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Responses to Stress in Adolescence: Measurement of Coping and Involuntary Stress Responses

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The development of a measure of coping and involuntary stress responses in adolescence is described. The Responses to Stress Questionnaire (RSQ) reflects a conceptual model that includes volitional coping efforts and involuntary responses to specific stressful events or specified domains of stress. The psychometric characteristics of the RSQ were examined across 4 domains of stress in 3 samples of adolescents and parent reports obtained in 2 samples. The factor structure of the RSQ was tested and replicated with an adequate degree of fit using confirmatory factor analysis across 3 stressors in 2 samples. Internal consistency and retest reliability for the 5 factors were adequate to excellent. Concurrent validity was established through correlations with another measure of coping, heart rate reactivity, and correlations of self- and parent-reports. Significant correlations with both adolescents' and parents' reports of internalizing and externalizing symptoms were consistent with hypotheses.

Knowledge of the ways in which children and adolescents respond to stress is important in understanding normative development and health, as well as in understanding the development of psychopathology and physical illness. Stress responses include involuntary or automatic reactions (reflecting individual differences in temperament and conditioned patterns of stress reactivity) and voluntary attempts to cope with stress. Involuntary stress responses and voluntary coping efforts are related to internalizing and externalizing emotional–behavioral problems, suggesting that the effects of stress may be influenced by individual differences in stress responses and coping (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, in press; Wolchick & Sandler, 1997).

Despite the significance of coping in understanding the emotional and behavioral correlates of both acute and chronic stress, research in this area has been hindered by the lack of adequate measures of children's and adolescents' stress responses (Ayers, Sandler, & Twohey, 1998; Compas et al., in press). A significant problem involves limitations in the conceptual basis of previous measures (for exceptions, see Ayers, Sandler, West, & Roosa, 1996; Walker, Smith, Garber, & Van Slyke, 1997). Most existing measures have not been guided by an explicit model (e.g., Spirito, Stark, & Williams, 1988), and scales generated through exploratory factor analysis have either lacked theoretical coherence or have not been replicated. Additionally, measures have failed to capture the full range and diversity of responses to stress in children and adolescents, relying on overly simplistic dichotomies such as problem- and emotion-focused coping or approach versus avoidance (e.g., Compas, Worsham, Ey, & Howell, 1996). Furthermore, insufficient attention has been given to the psychometric properties of measures, the specificity of stressors targeted by coping questionnaires, and relations among different coping responses.

The Responses to Stress Questionnaire (RSQ) was developed based on a multidimensional model of responses to stress (Compas, Connor, Osowiecki, & Welch, 1997; Compas et al., in press; Compas, Connor, Saltzman, Thomsen, & Wadsworth, 1999), with the goal of creating a theoretically based and psychometrically sound measure.[1] This model emphasizes the importance of assessing a broad range of responses to stress, including both voluntary or controlled coping responses and involuntary or automatic reactions. Adaptation to stress involves cognitive, behavioral, emotional, and physiological responses, with involuntary responses capable of facilitating or constraining a child's ability to initiate voluntary coping responses. Within this model, an understanding of response effectiveness cannot be separated from the nature of the stressor, and no pattern of responses to stress is assumed to be universally helpful or detrimental across situations (Compas et al., in press).

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[1] Although coping and stress responses of children and adolescents are important, our focus in the development of the RSQ is on coping in adolescence; preadolescent children were expected to have greater difficulty in providing reliable reports on some of the relatively complex cognitive processes involved in coping (cf. Achenbach, 1991). Future development of the RSQ will address children's self-reports.

The primary dimension in this model distinguishes between voluntary and involuntary[2] responses to stress (Compas et al., 1997). *Coping* refers to responses that are experienced as voluntary, under the individual's control, and involving conscious effort (Lazarus & Folkman, 1984). Voluntary coping efforts are within conscious awareness and are oriented toward regulating one's cognitive, behavioral, emotional, or physiological responses to a stressor or toward the stressor itself. Involuntary responses to stress include temperamentally based and conditioned reactions that may or may not be within conscious awareness and are not under volitional control, such as emotional and physiological arousal, intrusive thoughts and rumination, and emotional numbing. Both voluntary and involuntary stress responses are further distinguished on a second dimension of engagement with or disengagement from the stressor or one's reactions to the stressor (e.g., Tobin, Holroyd, Reynolds, & Wigal, 1989). Engagement responses are directed toward a stressor or one's reactions to the stressor and include approach responses; disengagement responses are oriented away from a stressor or one's reactions and include avoidance responses. Because volitional coping responses are goal directed, they can be further distinguished as primary control coping strategies (aimed directly at altering objective conditions, such as the stressor or one's emotional response to the stressor) and secondary control coping strategies (focused on adaptation to the problem; e.g., Rudolph, Dennig, & Weisz, 1995; Weisz, McCabe, & Dennig, 1994). Examples of primary control coping include problem solving and emotional regulation, and secondary control coping includes acceptance and cognitive restructuring.

On the basis of this conceptual model, the RSQ was designed to include a broad range of coping responses and to identify concrete cognitive and behavioral responses used by adolescents in adapting to stress. Existing measures have been particularly weak in assessing adaptive techniques for managing emotional responses to stress. Thus, findings that indicate negative effects of emotion-focused coping (e.g., Compas, Malcarne, & Fondacaro, 1988; Windle & Windle, 1996) may be due to the skewed sampling of the ways that young people attempt to regulate their emotions (cf. Stanton, Danoff-Burg, Cameron, & Ellis, 1994). Assessment of emotional regulation and the specific strategies used to regulate affect are important in understanding links between emotion-focused coping and adjustment.

On a practical level, previous measures have given inadequate attention to the reasons for individuals' responses to items. First, items high in social desirability may be subject to "yea saying" because respondents are not asked to describe how they actually carried out a specific coping response, such as problem solving. This can be addressed by items that require respondents to articulate specifically how they implemented a given strategy. Second, because coping is motivated by concerns about a stressor or negative emotions, increased emotional distress is likely to be associated with greater overall endorsement of coping items. Thus, disparate strategies, such as engagement and disengagement, may be correlated. Scoring each specific scale as a proportion of the total responses made by an individual controls for individual differences in base rates of item endorsement and may facilitate the identification of effective responses to stressors (e.g., Forsythe & Compas, 1987; Osowiecki & Compas, 1999; Vitaliano, Maiuro, Russo, & Becker, 1987).

Greater attention must also be given to the characteristics of the stressor that is the focus of coping responses. Most current instruments ask children and adolescents to report on the ways that they generally cope with stress (e.g., Frydenberg & Lewis, 1991; Ryan-Wegner, 1990). However, it is unclear how respondents aggregate reports of their coping responses across multiple stressful events that may differ in intensity and controllability. Given that the type and the efficacy of responses may vary depending on the demands and one's appraisals of the situation, differences between beneficial and detrimental coping strategies may be obscured by measures that assess responses to multiple stressors. In addition to limiting responses to a specific stressful event or domain of stress, items within a measure should prompt respondents by referring to the stressful event that is the target of the coping efforts to facilitate recall and enhance reliability.

Finally, the psychometric properties of most measures have not been well established, with limited data available on the test–retest reliability and validity of scales (Compas et al., in press). The use of confirmatory factor analysis and assessment of convergent and discriminant relations of volitional coping responses with other coping scales are important steps in establishing construct and criterion validity. Involuntary responses to stress need to be compared with other constructs that reflect automatized responding, such as psychophysiological measures of stress reactivity (e.g., heart rate variability in response to stress; Sherwood & Turner, 1992; Tomaka, Blascovich, Kelsey, & Leitten, 1993). Furthermore, previous measures have relied almost exclusively on adolescents' self-reports. Reports from other informants are essential to compare the perspectives of different informants on the ways that adolescents respond to stress and to address problems of shared method variance in studies using self-reports of both coping and adjustment. However, only modest correlations are expected with self-reports because parents, teachers, and peers observe incomplete samples of behavior, have different perspectives on the same behaviors, and are not able to observe coping and involuntary stress responses involving covert cognitive processes (cf. Achenbach, McConaughy, & Howell, 1987).

The present study was designed to develop and evaluate a measure of adolescents' responses to stress (the RSQ) and to determine the psychometric properties of this measure. We designed the RSQ to capture two broad categories—voluntary coping efforts intended to regulate either the source of stress or one's reactions to stress and involuntary cognitive, affective, behavioral, and physiological responses (Compas et al., 1997, in press). We hypothesized that both voluntary and involuntary stress responses would be distinguished along a dimension of engagement versus disengagement and that voluntary engagement coping would be further distinguished by efforts directed toward achieving either primary control (changing the situation or one's emotions) or secondary control (adapting to the situation). This model of responses to stress was expected to fit the data generated with the

[2] A similar distinction is made in cognitive psychology between automatic and controlled processes (e.g., Shiffrin & Schneider, 1977). We have selected the terms voluntary and involuntary because these terms emphasize the degree of personal control that individuals experience over their responses.

RSQ better than alternative models (e.g., problem focused vs. emotion focused).

Additional goals involved tests of psychometric properties of the RSQ, including examination of internal consistency and test–retest reliability, construct validity, and hypothesized associations with measures of emotional–behavioral problems. Measures of validity include associations of adolescents' self-reports on the RSQ with alternative measures of coping, parental reports of adolescent coping, and a laboratory measure of heart rate reactivity to stress. First, we expected moderate convergent and discriminant validity (Campbell & Fiske, 1959) with corresponding scales on a second self-report measure of coping (COPE; Carver, Scheier, & Weintraub, 1989). The Primary Control Engagement Coping subscale on the RSQ was expected to correlate with five subscales on the COPE (Active Coping, Planful Coping, Instrumental Support, Ventilation of Emotions, and Emotional Support). The Secondary Control Engagement Coping subscale on the RSQ was expected to correlate with two subscales on the COPE (Positive Reinterpretation and Acceptance). Finally, the Disengagement Coping subscale on the RSQ was hypothesized to correlate with three COPE subscales (Denial, Behavioral Disengagement and Mental Disengagement). Second, we expected modest to moderate convergent validity coefficients for comparable scales on the RSQ in parents' reports and adolescents' reports of adolescents' stress responses (cf. Achenbach et al., 1987). Third, we hypothesized that self-reports of involuntary engagement responses (including emotional and physiological arousal) would be related to greater heart rate reactivity as measured by the degree of change in mean heart rate from baseline to response to a laboratory stress task. Finally, we hypothesized that voluntary coping and involuntary stress responses would be related to symptoms of internalizing and externalizing problems.[3] On the basis of previous research (Compas et al., in press), we expected that in response to most stressors, Primary and Secondary Control Engagement Coping responses would be related to fewer symptoms of Internalizing and Externalizing problems, whereas voluntary Disengagement Coping and Involuntary Engagement (e.g., rumination, intrusive thoughts) and Involuntary Disengagement (e.g., escape, emotional numbing) responses would be positively related to symptoms.

Method

Participants and Procedures

Sample 1. The first sample was composed of 437 older adolescents, aged 16–19 years (M = 18.2 years, SD = 0.6); 69% were female. Participants in this sample were first- or second-year college students enrolled in an introductory psychology course at a New England public university. Course credit was offered for participation in either two experimental sessions conducted in small groups or for completion of questionnaires at home. All participants completed the RSQ in reference to current social stressors, along with the Young Adult Self-Report (YASR; Achenbach, 1997). Participants in this first phase of the study were recruited and were then randomly assigned to complete a second set of questionnaires 1 week later. Follow-up sessions relevant to this study included completion of a second RSQ (n = 101), an alternative measure of coping (COPE; Carver et al., 1989; n = 62), and a laboratory study of coping with interpersonal stress (n = 62). Laboratory participants attended two sessions on consecutive days in which they were presented with a series of tasks and stimuli that represented varying levels of social stress, with continuous measurement of heart rate during these tasks. Although college student samples are limited in their representativeness, this sample offered opportunities to test certain psychometric features of the measure (e.g., test–retest reliability) that were not feasible with our other samples.

Sample 2. The second sample was composed of 364 adolescents, aged 12–18 years (M = 14.7 years, SD = 1.7); 56% were female. They were enrolled in a public junior or senior high school in a rural area of northern New England (Wadsworth, Compas, & Connor, 1998; Wadsworth, Connor, Tompkins, Grosz, & Compas, 1999). The community in which they lived was selected for a larger study of coping with family conflict and economic difficulties because of high rates of unemployment and low income. Adolescents completed two versions of the RSQ, one in reference to economic strain and a second in regard to family conflict, along with the Youth Self-Report (YSR; Achenbach, 1991). In addition, parents of 75 of the participants also completed measures, including a parent version of the RSQ asking them to report on the ways their children responded to and coped with economic stress and the Child Behavior Checklist (CBCL; Achenbach, 1991). On the basis of a 9-point Hollingshead (1975) index of parental occupation, the parents in these families had a mean occupational index of 4.5, which falls between skilled manual laborers and clerical or sales workers. Reflective of the demographic characteristics of this region of northern New England, 97% were Caucasian, 3% did not specify ethnicity. Comparison of adolescents whose parents participated in the study and adolescents whose parents did not participate indicated that there were no significant differences between these groups on demographic variables or the YSR, and there was only one significant difference on one scale of the two versions of the RSQ.

A lay summary–consent form was mailed to parents of all adolescents enrolled in the participating middle school and high school. Parents were instructed to return the form only if they did not wish their child to participate (i.e., passive consent). On a designated day, interested students whose parents had indicated passive consent completed a battery of questionnaires in their classrooms, with research assistants available to describe the questionnaires, monitor participation, and answer questions. Packets of questionnaires were mailed to parents at this time, with instructions to complete the measures and return them to the researchers in a prepaid envelope.

Sample 3. The third sample was comprised of 82 adolescents and parents participating in a larger study of coping with recurrent abdominal pain (RAP; Thomsen, Compas, Colletti, & Stanger, 1999). Diagnosis of RAP required that abdominal pain interfered with daily functioning, with all participants experiencing at least three pain episodes in the 3 months prior to diagnosis. Adolescents ranged in age from 11 to 17 years old (M = 13.4 years, SD = 1.9); 70% were female, and 94% were Caucasian (6% did not specify their ethnicity), and were reflective of regional demographics. Parents were approached either by mail or during a visit to the pediatric gastroenterologist. Participants completed a set of questionnaires, including a version of the RSQ referring to RAP, the CBCL for parents, and the YSR for adolescents. As expected for youth with RAP, elevations were noted on the Somatic Complaints scale of the CBCL and YSR, with mean T scores of 65.7 and 61.0, respectively. On the basis of the 9-point Hollingshead (1975) occupation index, these families had a mean occupational score of 6.3, corresponding to the range from technician to manager–minor professional.

[3] Some researchers have used correlations with measures of symptoms of distress and psychopathology as tests of the validity of a measure of coping. However, from our perspective, one of the important hypotheses to be tested is whether coping is related to symptoms of distress and psychopathology. It is tautological to use the association between coping and symptoms to both establish the validity of the measure and to test hypotheses about this relationship. Therefore, we do not consider these associations to be part of the validity testing of the RSQ.

Measures

RSQ. The RSQ consists of 57 items that represent a range of volitional coping and involuntary responses to stress characteristic of adolescence. Separate versions were developed for adolescents' self-reports and parents' reports of their adolescents' responses (see Appendix for the social stress version of the RSQ). Items are rated on a scale from 1 to 4 that indicates the degree to which or frequency with which each response was enacted by the individual (from *not at all* to *a lot*). Items for the voluntary coping scales were selected to represent both cognitive and behavioral responses, and items for the involuntary response scales were selected to capture cognitive, behavioral, emotional, and physiological responses. Specific scales are described below.

Several steps were taken to tailor the measure to the specific stressor domain of interest. First, an initial set of questions asks respondents to report on the recent occurrence of stressors in the relevant domain (e.g., social stress, family conflict, economic strain, pain), the degree to which these events have been stressful, and their perception of control over the events. Second, although the nature of the items is consistent across different versions of the measure, items are worded on each form to refer to the targeted stressor or domain of stress. Four versions of the RSQ are reported here: Social Stress (Sample 1), Economic Strain (Sample 2), Family Conflict (Sample 2), and RAP (Sample 3). Respondents were asked to check off events that had occurred recently in the specific domain and to think about these specific events in completing each version of the RSQ. All analyses are based on reports of respondents endorsing at least one of these stressors (all respondents in Sample 1 identified a social stressor, all respondents in Sample 3 had experienced a recent episode of abdominal pain, 84% of Sample 2 had experienced an economic stressor, and 91% of Sample 2 had experienced family conflict).

Items were generated to represent the three dimensions of the hypothesized model of responses to stress (voluntary vs. involuntary, engagement vs. disengagement, primary vs. secondary control), including new items developed for this scale and adaptation of some items from existing measures of coping, temperament, and stress reactivity (Compas et al., 1997, in press). The model that guided item selection for the RSQ included 10 categories of voluntary coping and nine categories of involuntary responses to stress that have been represented in the literature. With regard to voluntary coping responses, we hypothesized that problem solving, emotional regulation, and emotional expression would load on a Primary Control Engagement factor, whereas positive thinking, cognitive restructuring, and acceptance would load on a Secondary Control Engagement factor. Avoidance and denial were expected to load on Primary Control Disengagement, whereas distraction and wishful thinking were hypothesized to form Secondary Control Disengagement. For the involuntary responses to stress, involuntary engagement included intrusive thoughts, rumination, emotional arousal, physiological arousal, and impulsive action, whereas involuntary disengagement was hypothesized to include emotional numbing, cognitive interference, escape, and inaction. Unlike most other measures, an independent social support scale was not created because social support can be accessed for many reasons. Thus, items reflecting specific uses of social support were included in problem solving, emotional regulation, and emotional expression. Three item parcels were created for each of the 19 categories, resulting in a total of 57 items on the RSQ. Examples of items in each of the parcels, and the hypothesized structure of the scales are presented in Table 1.

Several items were designed to increase the amount of information provided concerning the nature of responses. For example, two items assessing problem solving ask respondents to write out the plan of action they generated or actions they took to address the problem. Similarly, several items include examples of specific responses that may have been enacted, as with an emotional expression item that asks respondents to indicate which of several different ways they let their feelings out (e.g., writing in a journal or diary, complaining to let off steam, listening to music, exercising, crying, drawing or painting, being sarcastic or making fun, punching a pillow, yelling). Items pertaining to social support ask respondents to indicate the sources from whom they sought or received support (e.g., friends, parents, teachers, brother or sister). Thus, the RSQ requires respondents to detail the specific nature of their response rather than simply endorse a broad or nonspecific item. For the present analyses, these items were checked to ensure the response was valid.

COPE. The COPE (Carver et al., 1989) is a 52-item self-report measure of coping composed of 13 scales. It was selected for inclusion with a subset of Sample 1 because it contains scales comparable with scales on the RSQ. Respondents rated the degree to which they used each response in coping with recent social or interpersonal stressors along a 4-point scale. Internal consistency and test–retest reliability are well established (Carver et al., 1989). Although the COPE and the RSQ ask about some similar types of coping responses, only four items have direct counterparts on both measures.

Physiological arousal. For Sample 1 participants involved in the laboratory component of the study, heart rate was recorded using a BioPac (Santa Barbara, CA) photo-plethysmograph transducer and amplifier controlled by AcqKnowledge software (BioPac Systems, Inc., 1998). Continuous heart rate readings were obtained over two laboratory sessions, with the baseline heart rate for each day defined as the average heart rate over the last 5 min of a 10-min relaxation period. For both of the experimental sessions, heart rate was measured continuously as participants were presented with a series of stressors, including observing a videotape of a critical interpersonal evaluation of another (confederate) participant, completing an emotion Stroop task, and responding to Thematic Appreciation Test (TAT) cards under stressful conditions (see Connor, 1998, for details). Following data collection, artifacts due to hand movement were edited from the data, and mean heart rate scores for each task were obtained. To indicate the level of physiological reactivity of each participant, the difference between mean heart rate for their baseline and highest reactive period was determined.

CBCL. Parents of adolescents in Samples 2 and 3 completed the CBCL (Achenbach, 1991), a 118-item checklist of problem behaviors and competencies in the past 6 months, with items rated on a 3-point scale ranging from *not true* to *often true.* This measure assesses both Internalizing (anxiety–depression, social withdrawal, somatic complaints) and Externalizing (aggression, delinquency) emotional–behavioral problems, with data reported as normalized T scores ($M = 50$, $SD = 10$) based on a nationally representative sample of children and adolescents, with separate norms for age and sex. Reliability and validity of the CBCL are well established.

YSR. Adolescents in Samples 2 and 3 completed the 112-item YSR (Achenbach, 1991), a self-report version of the CBCL for adolescents aged 11–18 years rated on the same scale as the CBCL. Reliability and validity of the YSR are well established. The Internalizing and Externalizing scales, normed separately by sex on the basis of a nationally representative sample, were used in the present analyses.

YASR. Adolescents in Sample 1 completed the YASR (Achenbach, 1997), an upward extension of the YSR that includes 119 behavior-problem items. Like the YSR and the CBCL, the YASR uses a 6-month time frame and assesses both internalizing and externalizing symptoms. The syndromes have excellent reliability and validity. Syndromes from the YASR are associated with *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., rev.; American Psychiatric Association, 1987) diagnoses obtained from structured interviews and discriminate between young adults referred and those not referred for mental health services. The Internalizing and Externalizing scales, normed separately by sex from a nationally representative sample of young adults, were used in the present analyses.

Results

Raw RSQ scores were used for factor analyses and reliability and validity analyses. However, because of gender differences in

Table 1
Hypothesized Factor Structure of the Responses to Stress Questionnaire and Sample Items (Family Conflict Version)

Factor	Item
Primary Control Engagement Coping	
Problem Solving (Items 3, 17, 24)	I try to think of different ways to change the problem or fix the situation. Write one plan you thought of.
Emotional Regulation (Items 21, 45, 48)	I keep my feelings under control when I have to, then let them out when they won't make things worse.
Emotional Expression (Items 7, 20, 32)	I let someone or something know how I feel (check all that you talked to): parent, teacher, friend, God, brother/sister, stuffed animal, pet.
Secondary Control Engagement Coping	
Positive Thinking (Items 19, 50, 52)	I tell myself that everything will be all right.
Cognitive Restructuring (Items 34, 36, 39)	I think about the things that I am learning from the situation, or something good that will come from it.
Acceptance (Items 8, 13, 29)	I realize that I just have to live with things the way they are.
Primary Control Disengagement Coping	
Avoidance (Items 1, 15, 27)	I try to stay away from people and things that make me feel upset or remind me of the problem.
Denial (Items 9, 41, 56)	When something goes wrong with my family, I say to myself, "This isn't real."
Secondary Control Disengagement Coping	
Wishful Thinking (Items 5, 11, 23)	I deal with the problem by wishing it would just go away, that everything would work itself out.
Distraction (Items 30, 43, 54)	I keep my mind off my parents' fighting by (check all that you do): exercising, playing video games, seeing friends, doing a hobby, watching TV.
Involuntary Engagement	
Rumination (Items 31, 40, 51)	When problems with my family come up, I can't stop thinking about how I am feeling.
Intrusive Thoughts (Items 6, 18, 25)	When we're having problems getting along, I can't stop thinking about the problems when I try to sleep, or I have bad dreams about them.
Physiological Arousal (Items 2, 12, 26)	When I have problems with my family, I feel it in my body (check all that apply): my heart races, I feel hot or sweaty, my breathing speeds up, my muscles get tight.
Emotional Arousal (Items 37, 44, 53)	When problems with my family come up, I get upset by things that don't usually bother me.
Involuntary Action (Items 33, 47, 57)	When we are having trouble getting along, I can't control what I say or do.
Involuntary Disengagement	
Emotional Numbing (Items 4, 16, 28)	When problems with my family happen I don't feel anything at all, it's like I have no feelings.
Cognitive Interference (Items 35, 38, 55)	My mind goes blank when I have problems with my family, I can't think at all.
Inaction (Items 42, 46, 49)	I just freeze when I have a problem with my family, I can't do anything.
Escape (Items 10, 14, 22)	I just have to get away when I have problems with my family, I can't stop myself.

Note. Item numbers refer to the version of the Response Stress Questionnaire presented in the Appendix.

base rate of responses (see below), scores reflecting the proportion of total responses were used in analyzing the correlations with the YSR, YASR, and CBCL.

Confirmatory Factor Analyses

Maximum-likelihood confirmatory factor analyses (CFA) were conducted using AMOS 3.61 (Arbuckle, 1997) to test the hypothesized model of voluntary and involuntary responses to stress. Criteria for an adequate versus a good fit of the model to the data have evolved with continued use of CFA (e.g., Bentler & Bonnett, 1980; Bollen, 1989; Hu & Bentler, 1999). Chi-square indices are reported on the basis of convention, although they have been widely criticized for having excess power to reject adequate models tested with large samples (Hu & Bentler, 1995). Thus, additional goodness-of-fit indices were selected to evaluate congruence between the data and proposed models (Cole, 1987; Marsh, Balla, & McDonald, 1988), including Bentler's (1990) Comparative Fit Index (CFI), and Steiger's (1990) root mean square error (RMSEA), which allows for comparison of nonnested models. For Bentler's CFI, models with an adequate fit yield values greater than .90, and models with a good fit yield values of .95 or greater; for RMSEA, values less than .10 indicate an adequate fit, and values of .06 or less indicate a good fit. However, it is also important to consider fit indices in light of the results of CFA with similar measures (Bollen, 1989); we consider this issue in the discussion.

CFAs were guided by the procedures used by Walker and colleagues in the development of a pediatric pain coping measure (Walker et al., 1997). Sample 1 (social stress) was used to test and refine the factor model of the RSQ, followed by cross-validation of the model using Sample 2 in separate analyses of the family conflict and economic strain data to demonstrate replication of the factor structure. Because of the number of latent variables in the hypothesized model, testing the full model would have required the inclusion of additional manifest variables (i.e., the model was unidentified). Because the primary goal was to test the RSQ rather than the hierarchical model of coping, separate tests of the voluntary and involuntary portions of the model were performed rather than adding manifest variables from other measures.

Voluntary coping responses. We began by testing the two-tiered model of voluntary responses to stress described in the introduction. The second-order latent variable Voluntary Engagement was composed of the first-order latent variables Primary Control Engagement (consisting of the manifest variables problem solving, emotional regulation, and emotional expression) and Secondary Control Engagement (consisting of positive thinking, cognitive restructuring, and acceptance). The second-order latent variable Voluntary Disengagement was composed of the first-order

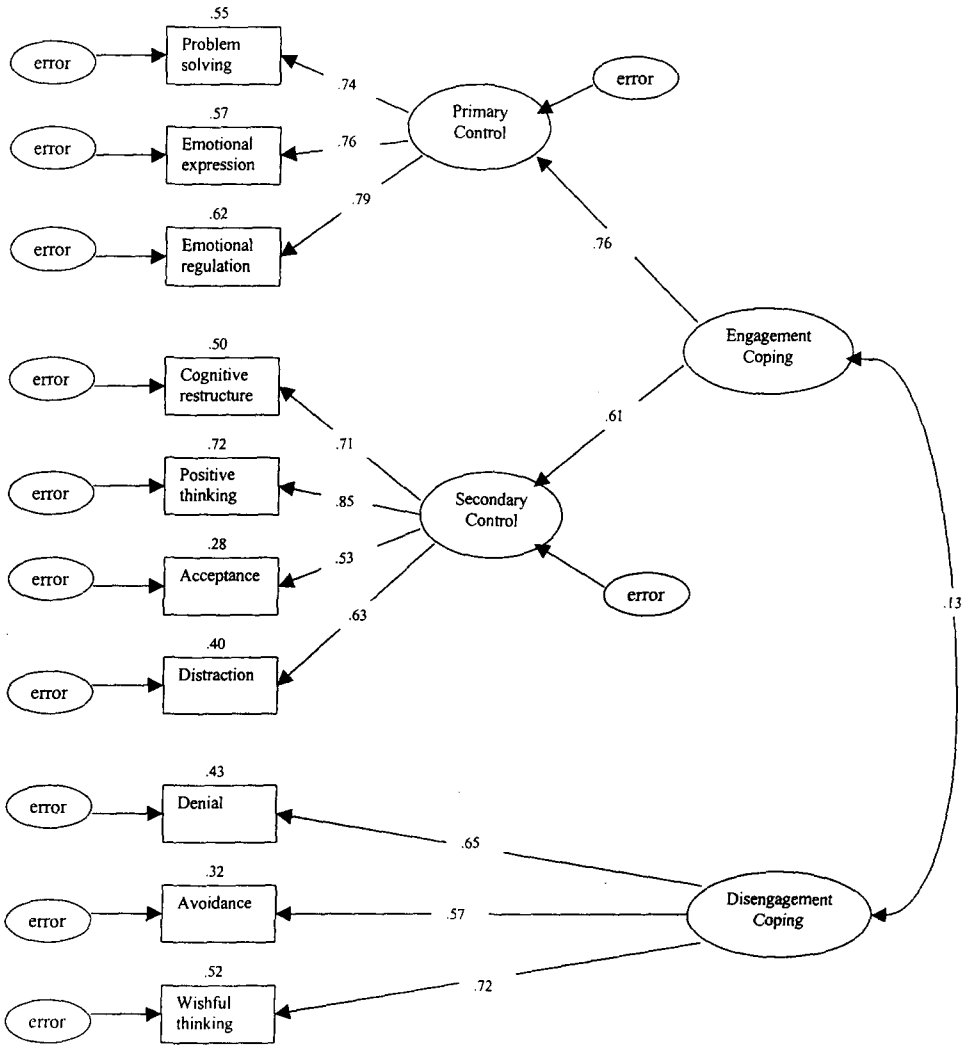

Figure 1. Model of voluntary coping responses to stress factors derived through confirmatory factor analysis in a sample of 17- to 19-year-olds coping with social stress.

latent variables Primary Control Disengagement (represented by the manifest variables avoidance and denial) and Secondary Control Disengagement (represented by distraction and wishful thinking). Voluntary Engagement and Disengagement were permitted to correlate with one another. Because the fit of this hypothesized model was inadequate, a decision was made to allow certain changes based on modification indices. All changes were required to be theoretically logical, and, to keep the factor structure conceptually clean, item parcels were not allowed to load on more than one factor.

Results of preliminary model testing indicated that wishful thinking loaded strongly on Primary Control Disengagement and that distraction loaded strongly on Secondary Control Engagement. Thus, the latent variable Secondary Control Disengagement was eliminated, and avoidance, denial, and wishful thinking loaded on a single Disengagement factor. Because distraction requires engagement with a thought or activity unrelated to the stressor, with the goal of decreasing emotional arousal, it was considered plausible as a form of Secondary Control Engagement and was moved to that factor. The revised model presented in Figure 1 was an adequate fit to the data for Sample 1 (social stress), $\chi^2(32, N = 429) = 137.7$, $p < .001$, CFI = .92, RMSEA = .09. Although modification indices indicated that a better fit could be achieved by allowing item parcels to cross load or by correlating error terms, these changes appeared to capitalize on chance and would not have clear implications for the scoring of the RSQ. Thus, no further modifications were made.

This model of voluntary coping was then successfully cross-validated[4] twice in Sample 2 for coping with economic strain,

[4] Further support for this model was found in the use of CFA to confirm the factor structure of the RSQ in a sample of over 400 Navajo adolescents (CFI = .93, RMSEA = .07; Reickmann, Wadsworth, Benson, & Compas, 1999). This provides evidence for the replicability of this factor structure across ethnically diverse samples.

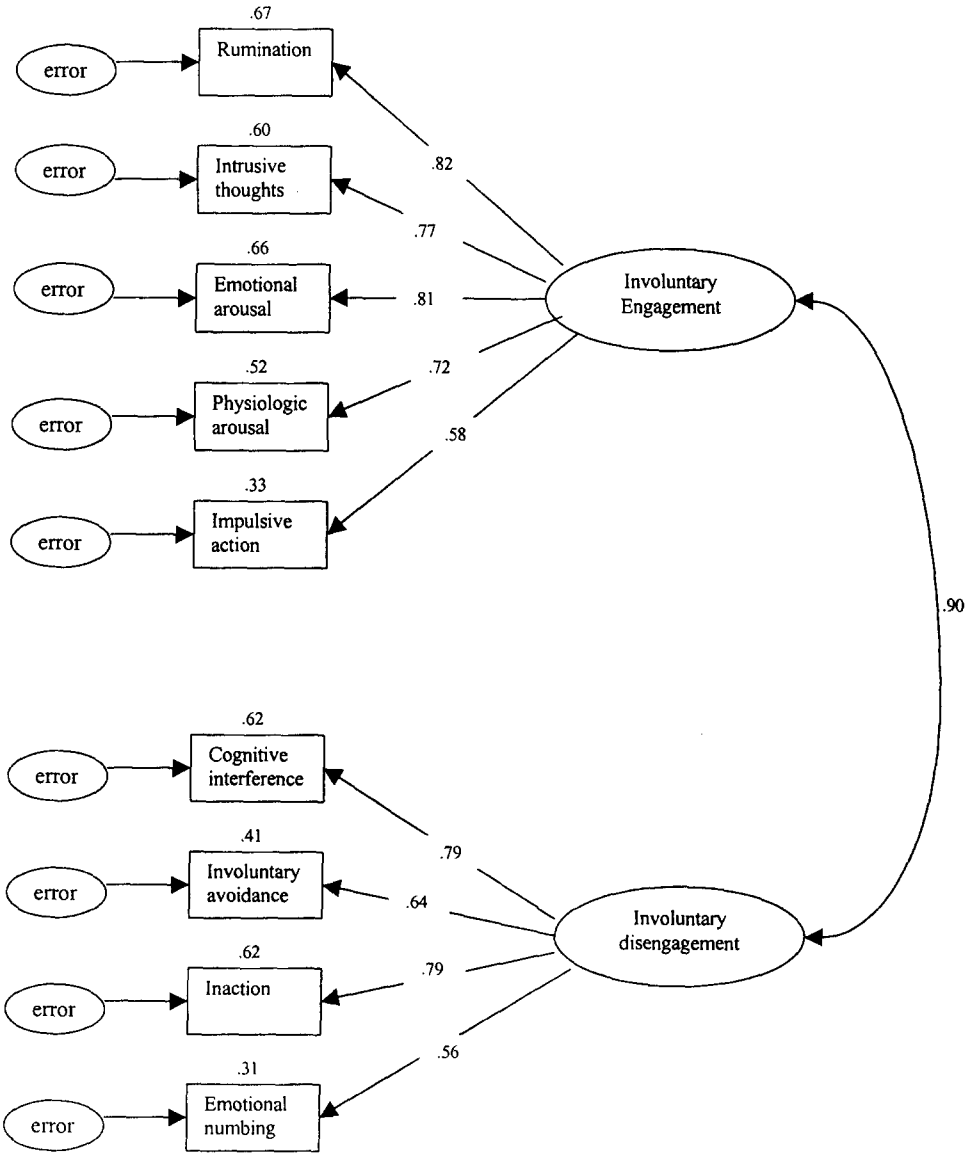

Figure 2. Model of involuntary responses to stress factors derived through confirmatory factor analysis in a sample of 17- to 19-year-olds coping with social stress.

$\chi^2(32, N = 304) = 125.5, p < .001$, CFI = .92, RMSEA = .09, and family conflict, $\chi^2(32, N = 333) = 114.7, p < .001$, CFI = .94, RMSEA = .09. As a further test of the generalizability of the model, we conducted separate tests for males and females for social stress, economic strain, and family conflict stressors. The model was a good fit for both males and females in all samples.

Comparison of this model with alternative models of coping indicates that it is superior to simpler problem–emotion-focused and engagement–disengagement coping models. A model distinguishing only between engagement or disengagement coping strategies did not adequately fit the data in any sample, $\chi^2(34, N = 429) = 517.9, p < .001$, CFI = .61, RMSEA = .18, for Sample 1 (social stress); $\chi^2(34, N = 304) = 217.4, p < .001$, CFI = .84, RMSEA = .13, for Sample 2 (economic strain); and $\chi^2(34, N = 333) = 280.3, p < .001$, CFI = .83, RMSEA = .15, for coping with parental conflict in Sample 2. A model proposing a primary distinction between the commonly used dimensions of problem-focused and emotion-focused coping also provided a poor fit to the data for Sample 1 (social stress), $\chi^2(34, N = 429) = 610.3, p < .001$, CFI = .54, RMSEA = .20; Sample 2 (economic strain), $\chi^2(34, N = 304) = 256.2, p < .001$, CFI = .81, RMSEA = .15; and Sample 2 (family conflict), $\chi^2(34, N = 333) = 351.9, p < .001$, CFI = .78, RMSEA = .17.

Involuntary responses to stress. Using Sample 1 (social stress), the proposed two-factor model of involuntary responses to stress shown in Figure 2 was tested. Involuntary Engagement consisted of rumination, intrusive thoughts, emotional arousal, physiological arousal, and impulsive action. Involuntary Disengagement consisted of cognitive interference, involuntary avoidance, inaction, and emotional numbing. This model was an ade-

quate fit to the data for Sample 1, $\chi^2(26, N = 429) = 121.0, p < .001$, CFI = .95, RMSEA = .09. Because of the high correlation between the Involuntary Engagement and Disengagement factors, the two-factor model was contrasted with a one-factor model. Although the one-factor model was an adequate fit to the data, $\chi^2(26, N = 429) = 173.3, p < .001$, CFI = .92, RMSEA = .11, the two-factor model provided a superior fit, $\chi^2(2, N = 429) = 52.3, p < .005$. Because the two-factor model also preserves an important theoretical distinction and more closely parallels other conceptualizations of involuntary responses, such as symptoms of intrusive thoughts and avoidance in posttraumatic stress disorder, the two-factor model was retained.

Cross validation of the two-factor model of involuntary responses indicated a good fit for both economic strain, $\chi^2(26, N = 304) = 103.2, p < .001$, CFI = .96, RMSEA = .09, and family conflict, $\chi^2(26, N = 333) = 88.4, p < .001$, CFI = .97, RMSEA = .08. This model of involuntary responses was also a good fit when tested separately for males and females in all three samples.

Correlations between factors. The correlations among the five factors using raw score and proportion scores for Sample 1 (social stress) are shown in Table 2. Correlations among the raw scores ranged from nonsignificant to significant and moderate in magnitude. Primary Control Engagement Coping was significantly correlated with Secondary Control Engagement Coping and Involuntary Engagement but not with the other scales. Disengagement Coping was correlated with both Involuntary Engagement and Involuntary Disengagement but not with either Primary or Secondary Control Engagement Coping. Finally, Involuntary Engagement and Disengagement were significantly correlated. Moderate to strong correlations among different types of coping are common in cross-sectional coping research because most individuals use multiple coping strategies, and higher levels of distress are associated with more coping of all types. However, the correlations were disattenuated substantially when proportion scores were used for the same sample. Primary and Secondary Control Coping were modestly correlated with each other, and they were negatively correlated with Disengagement Coping, Involuntary Engagement, and Disengagement. Disengagement Coping was correlated with Involuntary Disengagement, and Involuntary Engagement and Disengagement were significantly correlated, although the magnitude of the correlation was lower than in the analyses with raw scores.

Table 2
Correlations Between Responses to Stress Questionnaire Scales

Scale	Primary Control Engagement	1.	2.	3.
	Raw social stress scores			
1. Secondary Control Engagement Coping	.34**			
2. Disengagement Coping	.06	.07		
3. Involuntary Engagement	.12	.03	.66**	
4. Involuntary Disengagement	.35**	−.03	.56**	.76**
	Proportional social stress scores			
1. Secondary Control Engagement Coping	.17**			
2. Disengagement Coping	−.49**	−.12*		
3. Involuntary Engagement	−.41**	−.67**	.09	
4. Involuntary Disengagement	−.64**	−.32**	.40**	.42**

* $p < .05$. ** $p < .001$.

Reliability

Internal consistency. The internal consistency reliabilities (Cronbach's alphas) for the 19 parcels and five factors on the self-report version of the RSQ from the three samples are summarized in Table 3. Internal consistencies for the 19 parcels (each consisting of three items) ranged from .37 to .76 (mean α = .59) for Sample 1, from .58 to .80 for family conflict in Sample 2 (mean α = .68), from .46 to .75 for economic strain in Sample 2 (mean α = .65), and from .32 to .79 (mean α = .57) for Sample 3. Internal consistencies for the five factors (containing 9–15 items) ranged from .73 to .89 in Sample 1 (mean α = .81), from .84 to .92 for family conflict in Sample 2 (mean α = .87), from .80 to .92 for economic strain (mean α = .85) in Sample 2, and from .67 to .88 for Sample 3 (mean α = .80).

Internal consistencies for parents' reports on the RSQ were calculated in Sample 2 for economic strain and family conflict (n = 75) and for Sample 3 for pain (n = 82). For Sample 2, alphas for the 19 parcels ranged from .01 to .75 (mean α = .49), and alphas for the five factors ranged from .67 to .88 (mean α = .78). Similarly, for parents' reports in Sample 3, alphas for the 19 scales ranged from .30 to .70 (mean α = .54) and from .63 to .85 for the five factors (mean α = .75).

Test–retest reliability. Test–retest reliability data were obtained from 101 older adolescents drawn from Sample 1 who completed the social stress version of the RSQ twice, 1–2 weeks apart. The reliability coefficients ranged from .49 to .76 (mean r = .65) for the 19 parcels and from .69 to .81 (mean r = .77) for the five factors (see Table 3).

Validity

The validity of the RSQ was examined through (a) convergent and discriminant validity correlations of the scales of the RSQ with similar scales from the COPE completed 1 week later, (b) correlations between self- and parent-reports on the RSQ, and (c) correlations of the RSQ scales and heart rate reactivity on the laboratory task.

Correlations with the COPE. The convergent and discriminant correlations between the RSQ and the COPE are presented in Table 4. The correlations represent both convergent validity between scales that represent similar constructs on the RSQ and the COPE (monotrait-heteromethod) and discriminant validity between scales that represent different constructs on the two measures (heterotrait-heteromethod). The Primary Control Engagement Coping factor on the RSQ was significantly related to five similar scales on the COPE (Active Coping, Planful Coping, Instrumental Support, Venting of Emotions, and Emotional Support), and was not correlated with scales that represented different constructs on the COPE (e.g., Restraint Coping, Acceptance, Denial, and Behavioral and Mental Disengagement). The Secondary Control Engagement scale on the RSQ was significantly related to two similar scales on the COPE (Positive Interpretation and Acceptance), and was not correlated with scales that reflected different aspects of coping on the COPE (e.g., Active Coping, Planful

Table 3
Internal Consistency and Test–Retest Reliabilities of Self-Report Responses to Stress Questionnaire Primary and Secondary Scales

Scale	Internal consistency reliability				Test–retest reliability, social stress[a]
	Social stress[a]	Family conflict[b]	Economic strain[b]	Pain[c]	
Primary Control	**.82**	**.84**	**.80**	**.72**	**.81**
Engagement Coping					
Problem Solving	.63	.67	.67	.48	.67
Emotional Regulation	.48	.60	.59	.46	.70
Emotional Expression	.70	.76	.67	.61	.70
Secondary Control	**.80**	**.84**	**.83**	**.79**	**.74**
Engagement Coping					
Acceptance	.50	.60	.68	.52	.51
Distraction	.45	.59	.62	.54	.70
Cognitive Restructuring	.52	.58	.65	.54	.71
Positive Thinking	.67	.67	.62	.60	.73
Disengagement Coping	**.73**	**.88**	**.85**	**.67**	**.69**
Denial	.49	.60	.46	.53	.65
Avoidance	.51	.68	.66	.32	.49
Wishful Thinking	.64	.73	.65	.48	.63
Involuntary Engagement	**.89**	**.92**	**.92**	**.88**	**.81**
Rumination	.76	.78	.74	.69	.76
Intrusive Thoughts	.69	.78	.70	.72	.70
Emotional Arousal	.65	.70	.72	.63	.69
Physiological Arousal	.65	.71	.65	.52	.74
Impulsive Action	.72	.80	.72	.79	.69
Involuntary Disengagement	**.81**	**.88**	**.86**	**.85**	**.78**
Emotional Numbing	.37	.63	.42	.59	.50
Inaction	.64	.63	.74	.68	.76
Escape	.52	.67	.65	.51	.61
Cognitive Interference	.65	.74	.75	.57	.68

Note. Numbers in bold signify factor scores.
[a] Sample 1. [b] Sample 2. [c] Sample 3.

Coping, Instrumental Support, Ventilation of Emotions, and Denial). The Voluntary Disengagement Coping scale of the RSQ was significantly correlated with four similar scales on the COPE (Restraint Coping, Denial, Behavioral Disengagement, and Mental Disengagement). Only three correlations that were not expected as part of the pattern of convergent validity reached significance—Primary Control Engagement Coping on the RSQ with suppression of competing activities and positive reinterpretation on the COPE and Disengagement Coping on the RSQ with ventilation of emotions on the COPE. All of the convergent validity correlations were either within or greater than the range of .30 to .50 that is typical for these analyses (Fiske & Campbell, 1992). Following guidelines of Byrne and Goffin (1993), we examined the percentage of the convergent validity coefficients that were greater in magnitude than the discriminant validity coefficients. Only 2% of the comparisons violated this pattern, exceeding Byrne and Goffin's (1993) criteria (5%) for a high degree of discriminant validity.

Table 4
Convergent and Discriminant Validity Correlations of Voluntary Responses to Stress Questionnaire Coping Scales With COPE

COPE	Primary Control Engagement	Secondary Control Engagement	Disengagement
Active Coping	**.50****	.20	.08
Planful Coping	**.50****	.15	.06
Suppression of Activities	.35**	.15	.21
Instrumental Support	**.46****	.11	.13
Ventilation of Emotions	**.48****	.00	.32*
Emotional Support	**.58****	.11	.19
Positive Reinterpretation	.49**	**.46****	.22
Acceptance	.10	**.33****	.13
Religion	−.03	.23	.19
Restraint Coping	.14	.21	**.36****
Denial	−.05	.11	**.49****
Behavioral Disengagement	−.02	.20	**.52****
Mental Disengagement	.02	.13	**.47****

Note. Boldface type indicates expected convergent validity correlations.
* $p < .05$. ** $p < .01$.

The differences between the hypothesized convergent and discriminant validity correlations were further tested using the Fisher's z transformation for comparing correlations (Howell, 1997). To reduce the number of comparisons, we calculated the mean of the hypothesized convergent correlations and mean of the discriminant correlations for each of the three RSQ voluntary coping scales. For Primary Control Engagement Coping, the mean of the convergent correlations ($r = .465$) was significantly greater than the mean of the discriminant correlations ($r = .121$), $z = 2.08$, $p < .05$. The mean of the convergent ($r = .395$) and the discriminant correlations ($r = .126$) for Secondary Control Engagement Coping were not significantly different, $z = 1.34$. The mean convergent

Table 5
Correlations Among Parents' Reports and Adolescents' Reports of Adolescents' Responses to Stress and Internalizing and Externalizing Problems

	Parent-report scale						
	RSQ					CBCL	
Adolescent-report scale	1.	2.	3.	4.	5.	6.	7.
				RSQ			
1. Primary Control Engagement	**.30***	.15	−.21	−.33†	−.11	−.15	−.22†
	.21†	−.07	−.11	.05	−.07	−.09	−.20†
2. Secondary Control Engagement	.09	**.31***	−.19	−.27*	−.16	−.18	−.20
	.14	**.46****	.09	−.44**	−.26†	−.22†	−.16
3. Disengagement Coping	−.11	−.37*	**.27***	.32*	.14	.09	.02
	−.22†	.04	**.28***	−.09	.04	−.03	.00
4. Involuntary Engagement	−.25†	−.17	.25	**.22**	.13	.13	.28*
	−.06	−.28*	−.23†	**.40****	.10	.18	.14
5. Involuntary Disengagement	−.12	−.07	−.02	.26†	**.06**	.17	.10
	−.13	−.23†	.01	.10	**.28***	.14	.19
				YSR			
6. Internalizing	−.26†	−.37**	.20	.39**	.28*	.40*	.42*
	−.21†	−.19	.08	.27*	.04	.36**	.23†
7. Externalizing	−.38**	−.34*	.34*	.37**	.27*	.24	.62*
	−.10	−.18	−.11	.21†	.13	.19	.64**

Note. Correlations are presented on top for Sample 2 (family conflict economic strain) and on bottom for Sample 3 (recurrent abdominal pain) on each line. Bold numbers indicate expected convergent validity coefficients for self- and parent-report RSQ. RSQ = Responses to Stress Questionnaire; CBCL = Child Behavior Checklist; YSR = Youth Self-Report.
† $p < .10$. * $p < .05$. ** $p < .01$.

($r = .493$) and discriminant correlations ($r = .161$) for Disengagement Coping approached significance, $z = 1.80$, $p < .10$.

Parent and adolescent reports. The correlations of the RSQ factor scores from adolescents' self-reports and parents' reports were examined in Samples 2 and 3 (see Table 5). For Sample 2 ($n = 75$), parents' and adolescents' reports on coping with family conflict and economic strain were combined because the samples for the two stressors were not large enough to analyze separately and there was no reason to expect the pattern of correlations to differ across these two stressors because both were related to family stress. Four of the five convergent validity correlations (i.e., between the same scales of the RSQ across informants) were positive and greater than .20 in magnitude; three of the five correlations were significant at $p < .05$ (Primary Control Engagement Coping, $r = .30$; Secondary Engagement Coping, $r = .31$; and Disengagement Coping, $r = .27$). For Sample 3 (RAP; $n = 82$), all of the convergent validity correlations were positive and significant: Primary Control Engagement Coping ($r = .21$, $p = .054$), Secondary Control Engagement Coping ($r = .46$, $p < .001$), Disengagement Coping ($r = .28$, $p < .01$), Involuntary Engagement ($r = .40$, $p < .001$), and Involuntary Disengagement ($r = .28$, $p < .01$). Four of the 10 convergent validity coefficients were in the range of .30–.50 suggested by Fiske and Campbell (1992), and three others closely approached this range (.27 and .28). Only 6% of the discriminant validity correlations exceeded the convergent validity correlations in magnitude, approaching the 5% criterion for high discriminant validity suggested by Byrne and Goffin (1993).

The pattern of convergent and discriminant validity correlations was further tested using the Fisher's z transformation to contrast the mean of the correlations of the same scales across informants (e.g., adolescents' reports of Primary Control Engagement with parents' reports of Primary Control Engagement), with the mean of different scales across informants (e.g., adolescents' reports of Primary Control Engagement with parents' reports of Secondary Control Engagement). For Sample 2, the difference between the mean convergent correlations ($r = .23$) and the mean of the discriminant correlations ($r = -.07$) approached significance, $z = 1.84$, $p < .10$. For Sample 3, the difference between the mean of the convergent correlations ($r = .33$) and discriminant correlations ($r = -.17$) was significant, $z = 3.21$, $p < .05$. For purposes of comparison, the mean convergent ($r = .51$) and discriminant correlations ($r = .33$) for the CBCL and YSR were not significantly different for Sample 2 ($z = 1.35$), and these correlations (convergent validity $r = .50$; discriminant validity $r = .21$) were significantly different for Sample 3 ($z = 2.15$, $p < .05$).

Correlations with heart rate reactivity. Heart rate reactivity data from a subset of Sample 1 ($n = 62$) were examined in relation to the RSQ factors reflecting physiological and emotional reactivity. On the basis of previous research, we predicted relations with disengagement coping strategies, which are often viewed as attempts to suppress arousal, and with involuntary engagement strategies, which include emotional and physiological arousal. Heart rate reactivity was significantly correlated with more Disengagement Coping ($r = .28$, $p < .05$) and more Involuntary Engagement responses ($r = .33$, $p < .01$) but was unrelated to Primary Control

Engagement, Secondary Control Engagement, and Involuntary Disengagement.

Gender Differences

Although few studies have investigated gender differences in coping, several have found that girls report more coping responses than boys (Compas et al., in press). Therefore, responses on the RSQ were examined as a function of gender in Samples 1 and 2. Consistent significant gender differences were found, with females reporting higher levels of voluntary and involuntary responses than males in both samples. In Sample 1, *t* tests indicated that females scored significantly higher than males on 9 of 19 scales (Problem Solving, Positive Thinking, Wishful Thinking, Emotional Regulation, Emotional Expression, Denial, Intrusive Thoughts, Emotional Arousal, and Physiological Arousal), and males did not score higher than females on any scales. In Sample 2, for responses to economic strain, girls scored higher than males on all 10 voluntary scales and one of the involuntary scales (Emotional Arousal). For family conflict, girls scored higher on every voluntary scale except Acceptance and on all of the involuntary scales. Males did not score higher than females on any scales in Sample 2.

To address this base rate difference in endorsement of coping items, we calculated proportion scores with the total score for each scale divided by the total score on the RSQ. The proportion scores control for the total number of responses of each individual, providing an index of the relative degree to which each response category that was used. Fewer gender differences were found using proportion scores, and those differences that were significant were more balanced, with males using proportionately more of some strategies. In Sample 1, females reported proportionately more problem solving, emotional expression, and physiological arousal, whereas males responded with more cognitive restructuring, emotional regulation, acceptance, distraction, emotional numbing, and escape. In Sample 2, for economic strain, females scored higher than males on positive thinking and emotional expression, whereas males scored higher on rumination, impulsive action, cognitive interference, escape, and inaction. For family conflict in Sample 2, females used proportionately more emotional expression and emotional regulation, whereas males used more acceptance and inaction.

Association With Internalizing and Externalizing Symptoms

Drawing on previous research (Forsythe & Compas, 1987; Osowiecki & Compas, 1999; Vitaliano et al., 1987) and the gender differences reported above, we used proportion scores in correlational analyses with the YSR, YASR, and CBCL. Correlations of RSQ factors with internalizing and externalizing scores on the YSR and YASR are presented in Table 6 for all three samples. The correlations indicate moderate to strong associations of all five RSQ factors with emotional and behavioral problems in all three samples. Specifically, Primary and Secondary Control Engagement Coping were related to lower internalizing and externalizing problems, whereas Disengagement Coping and Involuntary Engagement and Disengagement responses to stress were all positively related to behavioral–emotional problems. Although these correlations were generally moderate in magnitude and statistically significant, there were some exceptions. Correlations were somewhat weaker for girls' voluntary and involuntary responses to family conflict. This suggests the importance of considering stressors individually, as the efficacy of coping responses may differ across stressors, with no response helpful or maladaptive in all situations.

Correlations of parents' reports of their children's coping on the RSQ and parents' reports of their children's internalizing and externalizing behavioral–emotional problems on the CBCL in Samples 2 and 3 are presented in Table 7. These findings resemble those found in adolescents' self-reports. That is, both Primary and

Table 6
Correlations of Adolescent Reports on RSQ Factors With Internalizing and Externalizing Symptoms on the YASR in Sample 1 and the YSR in Samples 2 and 3

	YASR (Sample 1)				YSR (Sample 2)					
	Internalizing		Externalizing		Internalizing		Externalizing		YSR (Sample 3)	
Self-report RSQ	Male	Female	Male	Female	Male	Female	Male	Female	Internalizing	Externalizing
Primary Control Engagement Coping	−.49***	−.39***	−.37***	−.30***	−.21** −.19*	−.01 −.26***	−.22** −.20**	.01 −.15	−.24*	−.28*
Secondary Control Engagement Coping	−.46***	−.52**	−.30***	−.27***	−.32*** −.30***	−.08 −.31***	−.31** −.34***	−.09 −.27***	−.35**	−.21
Disengagement Coping	.29***	.23**	.18*	.06	.24** .36***	.03 .28***	.23** .38***	.02 .20*	.01	.07
Involuntary Engagement	.53***	.45***	.35***	.25**	.23** .27**	−.03 .19*	.26** .31***	−.02 .29***	.29**	.29**
Involuntary Disengagement	.38***	.36***	.40***	.18**	.26** .10	.08 .29***	.25** .11	.07 .15	.31**	.15

Note. For Sample 2, correlations for economic strain appear on top and for family conflict below on each line. RSQ = Response to Stress Questionnaire; YASR = Young Adult Self-Report; YSR = Youth Self-Report.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7
Correlations of Parents' Reports of Their Children's Coping and Internalizing and Externalizing Symptoms on the Child Behavior Checklist in Samples 2 and 3

Parent-Report Response to Stress Questionnaire	Sample 2 (n = 71)		Sample 3 (n = 82)	
	Internalizing	Externalizing	Internalizing	Externalizing
Primary Control Engagement Coping	−.53***	−.39***	−.45**	−.19
Secondary Control Engagement Coping	−.44***	−.38***	−.31**	−.19
Disengagement Coping	.38***	.38***	.12	.00
Involuntary Engagement	.51***	.34***	.27*	.11
Involuntary Disengagement	.45***	.35***	.43**	.28**

* $p < .05$. ** $p < .01$. *** $p < .001$.

Secondary Control Engagement Coping were related to fewer behavioral–emotional problems, whereas Disengagement Coping, Involuntary Engagement, and Involuntary Disengagement responses were related to more behavioral–emotional problems.

Finally, correlations of coping and behavioral–emotional problems across informants were examined in Samples 2 and 3 and are summarized in Table 5. In general, parents' reports of their adolescents' responses to stress on the RSQ were significantly related to adolescents' reports of internalizing and externalizing problems on the YSR; all five of the correlations were significant and four of the five were greater than .30 for Sample 2, and one of the correlations was significant for Sample 3. Adolescents' reports on the RSQ were not as consistently or strongly related to parents' reports on the CBCL; Primary Control Coping was negatively correlated with externalizing problems in both samples, Secondary Control Coping was inversely related to internalizing symptoms in Sample 3, and Involuntary Engagement was significantly related to externalizing problems in Sample 2. The remaining correlations were in the expected direction but did not reach significance. The direction of the correlations was consistent with the pattern found for the within-informant correlations—Primary and Secondary Control Coping were negatively related to symptoms, whereas Disengagement Coping, Involuntary Engagement, and Involuntary Disengagement were positively related to symptoms.

Discussion

This study developed a reliable and valid measure for use with adolescents on the basis of a multidimensional model of responses to stress. The conceptual model was developed to include a broad range of responses to stress by assessing both voluntary coping and involuntary stress responses and to consider the placement of responses along the dimensions of voluntary–involuntary, engagement–disengagement, and primary–secondary control. CFAs indicated a consistent factor structure across samples, stressors, and gender. The final structure provides some support for distinctions between two basic dimensions of responses to stress—voluntary versus involuntary and engagement versus disengagement. However, we were unable to test the full model because it was unidentified in the CFA. When the voluntary coping scales were tested separately, the findings indicate that voluntary engagement responses, which are goal directed, can be further distinguished along a dimension of primary or secondary control.

The structure of the voluntary portion of the coping model differed from the hypothesized model in three important ways. First, we expected that both voluntary engagement and disengagement would be further distinguished as involving primary versus secondary control responses. However, only engagement coping responses differed in terms of primary versus secondary control goals, perhaps because it is difficult to assert primary control through disengagement responses. We had conceptualized avoidance initially as a potential primary control response in which children changed the problem to some extent by ending exposure to the stressor (such as staying out of a bully's way). However, it is also easy to see how all disengagement responses may be more appropriately conceptualized as relinquished control (Weisz et al., 1994). Second, although we expected distraction to load on the Disengagement factor, it loaded on the Secondary Control Engagement factor. In retrospect, this finding can be explained through the recognition that although distraction involves disengagement from the stressor, it also involves engagement with other stimuli by shifting one's attention away from a stressor and toward more positive targets (e.g., reading, listening to music). Although direct comparisons of relations between distraction, avoidance, and psychological outcomes have been rare in child coping research, laboratory findings support a distinction between distraction and avoidance (e.g., Wegner, 1994). Given that the majority of current measures combine distraction and avoidance in a single scale, the present findings highlight the importance of distinguishing between the two (see also Ayers et al., 1996). Despite differences between the hypothesized and final model, confidence in the modified model comes from the consistent replication across samples, targeted domains of stressful events, and gender.

For the involuntary portion of the model, the separation between Involuntary Engagement and Involuntary Disengagement received some support in the CFA. Although the two factors were highly correlated, CFA demonstrated that a two-factor model of involuntary responses fit the data significantly better than a one-factor model. Guidance in understanding the strong correlation between the two factors can be found in the posttraumatic stress disorder literature. Although symptoms of posttraumatic stress disorder, such as intrusive thoughts and emotional numbing, tend to co-occur for individuals, these responses are generally separated in time. More sophisticated longitudinal, laboratory, and daily coping studies are required to better understand the relationship between involuntary engagement and disengagement responses.

The observed factor structure of the RSQ compares favorably with other recent factor-analytically derived structures of coping scales for children and adolescents, while assessing a broader range of responses to stress. Ayers et al. (1996) identified four factors—Active Strategies (e.g., problem solving, seeking understanding), Avoidance (cognitive avoidance, avoidant action), Distraction (distracting action, physical release of emotions), and Support Seeking (emotion-focused and problem-focused support). Walker et al. (1997) identified three factors in their measure of coping with pediatric pain—Active Coping (e.g., problem solving, social support, rest), Passive Coping (e.g., self-isolation, disengagement), and Accommodative Coping (e.g., acceptance, distract–ignore). The differences in the factor structures among these three measures are in part attributable to the different items comprising the measures and to the different types of stress faced by respondents. Furthermore, the fit indices for the RSQ (CFI's from .91 to .97) compare favorably with the standards set by these other studies of coping in adolescence, exceeding those reported by Walker et al. (1997; CFI's from .77 to .84) and approaching the CFI of .96 reported by Ayers et al. (1996).

The factor structures identified in the present analyses and these other recent factor-analytic studies did not support the widely used distinction between problem-focused and emotion-focused coping because strategies that focused on the problem or the emotion consistently loaded together on common factors. Most notably, in the present analyses, Primary Control Engagement Coping included problem solving along with emotional regulation and emotional expression. Thus, the problem-focused versus emotion-focused distinction does not appear to be a primary dimension distinguishing among coping strategies, at least in adolescence. The current model provides stronger support for the distinction between responses aimed at achieving primary or secondary control (e.g., Weisz et al., 1994). In addition, a simple one-dimensional model of engagement versus disengagement responses was not supported, indicating that this dimension is part of a more complex model of responses to stress.

The results of the studies reported here provide initial evidence for the reliability of the RSQ as an index of both voluntary coping and involuntary stress responses in adolescence. Both the internal consistency and test–retest reliability of the RSQ were adequate to strong, with the five factors achieving adequate reliability; the 19 parcels of items were not sufficiently reliable. This pattern is not surprising because the parcels included only three items each, limiting the degree of reliability that could be achieved. Most previous studies have not examined the test–retest reliability of adolescents' responses (Compas et al., in press). The present findings are encouraging, however, as they suggest that adolescents responded in a consistent manner to items that shared a similar conceptual basis, and their responses on the five factors were relatively reliable over a short period of time. The reliability statistics support the use of the five factors but not the 19 three-item parcels in subsequent applications of the RSQ. Further assessment of test–retest reliability is valuable because these results are based on a college student sample and may not be representative of test–retest reliability in younger samples.

The data provide some support for the construct and criterion validity of the RSQ. First, the RSQ achieved adequate convergent and divergent validity with the COPE. The validity coefficients were adequate for Primary Control Engagement Coping and Disengagement Coping and were in the expected direction for Secondary Control Engagement Coping. Second, the Involuntary Engagement and Disengagement Coping scales were significantly correlated with heart rate reactivity on a laboratory task. The Involuntary Engagement factor includes scales reflecting physiological and emotional reactivity, and was expected to be associated with greater heart rate reactivity. The correlation between Disengagement Coping (e.g., avoidance, denial) and greater physiological reactivity is consistent with research showing the negative consequences of coping that is intended to suppress or avoid unwanted thoughts and emotions (e.g., Wegner, 1994). Finally, significant convergent validity correlations that were small to moderate in magnitude were found between reports of parents and adolescents on the RSQ, and the convergent validity coefficients exceeded the discriminant validity coefficients in several analyses. These correlations are comparable in magnitude to those typically found for measures of internalizing problems (Achenbach et al., 1987), even though many of the items on the RSQ reflect covert responses that are difficult to observe. We believe that these findings are the first comparing parent and adolescent responses on a measure of coping, and they indicate that adolescents' responses are not limited to their own idiosyncratic perceptions or response biases. A next step will involve factor analyses of parent-report data to determine whether the same factors will be confirmed across self-report and parent-report.

Hypothesized relations between coping and both internalizing and externalizing symptoms were supported in analyses of both adolescent and parent reports. First, both Primary and Secondary Control Coping were generally related to lower levels of internalizing and externalizing symptoms. This is noteworthy because both of these scales contain emotion-focused coping items, and most previous studies have found that emotion-focused coping is related to more symptoms (Stanton et al., 1994). The items that tap emotional regulation and emotional ventilation on the RSQ may reflect more adaptive coping with negative emotions, such that they are associated with lower symptoms of emotional problems. Second, Disengagement Coping was generally related to more internalizing and externalizing symptoms. This is consistent with a broad literature on the ineffectiveness of avoidance, denial, and wishful thinking in response to stress. Third, significant correlations were found between parents' reports on the RSQ and adolescents' reports of internalizing and externalizing problems on the YSR. These correlations indicate that the association between coping and involuntary stress responses and internalizing–externalizing symptoms are not solely due to shared method variance in measuring these constructs. The stressors that were the focus of the present analyses were all relatively uncontrollable. Therefore, we expect that these patterns of correlation may differ for other stressors, particularly ones that offer greater opportunities for personal control (e.g., academic stressors).

The findings suggest that the RSQ has several features that make it a valuable tool for studying adolescents' responses to stress. First, the RSQ is unique in measuring both voluntary and involuntary responses. The inclusion of involuntary responses highlights the importance of the interplay between coping and reactivity in understanding stress responses. Second, the RSQ is one of few adolescent coping measures with a theoretical basis. Third, unlike most other measures, the RSQ focuses on assessment of responses to specific categories of stressors rather than measur-

ing general coping or aggregating responses to different types of stress for each participant. This allows for greater understanding of the context-specific effects of coping. Fourth, the RSQ differs from other coping measures by requiring that respondents indicate the specific strategies used when endorsing socially desirable coping items, allowing for a higher level of confidence that a given coping response was actually used. Fifth, the RSQ includes a better sampling of emotion regulation responses that are likely to be beneficial to youth, a category of responses that have been inadequately assessed in both adult and child coping measures. Sixth, in terms of measure development, the RSQ exceeds the standards for existing child and adolescent coping measures, including replication of the proposed coping model in multiple samples and preliminary evidence of reliability and validity (psychometric data are not available for most adolescent coping measures). Finally, the development of a parent-report and an adolescent self-report version of the scale is unique to the RSQ, as is the presentation of data comparing parent and adolescent responses.

With the availability of the RSQ and other theoretically based, factor-analytically confirmed measures of coping (Ayers et al., 1996; Walker et al., 1997), the greatest gain in the literature on adolescent responses to stress is likely to come from improvements in research design and methodology. First, although participants in this study varied in socioeconomic status, our sample, along with samples in the majority of adolescent coping studies, lacked diversity with regard to ethnicity and culture. Subsequent research using the RSQ with more diverse samples is needed to determine whether the structure of coping differs across cultures. Second, the majority of published studies investigating the association between stress responses and internalizing–externalizing symptoms are based on cross-sectional analyses. Future research needs to examine the association of stress responses with changes in symptoms over time. Third, there was mixed evidence for different patterns of association of Primary and Secondary Control Coping or Involuntary Engagement and Disengagement with symptoms. Further analyses are needed to determine if these scales make independent contributions to the prediction of symptoms or if their effects are best understood in terms of interactions. Finally, the process of coping with a stressor involves the interplay of involuntary and voluntary responses to the event with cognitive, affective, physiological, and behavioral responses varying over time. Clearer understanding of these processes requires studies exploring the sequence in which responses to stress are generated and the combinations of those responses. These needs for future research notwithstanding, the RSQ appears to be a useful tool for the assessment of adolescents' coping and responses to stress. Use of the RSQ across different types of stress and in relation to emotional, behavioral, and health outcomes should advance our understanding of the ways that adolescents adapt to stress.

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Appendix

The Responses to Stress Questionnaire, Social Stress Version

A. Even when things are going well for teenagers, almost everyone still has some tough times getting along with other people.

1. So that we can find out how things have been going for you lately, please put a check mark by all the things on this list that have been a problem for you since the start of the school year.

Being around kids who are rude	☐	Fighting with other kids	☐
Not having as many friends as you want	☐	Having problems with a friend	☐
Having someone stop being your friend	☐	Being left out or rejected	☐
Being teased or hassled by other kids	☐	Asking someone out and being turned down	☐
Feeling pressured to do something	☐		

2. Circle the number that shows how stressful, or how much of a hassle these problems were for you.

1	2	3	4
Not at all	A little	Somewhat	Very

B. This is a list of things that people sometimes do, think, or feel when something stressful happens. Everybody deals with problems in their own way—some people do a lot of the things on this list or have a bunch of feelings, other people just do or think a few things.

Think of the situations you just checked off. For each item on the list below, circle **one** number from 1 (not at all) to 4 (a lot) that shows **how much** you do or feel these things when you have problems with other kids like the ones you just checked off. Please let us know about everything you do, think, and feel, even if you don't think it helps make things better.

	How much do you do this? Not at all	A little	Some	A lot
1. I **try** not to feel anything.	1	2	3	4
2. When I have problems with other kids I feel sick to my stomach or get headaches.	1	2	3	4
3. I try to think of different ways to change the problem or fix the situation. **Write one plan you thought of:**_____	1	2	3	4
4. When problems with other kids happen I don't feel anything at all, it's like I have no feelings.	1	2	3	4
5. I wish that I were stronger, smarter, or more popular so that things would be different.	1	2	3	4
6. **I keep remembering** what happened with the other kids or **can't stop thinking** about what might happen.	1	2	3	4
7. I let someone or something know how I feel. (Remember to circle a number.) → **Check all you talked to:**	1	2	3	4

Parent ☐ Friend ☐ Brother/Sister ☐ Pet ☐
Teacher ☐ God ☐ Stuffed Animal ☐ None of these ☐

8. I decide I'm okay the way I am, even though I'm not perfect.	1	2	3	4
9. When I'm around other people I act like the problems never happened.	1	2	3	4
10. I just **have** to get away when I have problems with other kids, I can't stop myself.	1	2	3	4
11. I deal with the problem by wishing it would just go away, that everything would work itself out.	1	2	3	4
12. I get really jumpy when I'm having problems getting along with other kids.	1	2	3	4
13. I realize that I just have to live with things the way they are.	1	2	3	4
14. When I have problems with other kids, I just **can't** be near anything that reminds me of the situation.	1	2	3	4
15. I **try** not to think about it, to forget all about it.	1	2	3	4
16. When problems with other kids come up I really don't know what I feel.	1	2	3	4
17. I ask other people for help or for ideas about how to make the problem better. → (Remember to circle a number.) **Check all you talked to:**	1	2	3	4

Parent ☐ Friend ☐ Brother/sister ☐
Teacher ☐ God ☐ None of these ☐

18. When I'm having problems getting along with other kids, I **can't stop** thinking about them when I try to sleep, or I have bad dreams about them.	1	2	3	4
19. I tell myself that I can get through this, or that I'll do better next time.	1	2	3	4
20. I let my feelings out. (Remember to circle a number.) → **I do this by:** (Check all that you did.)	1	2	3	4

Writing in my journal/diary ☐ Drawing/painting ☐
Complaining to let off steam ☐ Being sarcastic/making fun ☐
Listening to music ☐ Punching a pillow ☐
Exercising ☐ Yelling ☐
Crying ☐ None of these ☐

21. I get help from other people when I'm trying to figure out how to deal with my feelings. → **Check all that you went to:**	1	2	3	4

Parent ☐ Friend ☐ Brother/sister ☐ Pet ☐
Teacher ☐ God ☐ Stuffed animal ☐ None of these ☐

22. **I just can't** get myself to face the person I'm having problems with or the situation.	1	2	3	4
23. I wish that someone would just come and get me out of the mess.	1	2	3	4
24. I do something to try to fix the problem or take action to change things. **Write one thing you did:**_____	1	2	3	4
25. Thoughts about the problems with other kids just pop into my head.	1	2	3	4
26. When I have problems with other kids, I feel it in my body. → (Remember to circle a number.) **Check all that happen:**	1	2	3	4

My heart races ☐ My breathing speeds up ☐
I feel hot or sweaty ☐ My muscles get tight ☐
None of these ☐

You're half done! Before you keep working, look back at the first page so you remember what kinds of problems with other kids you told us about. Remember to answer these questions thinking about those problems.

27. I **try** to stay away from people and things that make me feel upset or remind me of the problem.	1	2	3	4

(Appendix continues)

28. I don't feel like myself when I have problems with other kids, it's like I'm far away from everything. 1 2 3 4
29. I just take things as they are, I go with the flow. 1 2 3 4
30. I think about happy things to take my mind off the problem or how I'm feeling. 1 2 3 4
31. When problems with other kids come up, I **can't stop** thinking about how I am **feeling.** 1 2 3 4
32. I get sympathy, understanding, or support from someone. (Remember to circle a number.) → 1 2 3 4

Check all you went to:

Parent ☐ Friend ☐ Brother/sister ☐ Teacher ☐
None of these ☐

33. When problems with other kids happen, I can't always control what I do. → 1 2 3 4
(Remember to circle a number.)

Check all that happen:

I can't stop eating ☐ I can't stop talking ☐
I do dangerous things ☐ I have to keep fixing/checking things ☐
None of these ☐

34. I tell myself that things could be worse. 1 2 3 4
35. My mind just goes blank when I have problems with other kids, I can't think at all. 1 2 3 4
36. I tell myself that it doesn't matter, that it isn't a big deal. 1 2 3 4
37. When I have problems with other kids right away I feel really: **(Check all you feel.)** → 1 2 3 4
(Remember to circle a number.)

Angry ☐ Sad ☐ Scared ☐ Worried/anxious ☐
None of these ☐

38. It's really hard for me to concentrate or pay attention when I have problems with other kids. 1 2 3 4
39. I think about the things I'm learning from the situation, or something good that will come from it. 1 2 3 4
40. When I have problems with other kids I **can't stop** thinking about what I **did or said.** 1 2 3 4
41. When something goes wrong with other kids, I say to myself, "This isn't real." 1 2 3 4
42. When I'm having problems with other kids I end up just lying around or sleeping a lot. 1 2 3 4
43. I keep my mind off problems with other kids by: (Remember to circle a number.) → 1 2 3 4

Check all that you do:

Exercising ☐ Seeing friends ☐ Watching TV ☐
Playing video games ☐ Doing a hobby ☐ None of these ☐

44. When problems with other kids come up, I get upset by things that don't usually bother me. 1 2 3 4
45. I do something to calm myself down when I'm having problems with other kids. → 1 2 3 4
(Remember to circle a number.)

Check all that you do:

Take deep breaths ☐ Pray ☐ Walk ☐ ☐
Listen to music ☐ Take a break ☐ Meditate ☐ None of these ☐

46. I just freeze when I have a problem with other kids, I **can't** do anything. 1 2 3 4
47. When I'm having a problem with other kids, sometimes I act without thinking. 1 2 3 4
48. I keep my feelings under control when I have to, then let them out when they won't make things worse. 1 2 3 4
49. When problems with other kids happen I can't seem to get around to doing things I'm supposed to do. 1 2 3 4
50. I tell myself that everything will be all right. 1 2 3 4
51. When I have problems with other kids, **I can't stop** thinking about why they happened to me. 1 2 3 4
52. I think of ways to laugh about it so that it won't seem so bad. 1 2 3 4
53. My thoughts start racing when I'm having a tough time with other kids. 1 2 3 4
54. I imagine something really fun or exciting happening in my life. 1 2 3 4
55. When a rough situation with other kids happens, I can get so upset that I can't remember what happened or what I did. 1 2 3 4
56. I try to believe it never happened. 1 2 3 4
57. When I have problems with other kids, sometimes I **can't** control what I do or say. 1 2 3 4

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