with duration of abuse.

be specifically linked to aggression (Sandler, Reynolds, Kliewer, & Ramirez, 1992), an externalizing outcome for which boys are at heightened risk. Although exposure to violence also appears to involve exposure to conflict, examination of studies conducted in this area indicates several focused on exposure to peer suicide (Brent et al., 1993, 1994; Rohde, Seeley, & Mace, 1997), which may also represent an experience of loss (which has been theorized to predict depression, Sandler et al., 1992). Others in this area examined post-traumatic stress disorder (PTSD), an outcome for which girls are at heightened risk, as the sole outcome variable (Berton & Stabb, 1996; Fitzpatrick & Boldizar, 1993).

It may be that exposure to particular types of violence (e.g., suicide, murder) and exposure to disaster, two stressors associated with increased risk for girls, are specifically associated with anxiety, and these specific stressor–outcome relations explain heightened risk for girls confronted with these stressors. Finally, cumulative stress measures generally tap a variety of stressors, including those occurring in one's social network. Thus, female vulnerability to interpersonal caretaking (Nolen-Hoeksema & Girgus, 1994) may explain heightened risk for girls reporting substantial cumulative stressors.³

Taken together, the patterns outlined above demonstrate potential interrelations among particular moderators, stressors, and outcomes. Unfortunately, conclusions which may be drawn from these patterns are tempered by methodological issues. In particular, 53% of cumulative stressor, 71% of exposure to violence, and 43% of exposure to disaster studies examined a greater number of internalizing measures relative to externalizing measures,⁴ thus increasing the odds that girls would endorse heightened rates of symptoms. Thirty percent of poverty studies, on the other hand, included more measures of externalizing than internalizing outcomes,⁵ thus increasing the odds that boys would report heightened symptoms. Nonetheless, focusing only on those studies that examined an equal number of internalizing and externalizing outcomes, the pattern of specificity remains for all areas except cumulative stressors. Of particular interest is that most (60%) divorce studies actually included more internalizing than externalizing outcomes, thus strengthening conclusions which may be drawn from the pattern of findings in this domain. The finding that boys responded with more symptoms to this stressor is consistent with the theory that conflict-based stressors are specifically associated with externalizing outcomes (Sandler et al., 1992). Further research is needed to determine the extent to which moderating and specificity relations interact in the prediction of psychopathology in children and adolescents (McMahon et al., 2003).

2.1.3. Race/ethnicity

Race/ethnicity has been examined as a moderator in at least 23 studies. Most of these studies compared the association between stressors and symptoms among European American, African American, and Latino youth (Attar, Guerra, & Tolan, 1994; Baldwin et al., 1993; Barrera, Li, & Chassin, 1993; Barrera, Li, & Chassin, 1995; Biafora, Warheit, Vega, & Gil, 1994; Bolger, Patterson, Thompson, & Kupersmidt, 1995; Costello, Keeler, & Angold, 2001; Dodge, Petit, & Bates, 1994; DuBois, Felner, Brand, Adan, & Evans, 1992; Feiring, Coates, & Taska, 2001; Felner et al., 1995; Guerra, Huesmann, Tolan, Van Acker, & Eron, 1995; Kuhn, Arrelano, & Chavez, 1998; March, Amaya-Jackson, Terry, & Costanzo, 1997; Mennen, 1994; Paschall, Ennett, & Flewelling, 1996; Rotheram-Borus, Mahler, Koopman, & Langabeer, 1996; Smith & Krohn, 1995; Steer, Scholl, & Beck, 1990) with a few studies including other racial/ethnic groups (Chandy et al., 1996; Costello, Farmer, Angold, Burns, & Erkanli, 1997; Raadal, Milgrom, Cauce, & Mancl, 1994). Seventy-four percent of these studies found race/ethnicity to moderate the association between stressors and symptoms. As with studies examining age and sex as moderators, discrepancies in findings are not readily explained by methodological differences across studies and variability in design limits meaningful comparisons.

³ It has been hypothesized that women are socialized to (1) be more sensitive to the needs of others, (2) invest more time and energy in the problems and lives of friends and family, and (3) base their self-esteem on the status of relationships with others (Boggiano & Barrett, 1991; Kaplan, 1986; Robbins & Tanck, 1991; Nolen-Hoeksema, Larson, & Grayson, 1999). Thus, women may be exposed to heightened rates of stressors in the lives of significant others (Kaplan, 1986; Kessler & McLeod, 1984) and more likely to experience distress in response to interpersonal difficulties (Boggiano & Barrett, 1991; Robbins & Tanck, 1991).

⁴ Fourteen percent examined a greater number of externalizing outcomes relative to internalizing outcomes; 43% examined an equal number of internalizing and externalizing outcomes.

⁵ Twenty percent examined a greater number of internalizing outcomes, relative to externalizing outcomes; 50% examined an equal number of internalizing and externalizing outcomes.

Among those studies that did find moderating effects for race/ethnicity, the most common pattern was a stronger association between stressors and psychological symptoms for White youth (Baldwin et al., 1993; Barrera et al., 1993, 1995; Biafora et al., 1994; Chandy et al., 1996; Costello et al., 1997; Feiring et al., 2001; Guerra et al., 1995; March et al., 1997). This may reflect the presence of specific cultural factors among youth of color (e.g., religious/family values) that offset the negative effects of stress. Alternatively, it may represent an artifact of reliance on stressor measures predominantly developed on White youth.

2.2. *Relatively malleable individual characteristics (cognitions, competence, coping)*

In comparison with studies examining age, sex, and race/ethnicity, a substantially higher percentage of studies examining cognitions as moderators reported evidence of moderation. At least 31 studies have examined cognitions as moderating variables (Abela & Sullivan, 2003; Benson & Deeter, 1992; Blocker & Copeland, 1994; Cauce, Hannan, & Sargeant, 1992; Chang & Sanna, 2003; Cheng & Lam, 1997; Cole & Turner, 1993; Cowen et al., 1992; Dixon & Ahrens, 1992; Feiring, Taska, & Lewis, 2002; Gore & Aseltine, 1995; Hammen, 1988; Hammen & Goodman-Brown, 1990; Hankin & Abramson, 2002; Hankin, Abramson, & Siler, 2001; Hilsman & Garber, 1995; Kliever & Sandler, 1992; Mannarino & Cohen, 1996; Mannarino, Cohen, & Berman, 1994; March et al., 1997; McFarlane, Bellissimo, & Norman, 1995; McGee, Wolfe, & Olson, 2001; Nolen-Hoeksema et al., 1992; O'Grady & Metz, 1987; Robinson, Garber, & Hilsman, 1995; Rudolph et al., 2001; Runyon & Kenny, 2002; Shirk et al., 1998; Southall & Roberts, 2002; Tram & Cole, 2000; Turner & Cole, 1994; Wills, McNamara, & Vaccaro, 1995). Eighty-three percent of these studies found evidence of moderation (Abela & Sullivan, 2003; Blocker & Copeland, 1994; Chang & Sanna, 2003; Cheng & Lam, 1997; Cowen et al., 1992; Dixon & Ahrens, 1992; Feiring et al., 2002; Gore & Aseltine, 1995; Hammen, 1988; Hammen & Goodman-Brown, 1990; Hankin & Abramson, 2002; Hankin et al., 2001; Hilsman & Garber, 1995; Kliever & Sandler, 1992; McGee et al., 2001; Nolen-Hoeksema et al., 1992; O'Grady & Metz, 1987; Robinson et al., 1995; Rudolph et al., 2001; Runyon & Kenny, 2002; Shirk et al., 1998; Southall & Roberts, 2002; Turner & Cole, 1994; Wills et al., 1995). This pattern is consistent with specific etiological models of psychopathology (e.g., cognitive theory of depression) and may represent the essential function of cognitions in the development of symptoms. It is also possible, however, that authors whose studies focused on theory-based moderating effects (such as cognitions) were less likely to publish non-significant findings (Rotton, Foos, Van Meek, & Levitt, 1995), whereas studies that focused on issues besides moderation and simply included age, gender, and race/ethnicity moderation analyses within a broader series of analyses were more apt to publish non-significant moderating results.

At least 13 studies have examined specific etiological models of psychopathology, based on cognitive theories of depression (Abela & Sullivan, 2003; Chang & Sanna, 2003; Cole & Turner, 1993; Hankin & Abramson, 2002; Hankin et al., 2001; Hilsman & Garber, 1995; Nolen-Hoeksema et al., 1992; Panak & Garber, 1992; Robinson, Garber, & Hilsman, 1995; Rudolph et al., 2001; Southall & Roberts, 2002; Shirk et al., 1998; Tram & Cole, 2000; Turner & Cole, 1994). Although these studies generally did not examine the same specific cognitions, they provide some of the best examples of theory-driven moderation research. All but three of these studies (Cole & Turner, 1993; Davila, Hammen, Burge, Paley, & Daley, 1995; Tram & Cole, 2000) found support for the moderating role of specific depressogenic cognitions. For example, Hammen and Goodman-Brown (1990) found that youth high on interpersonal self-schema, but not youth high on achievement self-schema, exhibited heightened depressive symptoms in response to interpersonal stressors. Shirk et al. (1998) reported similar findings.

Several studies indicated that children with depressogenic attributional style, maladaptive self-regulatory beliefs, or pessimism were at heightened risk for depressive symptoms when exposed to stressors (Chang & Sanna, 2003; Hankin & Abramson, 2002; Hankin et al., 2001; Hilsman & Garber, 1995; Panak & Garber, 1992; Robinson et al., 1995; Rudolph et al., 2001; Southall & Roberts, 2002). In addition, Hilsman and Garber (1995) and Chang and Sanna (2003) found a protective effect for positive attributions in response to stressors. Finally, both Nolen-Hoeksema and Girgus (1992) and Turner and Cole (1994) reported findings that illustrate the impact of development on the function of appraisal processes in response to stressors. Nolen-Hoeksema and Girgus (1992) examined stressors, cognitions, and age as predictors of depressive symptoms among youth followed from third to eighth grade. The authors reported that stressors, alone, emerged as a powerful predictor of depression among younger children; however, among older youth, the interaction of stressors with negative explanatory style emerged as a predictor. Turner and Cole (1994) reported a similar finding in their sample of fourth, sixth, and eighth grade youth. Negative cognitive style interacted

with stressors to predict depressive symptoms for older, but not younger, youth. The specificity, developmentally grounded, and theory-based nature of these studies exemplify the type of research needed to test and further develop specific conceptual models of the etiology of stressors in the development of specific types of psychopathology.

A number of studies examining competence and coping variables as moderators build on the theoretical frame of resilience research (Cicchetti & Garmezy, 1993; Garmezy, 1987; Rutter, 1987). This framework is valuable for examining particular factors that might protect youth from the negative effects of stressors and has the potential to facilitate the development of intervention/prevention programs based on naturally occurring characteristics and/or contexts beneficial to youth. At least 18 studies have examined competence as a moderating variable. Eight of these have examined *social* competence as a protective factor (Brown, Powell, & Earls, 1989; Cowen et al., 1992; Davila et al., 1995; Dubow, Tisak, Causey, Hryshko, & Reid, 1991; Goodman, Gravitt, & Kaslow, 1995; Luthar, Doernberger, & Zigler, 1993; Vinnick & Erickson, 1994; Wills, Vaccaro, & McNamara, 1992) and 10 have examined *intellectual/academic* competence (Cheng & Lam, 1997; Cicchetti, Rogosch, Lynch, & Holt, 1993; Cowen et al., 1992; Fergusson & Lynskey, 1996; O'Keefe, 1994b; Qouta, El-Sarraj, & Punamaki, 2001; Rae-Grant, Thomas, Offord, & Boyle, 1989; Shapiro, Leifer, Martone, & Kassem, 1992; Tiet et al., 2001; Wills et al., 1992; Zingraff, Leiter, Johnson, & Myers, 1994). Of these two variables, academic competence appears to be the more consistent buffer. Seventy-five percent of studies testing for a buffering effect for *intelligence/academic achievement* found such an effect (Cheng & Lam, 1997; Cowen et al., 1992; Fergusson & Lynskey, 1996; O'Keefe, 1994b; Wills et al., 1992; Zingraff et al., 1994), whereas only 25% of studies examining *social competence* reported a consistent protective effect (Cowen et al., 1992; Goodman et al., 1995).

Examination of the social competence studies suggests that developmental factors affect the role this variable plays. Vinnick and Erickson (1994) found social skills protective for the third graders, but not the 6th graders, in their sample. And two out of three studies examining younger (predominantly pre-adolescent) children (Cowen et al., 1992; Goodman et al., 1995) reported a buffering effect for social competence, whereas none of the four studies focusing exclusively on adolescent samples (Brown et al., 1989; Davila et al., 1995; Luthar et al., 1993; Wills et al., 1992) reported a consistent buffering effect. For example, Wills et al. (1992) reported that competence with adults was protective, but competence with peers accentuated the relation between stressors and substance use in their adolescent sample. In addition, Luthar et al. (1993) reported that social competence ("sociability" in particular) accentuated the relation between stressors and depressive symptoms in their ninth grade sample.

This pattern of findings suggests that social competence is more protective for pre-adolescents than it is for adolescents. One explanation for this is that socially competent adolescents are exposed to negative peer models who are engaged in substance use and/or other externalizing behaviors. Alternatively, it is possible that adolescent culture (e.g., focus on appearance, belonging to cliques, etc.) poses a risk for youth and those who are most immersed in this culture are at greatest risk. Further, adolescents (girls in particular) who are high on social competence (or sociability) may be more likely to take on interpersonal burdens, which heighten vulnerability to depression (Nolen-Hoeksema & Girgus, 1994). Additional research is needed to test these hypothesized explanations.

At least eight studies examined coping variables as moderators (Blocker & Copeland, 1994; Cowen et al., 1992; Cohen et al., 1996; Creasey, Mitts, & Catanzaro, 1995; Johnson & Pandina, 1993; Kilpatrick & Williams, 1998; Sandler et al., 1994; Wills et al., 1995) and about half reported a buffering effect (Blocker & Copeland, 1994; Cowen et al., 1992; Johnson & Pandina, 1993; Sandler et al., 1994). Unfortunately, little can be concluded in this area, as none of the studies examined the same coping construct using the same measure. Incremental research, using comparable measures, is needed to determine the potential moderating role of specific coping strategies in relation to stressors and symptoms (see Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001, for a review of the broader role of coping in developmental psychopathology).

Finally, Gazelle and Rudolph (2004) tested a diathesis-stress model of the role of interpersonal vulnerability (a construct which combines cognitive, social, and coping vulnerability in interpersonal situations) and interpersonal stressors (i.e., exclusion by peers) in the prediction of depression. They found that youth with greater interpersonal vulnerability were more likely to become depressed in the context of interpersonal stressors.

In sum, there is considerable evidence that cognitive factors moderate the relation between stressors and psychopathology, particularly with regard to depressive symptoms. Academic competence is a significant protective factor in the majority of studies and the role of social competence seems to be contingent on developmental factors (i.e., more protective for younger children). Few consistent findings have emerged for coping strategies as moderators.

2.3. *Environmental contexts (social support, family and peer environment, activities/positive events)*

Environment-based moderators that have been examined to date include social support, family environment (e.g., family cohesion, family structure, family routines, parenting style, and parent attachment), peer environment (e.g., positive peer relationships, interactions with substance abusing peers) and activities/positive events. Unfortunately, this area of research has been particularly hampered by inconsistent measurement of moderating constructs, thus precluding meaningful conclusions.

In brief, social support has been examined as a moderator in at least 32 studies (Benson & Deeter, 1992; Blocker & Copeland, 1994; Cauce et al., 1992; Clark-Lempers, Jacques, & Netusil, 1990; Cowen et al., 1992; DuBois et al., 1992; DuBois, Felner, Meares, & Krier, 1994; Dubow et al., 1991; Fergusson & Lynskey, 1996; Frison, Wallender, & Browne, 1998; Ge, Lorenz, Conger, Edler, & Simmons, 1994; Gore & Aseltine, 1995; Hershberger & D'Augelli, 1995; Jenkins & Smith, 1990; Kandel, Raveis, & Davies, 1991; Kliwer & Kung, 1998; Kliwer, Lepore, Oskin, & Johnson, 1998; Kliwer et al., 2001; Leadbeater & Linares, 1992; Luster & Small, 1997; McFarlane et al., 1995; Morrison & Clavenna-Valleroy, 1998; Muller, Goebel-Fabbri, Diamond, & Dinklage, 2000; O'Grady & Metz, 1987; O'Keefe, 1994b; Ozer & Weinstein, 2004; Paxton, Robinson, Shah, & Schoeny, 2004; Rae-Grant et al., 1989; Rhodes & Woods, 1995; Stiffman, Chueh, & Earls, 1992; Wills & Cleary, 1996; Wills et al., 1992, 1995; Ystgaard, 1997) and about half of these reported support for the buffering hypothesis (Benson & Deeter, 1992; DuBois et al., 1992, 1994; Ge et al., 1994; Gore & Aseltine, 1995; Hershberger & D'Augelli, 1995; Jenkins & Smith, 1990; Kliwer et al., 1998, 2001; Luster & Small, 1997; Muller et al., 2000; O'Grady & Metz, 1987; Ozer & Weinstein, 2004; Paxton et al., 2004; Rhodes & Woods, 1995; Wills & Cleary, 1996; Wills et al., 1992; Ystgaard, 1997).

At least 28 studies have tested for buffering effects as a function of family environment. Sixty-one percent of these found evidence of protection (Aseltine, 1996; Baer, McLaughlin, Burnside, Pokorny, & Garnezy, 1987; Brent et al., 1995; Brody & Forehand, 1990; Fergusson & Lynskey, 1996; Fitzpatrick & Boldizar, 1993; Forehand & Jones, 2003; Gorman-Smith & Tolan, 1998; Gribble et al., 1993; Holmes, Frentz, & Yu, 1999; Jenkins & Smith, 1990; Kliwer & Kung, 1998; Kliwer et al., 2001; Oates, O'Toole, Lynch, Stern, & Cooney, 1994; O'Keefe, 1994b; Punamaki, Qouta, & Sarraj, 1997; Wyman, Cowen, Work, & Parker, 1991) and 39% failed to find such an effect (Burt, Cohen, & Bjorck, 1988; Einbender & Friedrich, 1989; Felner et al., 1995; Fergusson, Horwood, & Lynskey, 1994; Garrison, Jackson, Marsteller, McKeown, & Addy, 1990; Gest, Neemann, Hubbard, Masten, & Tellegen, 1993; Krenichyn, Saegert, & Evans, 2001; Luster & Small, 1997; Paschall et al., 1996; Rubin et al., 1992; Trickett, 1993).

At least three studies (Fergusson & Lynskey, 1996; Rubin et al., 1992; Wills et al., 1995) have examined the moderating effect of peer environment. One found evidence of protective function (Rubin et al., 1992) and the other two found that negative peer environment (e.g., substance abusing, delinquent peers) exacerbated the association between stressors and symptoms (Fergusson & Lynskey, 1996; Wills et al., 1995).

Finally, at least 10 studies have examined the moderating effect of positive events/activities (Blocker & Copeland, 1994; Cohen, Burt, & Bjorck, 1987; Doyle, Wolchik, Dawson-McClure, & Sandler, 2003; Eckenrode et al., 2001; Fergusson et al., 1994; Jenkins & Smith, 1990; Kot, Landreth, & Giordano, 1998; Phan & Kingree, 2001; Rae-Grant et al., 1989; Siegel & Brown, 1988; Stiffman et al., 1992) and 70% (seven) reported evidence of a buffering effect (Blocker & Copeland, 1994; Cohen et al., 1987; Doyle et al., 2003; Eckenrode et al., 2001; Fergusson et al., 1994; Phan & Kingree, 2001; Stiffman et al., 1992). Two of these examined psychological interventions as moderators. Eckenrode et al. (2001) found that home visitation by nurses buffered the effects of child maltreatment on adolescent externalizing problems, whereas Kot et al. (1998) found that play therapy did not buffer the effects of exposure to domestic violence on behavior problems in children.

Unfortunately, in each of these areas (social support, family environment, peer environment, activities/positive events), a wide variety of constructs were examined, and the few patterns that did emerge were based on such few studies that conclusions are premature. For example, 100% of exposure to violence (Kliwer et al., 1998, 2001; Muller et al., 2000; Ozer & Weinstein, 2004; Paxton et al., 2004) and 100% of abuse studies (Luster & Small, 1997; Morrison & Clavenna-Valleroy, 1998) testing for moderating effects for social support found evidence of protective function, compared to only 45% to 50% positive findings for all other stress categories examined (i.e., 45% of cumulative stressors, 50% of poverty, and 50% of divorce/marital conflict studies reported evidence of a protective function for social support). This pattern suggests that social support may be particularly beneficial for youth exposed to particular types of stressors, but this conclusion is based on a small number of studies.

Incremental research, focused on the same specific constructs using comparable measures, is needed to determine the potential moderating role of specific environmental contexts in relation to stressors and psychological symptoms in youth. In addition, studies of environmentally based moderators should begin to move beyond self-report measures of these contexts (most have failed to do so). Self-report measures of child-based characteristics, such as cognitions and coping, make sense, in that youth (at least older youth) are likely most qualified to report on these internal processes/styles. However, self-report measures of environmental contexts may well be confounded with child-based characteristics, such as cognitions, coping, and competence.

2.4. Summary of moderator research

Results of studies testing the hypothesis that moderators influence the relation between stressors and psychological symptoms provide limited support for this hypothesis. This area of research has been fraught with variability in specific constructs examined and measures used, limiting conclusions. In addition, few moderator studies have been theory-driven. The handful of studies examining specific depressogenic cognitions as moderators of the relation between stressors and depressive symptoms represent an important exception. More studies like these, which test specific etiological models of developmental psychopathology, are needed. In addition, the findings suggestive of relations between particular moderators (i.e., gender) and particular stressors and outcomes highlight the importance of testing complex models that examine specific moderators in relation to specific stressors, mediators, and outcome.

3. Mediational hypotheses

A mediator is a variable that, conceptually and statistically, “accounts for the relation between a predictor and a criterion variable” (Baron & Kenny, 1986, p. 1176). The classic steps for the establishment of mediation recommended by Baron and Kenny (1986) are that: (a) the predictor is significantly related to the criterion, (b) the predictor is significantly related to the mediator, (c) the mediator is related to the criterion, and (d) the variance accounted for in the criterion, by the predictor, decreases when the mediator is controlled (Baron & Kenny, 1986).

Recently, however, there have been several challenges to this approach. A review of recent methodological articles on mediational analyses suggests that experts are divided about the importance of meeting all of Baron and Kenny’s (1986) recommended conditions. For example, Cole and Scott (2003), Holmbeck (2002), and Judd, Kenny, and McClelland (2001) support the use of all four conditions to establish mediation effects, arguing that indirect effects that are not found within the context of a significant relation between the independent and dependent variables do not conceptually or statistically explain that relation. On the other hand, MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), Shrout and Bolger (2002), and Collins, Graham, and Flaherty (1998) have argued that adhering to the four conditions required by Baron and Kenny (1986) results in a test that lacks sufficient power (at least to detect small to moderate effect sizes within small to medium-sized samples). They suggest that requiring Baron and Kenny’s (1986) first condition (i.e., that a significant relation between the independent and dependent variable be established) may prevent discovery of potentially valid mediational relations between variables that are only distally related. For example, the association between poverty and psychopathology is likely to be distal relative to more proximal stressors such as exposure to violence or abuse (Grant, McCormick, Poindexter, Simpkins, & Janda, 2004). As the independent variable becomes more distal, its expected effect upon the dependent variable is reduced because it is more likely to be mediated by additional mediators (Shrout & Bolger, 2002). The outcome is also more likely to be multiply determined, and introduction of random factors is more likely (Shrout & Bolger, 2002).

MacKinnon et al. (2002) and Shrout and Bolger (2002) also argue that suppression effects might alter the strength of the relation between independent and dependent variables, thereby obscuring potentially meaningful relations. For example, a stressor that leads to an outpouring of social support (for at least some portion of a sample) may only be related to psychopathology when social support is statistically controlled. In such a case, the association between stressors and psychopathology is likely to be reduced and may be non-significant, as it represents an average of positive and negative associations (Shrout & Bolger, 2002). Shrout and Bolger (2002) suggest that, before conducting mediational analyses, researchers determine whether the stressor and outcome are

expected to be distally or proximally related, and whether or not suppression effects are expected. On the basis of these conclusions, a decision should be made about whether or not the first condition outlined by Baron and Kenny (1986) is required.

Additional recent methodological recommendations include conducting analysis of the strength of the indirect effects and using confidence intervals rather than null-hypothesis statistical tests (see MacKinnon et al., 2002; Shrout & Bolger, 2002, for a detailed description of recommended strategies). Recommendations have also been made against the use of cross-sectional designs in mediational research (see Cole & Scott, 2003, for guidelines for conducting longitudinal mediational analyses using structural equation modeling).

Few stress researchers have yet taken advantage of these relatively recent recommendations. Most studies have been cross-sectional and one of two general statistical strategies has typically been employed (i.e., multiple regression analyses and structural equation modeling). Most studies have built upon the conceptual rationale provided by Baron and Kenny (1986), though many who have utilized structural equation modeling have not tested each of Baron and Kenny's (1986) conditions; rather, they have simply used evidence for model fit as evidence of mediation. To provide support for Baron and Kenny's (1986) mediational conditions using structural equation modeling, the following conditions should be met: (1) stressors directly predict psychological symptoms; (2) an indirect path through the hypothesized mediator also provides an adequate fit to the data; and (3) the model which includes the hypothesized mediator actually provides a better fit with the data than the model without the hypothesized mediator (based on a chi-square difference test; Holmbeck, 1997). Alternatively, if the model which best fits the data includes both direct and indirect paths, variance accounted for by the direct path decreases when an indirect path through the mediator is included in the model (Holmbeck, 1997).

4. Empirical evidence that mediators explain the relation between stressors and psychopathology

An important strength of mediator research is that all studies in this area (unlike the bulk of moderator studies) have explicitly set out to test mediational hypotheses (i.e., all have been theory-driven). The two broad theoretical models that have provided the basis for most mediator research are interpersonal theory (i.e., stressors affect the mental health of youth through disruption of important interpersonal relationships/interactions; Hammen & Rudolph, 1996) and cognitive theory (i.e., stressors affect the mental health of youth through their impact on cognitive processes; Cole & Turner, 1993; Harter, Marold, & Whitesell, 1992). The theory-driven focus on mediating processes makes this body of literature particularly exciting for the field of developmental psychopathology. For this reason, the 70 mediator studies conducted in the past 15 years will be reviewed in somewhat more detail, with a focus on specific conceptual and methodological issues pertinent to this area of research.

Studies testing mediational hypotheses have examined several specific types of variables as mediators of the relation between stressors and psychological symptoms. These variables may be categorized as environment-based (e.g., neighborhood stressors), family-based (e.g., family processes), and child-based (e.g., coping strategies) variables. In general, studies testing family-based mediating variables have operated within the general framework of interpersonal theories of psychopathology (Hammen & Rudolph, 1996), whereas studies examining child-based variables tend to be based on cognitive theories of psychopathology (Cole & Turner, 1993; Harter et al., 1992). Studies focused on environment-based mediators less frequently have tested specific theories of psychopathology and, more often, focused on the broad stress paradigm tenet that daily hassles mediate the relation between major life events and psychopathology (Compas et al., 1989). To date, mediational models have been tested for the following stressful experiences affecting children: poverty, parental divorce/marital conflict, exposure to violence, abuse, parental illness, and cumulative measures of stressors. Studies focusing on each of these types of stressors are reviewed below.

4.1. Poverty and economic hardship

Poverty has received more research attention than any of the other stressors examined in mediator research. This may be due to the broad distal nature of this stressor, which particularly begs the question of mediating mechanisms. Studies examining poverty have operationalized this construct in a variety of ways, ranging from traditional measures of low socioeconomic status (e.g., Dodge et al., 1994) to school records of student eligibility for free/reduced price school lunches (e.g., Bolger et al., 1995) to detailed measures of economic

stressors (e.g., Conger, R., Conger, K., Elder, Lorenz, Simons, & Whitbeck, 1993). Environment, family, and child-based mediators have been examined.

4.1.1. Environment-based mediators

At least three studies have tested the hypothesis that stressful life events mediate the relation between poverty and psychological symptoms among youth (Felner et al., 1995; Gore, Aseltine, & Colton, 1992; Guerra et al., 1995). Two of these (Felner et al., 1995; Gore et al., 1992) used Baron and Kenny's (1986) regressions, one used structural equation modeling (Guerra et al., 1995), and all three reported support for this hypothesis.

4.1.2. Family-based mediators

Evidence that family processes mediate the relation between poverty and psychological symptoms has been quite consistent. Fifteen of sixteen studies examining family-based variables as mediators of the relation between poverty and symptoms found support for this hypothesis (Bolger et al., 1995; Brody & Flor, 1997; Conger et al., 1991, 1992, 1993, 2002, Conger, Ge, Elder, Lorenz, & Simmons, 1994; Dodge et al., 1994; Elder, Conger, Foster, & Ardelt, 1992; Felner et al., 1995; Ge et al., 1992; Lempers, Clark-Lempers, & Simons, 1989; Paschall & Hubbard, 1998; Sampson & Laub, 1994; Smith & Krohn, 1995; Wills et al., 1995). For example, Conger et al. (1991, 1992, 1993, 1994), Elder et al. (1992), and Ge et al. (1992) conducted a series of studies examining family processes as mediators of the relation between acute economic loss and psychological symptoms in a sample of White middle class families faced with the farm crisis of the 1980s. Specifically, these authors hypothesized that economic hardship would be related to parental depressed mood through daily financial pressures associated with objective loss of income. Parental depression, in turn, was expected to predict marital conflict, which was expected to lead to changes in parenting behaviors (decreased nurturance, increased hostility, inconsistent discipline), which, finally, were hypothesized to predict adolescent psychological distress. The authors used structural equation modeling to test their hypotheses and reported that results supported their model. Recently, Conger et al. (2002) have replicated their model with African American families.

Family variables found to mediate the relation between poverty and symptoms in other studies include harsh or inconsistent discipline (Dodge et al., 1994; Lempers et al., 1989; McLoyd, Jayaratne, Beballo, & Borquez, 1994; Sampson & Laub, 1994), decreased warmth (Dodge et al., 1994; Lempers et al., 1989), poor parent–child relationships/attachment (McLoyd et al., 1994; Sampson & Laub, 1994; Smith & Krohn, 1995), poor supervision (Sampson & Laub, 1994), lack of maternal involvement in school (Bolger et al., 1995), disrupted family routines (Brody & Flor, 1997), family conflict (Paschall & Hubbard, 1998), parental control (Smith & Krohn, 1995), and lack of parental support (Wills et al., 1995).

4.1.3. Child-based mediators

At least three studies have examined child-based variables as mediators of the relation between poverty and psychological symptoms (De Haan & MacDermid, 1999; Guerra et al., 1995; Paschall & Hubbard, 1998). The specific variables examined include identity development (De Haan & MacDermid, 1999), beliefs approving of aggression (Guerra et al., 1995), and self-esteem (Paschall & Hubbard, 1998). All three studies used structural equation modeling, and all three reported support for their hypothesis.

4.2. Comprehensive models

Two studies examined a number of different types of mediators. Eamon (2002) used Baron and Kenny's regression analyses to find that neighborhood problems, fewer outside activities, mother depressed mood, and physical punishment partially mediated the relation between poverty and anxious/depressed symptoms in young adolescents. Wills et al. (1995) provide the only study to examine environment-based, family-based, and child-based mediators together in a single comprehensive model. The authors examined additional stressors, peer substance use, parental support, family substance use, perceived competence, esteem, control, and coping as mediators of the relation between parent education and substance use symptoms. The authors used both Baron and Kenny's (1986) regression analysis and structural equation modeling to test their hypotheses and provided evidence of mediation for additional stressors, peer substance use, parental support, and perceived competence.

4.3. Divorce and marital conflict

Divorce/marital conflict studies have generally examined either broad measures of divorce-related stressors (Forgatch, Patterson, & Skinner, 1988; Sandler, Wolchik, Braver, & Fogas, 1991; Sandler et al., 1994; Fogas, Wolchik, Braver, Freedom, & Bay, 1992), or focused specifically on marital conflict (Fauber, Forehand, Thomas & Wiersen, 1990; Harold & Conger, 1997; Harold, Osborne & Conger, 1997; Mann & MacKenzie, 1996; Pruett, Williams, Insabella, & Little, 2003). Mediation research on divorce has focused exclusively on family and child-based mediators. Evidence for the mediational role of both types of variables has been found.

4.3.1. Family-based mediators

At least five studies have examined family-based mediators of the relation between divorce/marital conflict and psychological symptoms. Four used structural equation modeling or path analysis to test their hypotheses (Fauber et al., 1990; Harold & Conger, 1997; Harold et al., 1997; Pruett et al., 2003) and one used Baron and Kenny's (1986) regressions (Mann & MacKenzie, 1996). With one exception (Mann & MacKenzie, 1996), these studies reported support for their hypothesis. Specific parenting behaviors found to mediate the relation between divorce/marital conflict and symptoms include parental psychological control and rejection/withdrawal (Fauber et al., 1990), parent hostility toward child (Harold & Conger, 1997; Harold et al., 1997), and negative changes in the parent-child relationship (Pruett et al., 2003).

4.3.2. Child-based mediators

At least two child-based variables have been examined as mediators of the relation between divorce-related stressors and child maladjustment: maladaptive coping (Sandler et al., 1994) and external locus of control (Fogas et al., 1992). Baron and Kenny's (1986) multiple regression equations were used in both studies and both reported support for their hypotheses.

4.4. Exposure to violence

At least eight studies have tested for mediators of the relation between exposure to violence (i.e., witnessing violence) and psychological symptoms. Types of violence examined include domestic violence (Spaccarelli, Coatsworth, & Bowden, 1995), community violence (Aisenberg, 2001; Dempsey, 2002; Kliwer et al., 1998; Krenichyn et al., 2001; Lee, 2001; Linares et al., 2001), and political violence (Punamaki et al., 1997). Types of mediators examined include family and child-based variables. Six studies used Baron and Kenny's (1986) regression analyses (Aisenberg, 2001; Dempsey, 2002; Kliwer et al., 1998; Krenichyn et al., 2001; Spaccarelli et al., 1995) and two used structural equation modeling (Linares et al., 2001; Punamaki et al., 1997). All but one (Krenichyn et al., 2001) reported support for their hypotheses.

4.4.1. Family-based mediators

Aisenberg (2001) and Linares et al. (2001) examined maternal distress as a mediator of the relation between exposure to community violence and symptoms in young children. Both studies used Baron and Kenny's (1986) regressions. The hypothesis was supported with Latino children (Aisenberg, 2001) and with predominantly African American children (Linares et al., 2001).

Punamaki et al. (1997) examined parenting style (punishment and rejection, intimacy and love, strictness and control) and parent political activity as mediators of the relation between exposure to political violence and self-reported psychological symptoms among Palestinian children. They used structural equation modeling and reported that both poor parenting and high political activity partially mediated the relation between exposure to violence and psychological symptoms.

4.4.2. Child-based mediators

At least four studies have examined child-based mediators of the relation between exposure to violence and symptoms. All four used Baron and Kenny's (1986) regression analyses to test their hypotheses and each reported support for their hypotheses. Dempsey (2002) found that negative coping mediated the relation between exposure to community violence and depression and anxiety symptoms. Kliwer et al. (1998) reported evidence that intrusive

thoughts partially mediated the relation between exposure to violence and symptoms. Lee (2001) found that children's anger mediated the relation between marital violence and total behavior problems. Spaccarelli et al. (1995) reported that aggressive control coping and attitudes toward aggression (but not peer relationship competence, self-control, or autonomy) mediated the relation between exposure to violence and violent behavior. Spaccarelli's pattern of findings may indicate that variables specifically related to outcome (i.e., aggressive control coping and attitudes toward aggression) are more likely to serve a mediating role. Alternatively, the reported pattern may reflect methodological and/or conceptual confounding across mediator and outcome variables (i.e., aggressive coping, attitudes toward aggression and aggressive behavior).

4.5. Abuse/victimization

At least 10 studies have examined mediators of the relation between various types of abuse/victimization and psychological symptoms. Types of abuse/victimization examined include physical abuse (Dembo et al., 1992; Dodge, Petit, Bates, & Valente, 1995; Maughan & Cicchetti, 2002; McGee et al., 2001; Whitbeck, Hoyt, & Ackley, 1997), sexual abuse (Dembo et al., 1992; Feiring et al., 2002; Feiring, Taska, & Lewis, 1998; Kisiel & Lyons, 2001), and "hate-crimes" (directed toward gay youth) (Hershberger & D'Augelli, 1995).

4.5.1. Environment-based mediators

One study (Whitbeck et al., 1997) examined environment and child-based mediators (child initiated transitions, time on own, affiliation with deviant peers) of the relation between physical abuse and self-report delinquent behaviors. The authors used structural equation modeling to test their hypothesis and found no evidence of mediating effects.

4.5.2. Family-based mediators

One study (Hershberger & D'Augelli, 1995) examined family and child-based mediators (family support and self-acceptance) of the relation between victimization and psychological symptoms among gay, lesbian, and bisexual youth. Structural equation modeling was used to test for mediation effects, and the authors reported that family support and self-acceptance partially mediated the relation between victimization and psychological symptoms.

4.5.3. Child-based mediators

In addition to the two studies reviewed above, which examined child-based mediators in conjunction with environment or family-based mediators (Whitbeck et al., 1997; Hershberger & D'Augelli, 1995), at least seven studies examined child-based mediators alone (Dembo et al., 1992; Dodge et al., 1995; Feiring et al., 1998, 2002; Kisiel & Lyons, 2001; Maughan & Cicchetti, 2002; McGee et al., 2001). Dembo et al. (1992) used structural equation modeling and reported evidence that drug use partially mediated the relation between sexual abuse and theft. Dodge et al. (1995) used Baron and Kenny's (1986) regression analyses and reported that social information processing (encoding errors, aggressive-response-accessing) mediated the relation between physical abuse and externalizing symptoms. Kisiel and Lyons (2001) used Baron and Kenny's (1986) regressions and found that dissociation mediated the relation between sexual abuse and psychological symptoms. Feiring et al. (1998) examined whether shame and negative attributional style mediate the relation between sexual abuse and symptoms. They used Baron and Kenny's (1986) regressions and found support for their hypothesis. In a follow-up study, they tested whether shame mediates the relation between abuse severity and symptoms in a group of sexually abused children with negative attributional style. They again used Baron and Kenny's (1986) regressions, but did not find support for this hypothesis. McGee et al. (2001) used Baron and Kenny's (1986) regressions to find that self-blame mediated the relation between maltreatment severity and internalizing problems in girls. Finally, Maughan and Cicchetti (2002) tested whether children's dysregulated emotional patterns mediated the link between physical abuse/neglect and anxious/depressed symptoms. They used Baron and Kenny's (1986) regressions and reported support for their hypothesis.

4.6. Parental illness and death

At least two studies have examined mediators of the relation between parental illness/death and psychological symptoms. The first (Grant & Compas, 1995) examined environment and child-based mediators of the relation

between parental illness and psychological symptoms. The second (West, Sandler, Pillow, Baca, & Gersten, 1991) examined environment and family-based mediators of the relation between parental death and psychological symptoms.

Grant and Compas (1995) tested two competing hypotheses to explain the relation between maternal cancer and psychological symptoms in adolescent daughters: (1) that maternal cancer would lead to increased family responsibilities for daughters and that these family responsibilities would predict psychological symptoms; (2) that maternal cancer would lead to increased use of ruminative coping strategies, which would lead to increased symptoms. Regression analyses (Baron & Kenny, 1986) were used to test for mediation effects. Results supported the first hypothesis. Family responsibility stressors fully mediated the relation between maternal cancer and symptoms of anxiety and depression among girls in their sample.

West et al. (1991) examined mediating processes in the relation between parental death and symptoms of depression, anxiety, and conduct disorder among children and adolescents. They hypothesized that the relation between parental death and psychological symptoms would be mediated by increased negative events, decreased positive events, increased distress of the surviving parent, and decreased family cohesion. Structural equation modeling was used to test for mediation effects. The authors concluded there is support for each of the paths in their model except for the path through increased negative events.

It is interesting that West et al. (1991) found no support for additional stressful experiences as mediators of the relation between parental death and psychological symptoms, whereas Grant and Compas (1995) reported that family responsibility stressors fully mediated the relation between maternal cancer and adolescent female distress. One interpretation of this apparent contradiction is that increased family responsibilities shouldered by adolescent girls whose mothers have cancer is a mediator distinct to this specific context. Additional research, which tests specific mediational processes in relation to specific contextual moderators, is needed.

West et al.'s (1991) conclusion that family-based variables (among others) mediate the relation between parental death and child depression, anxiety, and conduct problems is consistent with conclusions of many of the studies reviewed above. These studies point to family-based variables as important mediators of the relation between stressors and psychological symptoms affecting children and adolescents.

4.7. Normative events/transitions

At least two studies have examined mediators of the relation between normative events/transitions and psychological symptoms. Hurrelmann, Engel, and Weidman (1992) examined family (conflict with parents) and child-based (concern over career prospects) mediators of the relation between academic failure/academic stress and self-reported psychological symptoms among German adolescents. The authors used structural equation modeling and reported that conflict with parents and concern over career prospects fully mediated the relation between academic failure and symptoms and partially mediated the relation between academic stress and symptoms.

Panak and Garber (1992) examined the child-based variable, perceived peer rejection, as a mediator of the relation between peer rejection and depression and aggression symptoms. The authors used regression analyses (Baron & Kenny, 1986) and found that perceived peer rejection fully mediated the relation between peer rejection and depression symptoms.

4.8. Cumulative stressors

The final category of stressors examined for mediational processes is cumulative measures of stressful life events. Hypothesized mediators of the relation between cumulative stressors and psychological symptoms have included environment-based (additional stressors, peer substance use), family-based (family cohesion, family conflict), and child-based (negative affect, self-esteem, eating, and delinquency symptoms) variables.

4.8.1. Environment-based mediators

At least three studies have examined environment-based mediators of the relation between cumulative stressors and psychological symptoms (Compas, Howell, Phares, Williams, & Ledoux, 1989; Wagner, Compas, & Howell, 1988; Wills & Cleary, 1996). All three used structural equation modeling, and all three reported support for their hypothesis. Wagner et al. (1988) and Compas et al. (1989) reported that daily hassles mediated the relation between

major life events and psychological symptoms. Wills and Cleary (1996) reported that peer substance use partially mediated the relation between cumulative stressors and adolescent substance use.

4.8.2. Family-based mediators

At least four studies have examined family-based mediators of the relation between cumulative stressors and psychological symptoms (Barrera et al., 1995; Hoffman & Su, 1997; King, Beals, Manson, & Trimble, 1992; Roosa, Dumka, & Tein, 1996). Three of these used structural equation modeling (Barrera et al., 1995; Hoffman & Su, 1997; King et al., 1992) and one used Baron and Kenny's (1986) regressions (Roosa et al., 1996).

Specific family variables examined include family conflict (Barrera et al., 1995), family cohesion (Roosa et al., 1996), family support (King et al., 1992), and parent–child attachment (Hoffman & Su, 1997). Evidence was found for the mediating role of each of these family-based variables except parent–child attachment. Lack of evidence for the mediating role of parent–child attachment is consistent with the notion that attachment relationships develop during early childhood (Bowlby, 1988), and thus may be less susceptible (relative to family support, cohesion, or conflict) to recent stressful life events.

4.8.3. Child-based mediators

At least 11 studies have examined child-based mediators of the relation between cumulative stressors and psychological symptoms (Chang & Sanna, 2003; Chassin, Pillow, Curran, Molina, & Barrera, 1993; Cheng & Lam, 1997; Colder & Chassin, 1993; Cole & Turner, 1993; Deardorff, Gonzales, & Sandler, 2003; DuBois, Felner, Sherman, & Bull, 1994; Haine, Ayers, Sandler, Wolchik, & Weyer, 2003; Hussong & Chassin, 1993; Kandel et al., 1991; Tram & Cole, 2000). Specific mediators examined include negative affect (Chassin et al., 1993; Colder & Chassin, 1993; Hussong & Chassin, 1993), self-esteem or perceived competence (Cheng & Lam, 1997; DuBois et al., 1994; Haine et al., 2003; Tram & Cole, 2000), problem-solving (Cheng & Lam, 1997), eating disorder symptoms (Kandel et al., 1991), delinquency symptoms (Kandel et al., 1991), depression symptoms (Kandel et al., 1991), and negative cognitions (Chang & Sanna, 2003; Cole & Turner, 1993; Deardorff et al., 2003). Five of these studies used structural equation modeling (Chassin et al., 1993; Cole & Turner, 1993; Deardorff et al., 2003; DuBois et al., 1994; Kandel et al., 1991), four used Baron and Kenny's (1986) regressions (Chang & Sanna, 2003; Colder & Chassin, 1993; Hussong & Chassin, 1993; Tram & Cole, 2000), one used MacKinnon's (2000) analysis of indirect effects (Haine et al., 2003), and one used path analysis (Cheng & Lam, 1997). All reported support for their hypotheses.

4.9. Summary of mediator research

Results of studies testing the hypothesis that mediators explain the relation between stressors and developmental psychopathology provide support for this hypothesis. In contrast with the vast majority of moderator studies, all mediator studies have intentionally tested mediational hypotheses and, as a result, have generally been theory-driven. The most consistent finding across studies is that family-based variables (including parent–child relationships and parenting behaviors) mediate the relation between stressors and psychological symptoms in children and adolescents. This finding is consistent with interpersonal models of developmental psychopathology (Hammen & Rudolph, 1996) and suggests that stressors exert their negative impact on youth by disrupting important interpersonal relationships/interactions.

Although consistent support was found for family-based mediators, most of the studies which examined these variables did not test competing mediational models. Those studies which examined child (e.g., coping strategies) and environment-based (e.g., daily hassles) mediators found they also accounted for the relation between stressful events and symptoms in young people. Studies of integrative models, which examine how family, child, and environment-based mediators fit together to explain the relation between stressors and psychopathology, are needed. Family and child variables, in particular, are likely to be integrally related. A child's coping repertoire, for example, may be expanded or limited based on their family context (Gore & Eckenrode, 1994). It may be that parent behaviors elicit child behaviors (and vice versa) such that the types of parenting behaviors implicated in mediator studies which focused on family variables (e.g., parental warmth, hostile/rejecting parenting, inconsistent discipline) lead to the types of child behaviors/characteristics implicated in the studies focusing on child variables (e.g., low self-esteem, external locus of control, avoidant coping). For

example, hostile/rejecting parenting may lead to low self-esteem, which, in turn, leads to psychological symptoms (Garber, Robinson, & Valentiner, 1997).

Results of mediation studies also highlight the importance of considering moderating contexts in mediation research. Several studies indicated that mediational findings only held true for particular groups of youth and specific discrepancies in findings across contexts (i.e., Grant & Compas, 1995; West et al., 1991) support the notion that particular contexts moderate the role of mediating processes.

Analysis of methods used over the past 15 years reveals a trend toward greater sophistication. In earlier years, a substantial portion of researchers who used structural equation modeling to test for mediation effects did not establish the conditions generally agreed upon by the field at the time (i.e., Baron and Kenny's four conditions). Specifically, of the 70 studies reviewed, only 40 implemented all of the data analytic steps necessary to test for mediation effects (Baron & Kenny, 1986). Many failed to establish a direct relation between stressors and psychological symptoms and, in several cases, results reported in correlation matrixes suggest that such a relation did not exist in the particular sample examined. Of those investigators who did establish a direct relation between stressors and symptoms, many failed to do so independent of controlling for the hypothesized mediator. Therefore, they were unable to establish a significant decrease in the direct relation between stressors and symptoms once the mediator was controlled. Although recent critiques of Baron and Kenny's (1986) approach suggest not all of these steps are necessary for all studies (Shrout & Bolger, 2002), only 1 of the 30 studies that failed to establish all of Baron and Kenny's (1986) steps utilized more recently recommended approaches (e.g., MacKinnon, 2000).

De Haan and MacDermid's (1999) study illustrates both the pitfalls of failure to establish each of Baron and Kenny's (1986) conditions and also the promise of new techniques that discard some of those conditions (Shrout & Bolger, 2002). De Haan and MacDermid (1999) did not test for a direct association between poverty and symptoms, and they unexpectedly found that positive identity development "mediates" the relation between poverty and fewer symptoms. This finding does not represent mediation in the classic conceptual sense (i.e., a variable that explains the relation between two other variables; Baron & Kenny, 1986), but it remains an interesting and potentially important finding. It likely represents a suppression or moderator effect, such that youth high on positive development are protected from the negative effects of poverty (MacKinnon et al., 2002; Shrout & Bolger, 2002).

A similar issue is highlighted by Hershberger and D'Augelli's (1995) groundbreaking study of family and child-based mediators of the relation between victimization and psychological symptoms among gay, lesbian, and bisexual youth. In their introduction, the authors provide a rationale for exploring the processes whereby victimization leads to increased psychological distress, and the results depicted in their correlation matrix indicate a significant direct and positive relation between victimization and mental health problems, such that more victimization predicted more symptoms. However, the conceptual model they actually tested is one in which victimization leads to more family support, which leads to more self-acceptance, which leads, ultimately, to fewer psychological symptoms. Thus, results supporting this model provide evidence of indirect links between victimization and *fewer* symptoms, in spite of the fact that victimization was directly related to *more* symptoms. In this case, adherence to Baron and Kenny's (1986) conditions would have revealed that this finding does not represent mediation, at least not in the classic sense of the term. Nonetheless, this study's findings are also potentially quite interesting and important. Attention to suppression and moderation effects in mediation research represents the next step in mediational analyses (MacKinnon et al., 2002; Shrout & Bolger, 2002).

Although use of structural equation modeling (or path analysis) is more prone to interpretation problems, as illustrated above, it is also ideal for testing more complex mediational models (i.e., models that examine relations among parent, child and environment-based mediating variables and models that examine mediators in relation to particular moderating contexts). In more recent years, there have been fewer studies that have failed to meet Baron and Kenny's (1986) conditions for establishing mediation, perhaps as a result of widely read publications that have focused on this issue (e.g., Holmbeck, 1997). Interestingly, now that most researchers have developed expertise with applying Baron and Kenny's approach to new analytic techniques (i.e., structural equation modeling), challenges to this approach have emerged. In the future, researchers must carefully consider the benefits of each analytic approach in light of the conceptual model they wish to test (i.e., Are the relations hypothesized to be distal or proximal? Are suppression or moderator effects expected?) and be open to analysis and interpretation of unexpected effects (e.g., suppression or moderator effects; Shrout & Bolger, 2002).

5. Conclusion

Results of research testing for moderators and mediators of the relation between stressors and psychological symptoms highlight the strengths and weaknesses of the stress field as a whole. There has been little incremental research in the area of moderator studies. Relatively few studies have tested specific theoretical models, few have used similar designs and measures, and little consistent evidence of moderating effects has emerged. Those studies that have built on particular theoretical models (e.g., studies of the moderating role of cognitions in the relation between stressors and depression) represent an exception to this pattern.

Research on mediators stands in contrast to moderator research. Most of it has been theory-based, and a consistent pattern of findings has emerged. In particular, there is substantial evidence that family-based variables, such as parenting and parent–child relationships mediate the relation between stressors and psychological symptoms in children and adolescents. Past problems associated with failure to establish Baron and Kenny's (1986) conditions for mediation coupled with emerging strategies that may supplant the classic approach argue for the importance of careful attention to theoretical and methodological issues in process research, so that this field can continue to build upon its strong foundation.

Future studies should build on the strengths of mediator research. Studies should be theory-based and incremental. In addition, future studies should integrate moderator and mediator research by testing for specific mediators in relation to particular moderating contexts, so that we can better understand the complex ways in which stressful life experiences affect the well-being of children and adolescents.

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