

Coping Efforts and Efficacy, Acculturation, and Post-Traumatic Symptomatology in Adolescents
following Wildfire: A Latent Variable Path Analysis

by

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(ABSTRACT)

Recent studies of children and adolescents who have experienced a residential, industrial, or wild fire have suggested a causal link between fire disaster and PTSD related psychological distress. Not everyone, however, is equally affected by the stress of experiencing such an event, and the role of coping in this process may be an important mediating factor. Additionally, several studies have found that girls and African Americans report more distress following disasters than do boys and Caucasians. The current study sought to investigate the roles of exposure/loss, coping efficacy, and coping strategy in mediating psychological distress in adolescents after a disaster.

The current study included a representative sample of 206 9th graders from a Central Florida High School affected by severe wildfires who were assessed via self-report measures 3- and 10- months after the fires, in a latent variable path analysis to assess the fit of a model including exposure/loss, coping efficacy, coping strategy, and PTSD, depression, and anxiety scores. Moreover, acculturation level and SES were included along with gender and ethnicity in testing for the moderating role of sociodemographics, as little research has delved into the important proximal factors affecting reported racial differences, as ethnicity is better

conceptualized as a distal variable that works through a variety of proximal variables to affect outcomes.

Results indicated that although the assessment of the global fit of the latent variable path model revealed it to be a poor fit to the data, component fit of the model pointed to a possible mediating role of coping efficacy between exposure/loss and psychological distress, as well as coping efficacy being associated negatively with avoidant coping strategies. Likewise, post hoc regression analyses indicated an important role for exposure/loss, coping efficacy, and coping strategy as they related to PTSD symptomatology in adolescents at both Time 1 and Time 2. Finally, although relationships between the proposed variables and PTSD did not interact with gender, acculturation, SES, or ethnicity, there was a significant interaction between acculturation and ethnicity signifying that for African American youth, high acculturation levels were predictive of less PTSD symptomatology.

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Coping Efforts and Efficacy, Acculturation, and Post-Traumatic Symptomatology in Adolescents following Wildfire: a Latent Variable Path Analysis

Disaster research has examined the psychopathological consequences of a variety of natural and technological disasters. Research in the last decade has begun to focus on the effects of such disasters on children and adolescents. The hallmark of disasters is that they immediately plunge the child and family into situations in which they are exposed to multiple acute and chronic stressors that may affect adjustment (Saylor, Belter, & Stokes, 1997). These experiences have been found to have traumatic effects on children (Pfefferbaum, 1997), who have been shown to exhibit the full range of Post Traumatic Stress Disorder (PTSD) reactions and associated features in response to such disasters (Wilson & Raphael, 1993). In fact, symptoms of PTSD have emerged as one of the most common types of psychological distress observed in children following a disaster (Vernberg, La Greca, Silverman, & Prinstein, 1996).

Recent studies of children and adolescents who had experienced a residential, industrial, or wild fire have suggested a causal link between fire disaster and PTSD related psychological distress (Greenberg, 1994; Greenberg & Keane, 1997; Jones, Ribbe, & Cunningham, 1994; March, Amaya-Jackson, Terry, & Costanzo, 1997). The devastating consequences of fires and burns rank sixth among major causes of injury and death among infants to 19 year olds (Division of Injury Control, Center for Environmental Health and Injury Control, Centers for Disease Control, 1990). Greenberg (1994) found that children as well as adults experienced distress and fear of recurrence after a fire.

According to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association, 1994), the primary symptoms of PTSD include reexperiencing phenomena, such as recurrent and intrusive dreams or recollections of the event;

avoidance and numbing of responsiveness, such as avoidance of thoughts, feelings, activities, or people associated with the trauma; and symptoms of increased arousal, such as difficulty sleeping or concentrating. For a diagnosis of PTSD, after being exposed to a traumatic event which causes terror, hopelessness, or horror, one reexperiencing symptom, three avoidance symptoms, and two hyperarousal symptoms must be present. For children, associated features of PTSD include physical symptoms, frightening dreams (not necessarily about the traumatic event), play reenactment of the traumatic event, omen formation, regression to an earlier developmental level, and guilt (American Psychiatric Association, 1994).

Based on current studies, it is clear that children exhibit the full range of PTSD and its associated features, including dissociation, flashbacks, forms of denial, unconscious behavioral reenactments, psychic numbing, and hyperarousal states (Wilson & Raphael, 1993). Recent research (Giaconia et al., 1995) found that by the age of 18 years, more than two fifths of youths in a community sample met criteria for at least one DSM-IV trauma and more than 6% met criteria for a lifetime diagnosis of PTSD. Once established, then, PTSD in children may be chronic and often debilitating (Green, Lindy, Grace, & Leonard, 1992; Nader, Pynoos, Fairbanks, & Frederick, 1990). Partial symptomatology is common and may be disabling even if full criteria are not met. Furthermore, a lifetime diagnosis of PTSD by the age of 18 years significantly increases the risk of other lifetime diagnoses, such as depression, anxiety, and alcohol and drug dependence (Giaconia et al., 1995). Thus, it is important to consider all symptoms of psychological distress following disasters, especially in children, since they often have a chronic course that may disrupt development (Pfefferbaum, 1997). It is important to note that trauma can also precipitate a variety of symptoms and conditions beyond PTSD, including symptoms of depression and anxiety (Yehuda & McFarlane, 1995; March et al., 1997).

Not everyone, however, is equally affected by the stress of experiencing such an event, and understanding various risk and protective factors has become an important research issue. Certain variables have been postulated as possible mediators and moderators of the relationship between disaster and outcome. Exposure and loss are considered to be primary factors in the emergence of post-traumatic symptomatology in most disaster-response models (i.e., Freedy, Resnick, & Kilpatrick, 1992; March et al., 1997; Vernberg et al., 1996). Individual characteristics have also emerged as important moderators to consider (Shannon, Lonigan, Finch, & Taylor, 1991; Lonigan, Shannon, Finch, Daugherty, & Taylor, 1994). Given that coping efforts play important roles in the onset and maintenance of a wide range of psychological distress and psychopathology during childhood and adolescence (Compas, Orosan, & Grant, 1993), coping strategies are another likely source of youth's differential vulnerability to the effects of disaster. Research, however, has been negligent with respect to the inclusion of children's coping as a factor in disaster response. Studying the effect of coping efficacy and coping strategy as mediators of the relationship between disaster exposure and outcome may help to identify those children and adolescents who are most likely to experience post-traumatic distress symptoms (Green & Solomon, 1995). These variables may go a long way in clarifying the relationships between previously founded explanatory factors and outcome symptomatology.

Thus, the central purposes of the current study were to a) test the global fit of the variables in a theoretically-based latent variable path model to the data from the current sample, b) to assess the strength and direction of the component relationships within the model, and c) to test for possible differences in the model across sociodemographic subgroups. The following sections provide a summary of the relevant literature as it pertains to the variables of

exposure/loss, coping efficacy, coping strategy, and sociodemographic characteristics, and their relationships in the current model.

Figure 1 provides a pictorial representation of the proposed conceptual model. This section will discuss the possible role of each factor and provide theoretical rationale for the inclusion and omission of each relationship in the model, as well as its proposed direction.

Exposure and Loss

The constructs of exposure and loss have been previously shown to play a critical role in the explanation of post traumatic stress reactions following disasters. They are important to the conceptualization of a disaster-response model for children and adolescents, and are included in the proposed conceptual model as a single construct. Thus, this section will include a cursory review of these findings.

Exposure and loss have been found to be primary determinants of psychological distress after both natural and technological disasters. For example, Vernberg et al. (1996) found exposure (life threat) and loss (disruption) to account for 35% of the variance in their model with children. March et al. (1997) found degree of exposure to be the most significant explanatory factor of post-traumatic symptomatology in fourth- to ninth-graders after an industrial fire. Similarly, lost resources alone were found to contribute an additional 11% of the variance in psychological distress after having accounted for gender, age, ethnicity, income, previous trauma history, life event history, and life threat (Freedy, Saladin, Kilpatrick, Resnick, & Saunders, 1994) in a study with adults following Hurricane Hugo. Benight, Ironson, Klebe et al., (1998) found a significant negative relationship between loss of resources and coping self-efficacy in adults following Hurricane Andrew. Thus, the greater the loss, the lower the efficacy for coping

with such loss, and vice versa. Additionally, coping self-efficacy was found to mediate the relationship between loss and psychological adjustment.

These findings serve as the theoretical basis for the hypothesized negative relationship between exposure/loss and coping efficacy and the hypothesized omission of the direct relationship between exposure/loss and outcome symptomatology in Figure 1. As research has not previously looked at the direct relationship between exposure/loss and coping strategy, the model will be tested with and without arrows representing this direct relationship. The nested model will include only the indirect relationship, with coping efficacy mediating the relationship between exposure/loss and outcome. These relationships are included as dashed lines in Figure 1.

Coping Efficacy

Coping efficacy is defined as a child or adolescent's subjective appraisal of his/her ability to cope with the demands of a stressful or traumatic situation (Bandura, 1986). The sense of terror, horror, and helplessness in experiencing a perilous and uncontrollable stressor may very well overwhelm a child or adolescent's coping capabilities. This powerlessness over the situation may deplete one's sense of personal efficacy, creating an ongoing impediment to successful adaptation. Coping beliefs will largely determine coping efforts in response to the resource depletion brought about by the disastrous event (Bandura, 1997). When coping efficacy beliefs are high, it is hypothesized that individuals will focus efforts on actively rectifying pressing environmental and emotional demands through the use of active coping strategies. However, when coping efficacy is low, it is anticipated that greater energy will be directed toward avoidant coping strategies.

In social cognitive theory (Bandura, 1986), the perception that one will be efficacious in exercising control over potentially threatening events plays a crucial role in anxiety levels.

Children or adolescents with low coping efficacy for dealing with a disaster and its aftermath may dwell on their coping deficiencies and magnify the severity of possible threats. This serves to cause further distress and rumination and may impair their level of functioning (Bandura, 1997; Lazarus & Folkman, 1984).

Bandura (1997) purports that people who have high coping efficacy "adopt strategies and courses of action designed to change hazardous environments into more benign ones" (p. 141). Coping efficacy is central to perceptions of control and the enactment of effective coping strategies. Additionally, the impact of perceived coping inefficacy is well established (Bandura, 1997). Perceived inefficacy to cope with the potential threats of the post-disaster environment may lead children or adolescents to approach the situation anxiously, which may lower their sense of efficacy for successful coping performance.

To date, no studies have been identified that have investigated the relationships among coping efficacy, coping strategy, and distress following disaster exposure in children or adolescents. There have, however, been some studies which have included global self-efficacy (Murphy, 1987), and more recently, coping self-efficacy, in their models of adult disaster response (e.g., Benight et al., 1997).

Murphy (1987) found that after experiencing the Mount St. Helen volcano disaster, adults who reported higher levels of global self-efficacy reported lower levels of distress. She found that self-efficacy accounted for 25% of the variance in psychological distress. Benight and colleagues have investigated adults' self-efficacy judgments as they specifically relate to the coping demands of the disaster environment. Their research on coping self-efficacy measured in the acute aftermath of natural disasters has supported the significance of these judgments as predictive of post-traumatic psychological distress both cross-sectionally and

longitudinally (Benight, Ironson, Klebe et al., 1998; Benight, Swift, Sanger, Smith, & Zeppelin, 1998; Benight et al., 1997). Benight et al. (1997) found that coping self-efficacy accounted for 51% of the variance in predicting PTSD symptoms in HIV-infected men who had been exposed to Hurricane Andrew after controlling for amount of damage, life threat, education and income levels, as well as immune status. In a longitudinal study, Benight, Swift et al. (1998) found that lower judgments of coping self-efficacy in adults two months after Hurricane Andrew predicted greater distress levels nine months later. Benight, Ironson, Wyning et al. (1998) used a two-dimensional model of adult coping strategies, active versus avoidant, and found a negative relationship between coping self-efficacy and avoidant coping, concluding that avoidant coping increases as an individual perceives that they are not able to manage environmental demands. These findings serve as further theoretical support for the proposed model.

In fact, these studies with adults provide important information for the proposed conceptualization of coping efficacy and coping strategy in a model of disaster response in children and adolescents. They clearly suggest that early self-appraisals of coping efficacy are important in later recovery and show that coping efficacy is a potent predictor of post-traumatic symptomatology. The current study will include a model of coping gleaned from the child and adolescent literature.

It is hypothesized that coping efficacy will play a regulatory role for stress and anxiety caused by disaster exposure through its impact on coping behavior. Bandura (1986) suggests that individual reactions caused by exposure to severe stress are significantly determined by self-appraisals of one's ability to cope with environmental demands. As depicted by the arrow from exposure/loss to coping efficacy and the arrow directly from coping efficacy to outcome symptoms in Figure 1, coping efficacy is expected to serve as a mediator of environmental

demands and subsequent psychological distress following a disaster. Moreover, the selection of coping strategy and resultant psychological distress is proposed to be influenced by the self-evaluation of coping capability (Benight, Ironson, Klebe, Carver, Wynings et al., 1998). These relationships are accounted for in Figure 1 by the arrows from coping efficacy to the different coping strategies. That is, coping efficacy is hypothesized to have a positive relationship with active coping strategies, and a negative relationship with avoidant coping strategies.

Coping

Coping refers to cognitive and behavioral efforts to manage environmental and internal demands that are appraised as taxing or exceeding personal resources (Lazarus & Folkman, 1984) and is seen as an important mediator of emotional outcomes. Children's coping after exposure to a disaster may play an important role in influencing PTSD and comorbid symptomatology immediately following the disaster, as well as over time. Increased understanding of the role of coping will be essential in furthering our knowledge of the most effective ways to identify and predict those children and adolescents most at risk following exposure to a disaster. Evidence suggests a meaningful role of coping processes in child and adolescent functioning across a variety of conditions (Folkman & Lazarus, 1985). Traumatic events and coping efforts play important roles in the onset and maintenance of a wide range of psychological distress and psychopathology during childhood and adolescence (Compas, Orosan et al., 1993). Yet, research on children's coping following disasters has been virtually nonexistent in the literature (Vernberg et al., 1996).

However, Vernberg et al. (1996) and LaGreca, Vernberg, Silverman, and Prinstein (1996) offer a model upon which to base some preliminary conclusions. The above authors included coping skills in a conceptual model along with exposure, demographic characteristics, and

aspects of the post-disaster social environment, as predictive of outcome after a major disaster. Within this conceptual model, the relationship between coping and symptoms of PTSD is viewed as bi-directional in that the presence of post-disaster psychological distress "contributes to the use of coping strategies as well as being influenced by them after a major disaster" (p. 714). Vernberg et al. (1996) found that children who reported higher levels of coping overall after Hurricane Andrew, also reported more PTSD symptomatology. These results suggest that high levels of distress following a disaster which causes multiple disruptions in the child's life, may initially elicit a variety of coping strategies, both positive and negative. This seems particularly likely to occur with a novel, frightening, and disruptive event (Compas & Epping, 1993), such as a natural or technological disaster.

Ten months after the hurricane, higher PTSD symptomatology was found mostly in those children who had used negative (blame and anger) coping strategies early on in the recovery process (LaGreca et al., 1996). These results suggest that there may be differential outcomes for different types of coping in children after disasters across time.

Due to some of these preliminary results and the paucity of research in this area, the above authors called for further emphasis to be placed on the advantages and limitations of current coping measures available for use with children after a disaster. In fact, a major limitation of these studies is the fact that the coping instrument employed, the Kidcope (Spirito & Williams, 1988), was not based on a current theoretical model of childhood coping, and uses only one indicator to make up half of its factors, and two indicators to make up the other half. These factors did not break down according to the original analysis of the measure, nor in a way which was consistent with a current theoretical model of coping. Additionally, coping was only

measured at time one in these studies, overlooking the importance of changes in coping over time.

A major purpose of the current study was to meld the description or prediction of children's psychopathological outcomes after exposure to a disaster to a current conceptual model of coping, which would be advantageous in terms of both conceptualization and assessment. Ayers, Sandler, West, and Roosa (1996) developed a 4-dimensional model of coping with the factors being *active, avoidance, distraction, and support seeking coping*. This factor structure was replicated in separate analyses on children in the general population (Ayers et al., 1996) and a more specialized sample of children who had experienced the major stressor of parental divorce (Sandler, Tein, & West, 1994). These authors found the 4-factor model to be a superior fit to the data than either the problem- versus emotion- focused or the approach versus avoidant dichotomies.

The model makes conceptual distinctions between coping strategies. The active coping factor in this model includes coping strategies which would be classified as both problem-focused (cognitive decision making, direct problem solving) and emotion-focused (seeking understanding, positive cognitive restructuring) according to the two-dimensional model and is similar to the "approach" coping dimension of Ebata and Moos (1991). Additionally, the current model differentiates between avoidance and distraction coping, which are joined in the two-dimensional models and referred to as "avoidance" (Ebata & Moos, 1991) or emotion-focused coping (Lazarus & Folkman, 1984). In another recent conceptualization of children's coping, Compas, Connor, Harding, Saltzman, Wadsworth et al. (1997) include both distraction and avoidance in their "effortful disengagement" dimension of coping.

The current model differentiates the two in that avoidance refers to behavioral strategies to evade the stressor or reminders of the stressor, repress thoughts about it, or to engage in wishful thinking, whereas distraction refers to efforts to do something else to keep oneself from thinking about the stressor. This model has shown that these two dimensions do not join empirically, nor have the same effects on psychological symptoms. By replacing thoughts of the stressful or traumatic event with alternative activities, distraction may have the added benefit of engaging one in reinforcing activities which may serve to counteract anxiety and negative affect. Moreover, avoidance may in fact make the child or adolescent more aware of their distress (Sandler et al., 1994).

Support seeking in the 4-dimensional model is separated out and signifies the use of social support in coping, both to solve problems and to reduce negative emotions. This conceptual distinction varies from the 2-dimensional models in that it would have been included in approach coping or would be separated into problem and emotion-focused coping, respectively. Compas et al. (1997) grouped both active and support seeking coping into their "effortful engagement" dimension of coping.

In cross-sectional analyses using this 4-factor model, avoidance coping was found to be positively related to depression and conduct problems, and negatively related to self-esteem. Active coping, on the other hand, was negatively related to depression and positively related to self-esteem (Ayers et al., 1996). Additionally, avoidance coping has been found to partially mediate the positive relationship between negative events and depression, anxiety, and conduct problems (Sandler et al., 1994). Longitudinally, Sandler et al. (1994) found a significant negative relationship between both active and distraction coping and internalizing symptomatology at follow-up. In studies assessing children following parental divorce, Sandler et al. (1994) used

structural equation modeling to show that avoidance coping was significantly and positively related to child depression, anxiety, and conduct problems, and appeared to serve as a mediator of the relationship between stress and such psychological symptomatology.

Advantages of using this model are that 1) It is theoretically based, and therefore we may have greater confidence in our conclusions in that it is more likely to yield conceptually meaningful and replicable dimensions; 2) It was specifically designed for children, not adapted from an adult questionnaire; 3) It requests responses about an actual, not a hypothetical event, and 4) each factor has multiple indicators.

Due to the fact that a majority of the empirical evidence shows the strongest effects for active versus avoidance coping, and to increase model parsimony, these two constructs of coping were included in the current model. The current study proposed that coping strategies also play a role in mediating the direct effects of disaster trauma through coping efficacy by increasing or decreasing outcome symptomatology. According to the mediational model of coping, stress leads to the activation of one or more coping strategies. Depending on level of coping efficacy and thus, which coping strategy is employed, these increased coping efforts, in turn, lead to differences in adolescents' symptoms. Part of the negative effects of stress due to experiencing a disaster, then, can be accounted for by the utilization of maladaptive coping strategies. In other words, maladaptive coping strategies may lead to maladaptive outcome symptomatology. Effective coping strategies, on the other hand, would be expected to diminish the effects of stress in leading to post-traumatic outcome.

Theoretically, active coping strategies such as problem-solving might be used to find ways of changing situations that are amenable to change following a disaster (e.g., adapting to a move following a disaster), and positive restructuring might enable children to think about events

in ways that are less threatening (e.g., they did not cause the disaster). Trying to avoid thoughts, feelings, situations, or people associated with the event, however, may increase one's sense of numbing, detachment from people and activities, etc., which themselves are symptoms of PTSD. Additionally, as previously stated, attempts at avoiding thoughts may actually increase one's rumination. In other words, telling oneself to not think about something, may simply serve to bring it to mind.

These examples, in conjunction with results from studies with adults which found psychological distress to be related to increases in avoidant coping and suggested that active coping may provide more resolutions and improved functioning over time (Benight, Ironson, Klebe et al., 1998), serve as the theoretical basis for the following hypotheses for the four-factor measurement structure of coping. Although initial coping levels of any type are predicted to be associated with distress levels in the first few months following exposure, it is hypothesized in the current model that coping will have a negative relationship with post-traumatic distress and comorbid symptom levels 10 months after exposure to the event. Conversely, it is hypothesized that avoidant coping will be positively related to post-traumatic distress levels 10 months after exposure to the event.

Sociodemographic Characteristics and Acculturation

Demographic characteristics (Green et al., 1991) and cognitive style (Joseph, Brewin, Yule, & Williams, 1993) have been shown to influence PTSD risk in youths. Evidence from the coping literature also suggests differences in coping strategy selection based on developmental level, gender, and ethnicity. In fact, several studies have found that girls report more distress following disasters than do boys (e.g., Burke, Moccia, Borus, & Burns, 1986; Green et al., 1991; Lonigan et al., 1991; Shannon et al., 1994; Vernberg et al., 1996). However, these gender effects

do not always appear to persist over time (LaGreca et al., 1996). In studies of stress and coping in adolescence, Compas, Orosan et al. (1993) proposed that girls may increase their emotion-focused coping strategies more than boys do due to a female socialization toward rumination (increased attention to one's emotional states). This being the case, ruminative emotion-focused coping would serve to maintain the distress or disorder, inhibit problem-focused coping and instrumental behavior, and lead to more psychopathological outcomes. Studies with the 4-factor model of coping have been found to be invariant across gender (Ayers et al., 1996; Sandler et al., 1994).

Although research on ethnicity in the disaster literature has only recently been investigated, a number of results have revealed significant differences in outcome measures based on race. African American youth reported more PTSD symptoms than either Caucasian or other minority youth following Hurricane Hugo (Lonigan et al., 1991; Shannon et al., 1994). During the school year following exposure to Hurricane Andrew, LaGreca et al. (1996), found that children from Hispanic American and African American ethnic groups were less likely to evidence declines in PTSD symptomatology. March et al. (1997) found that African Americans (both male and female) and Caucasian females were more likely to exhibit posttraumatic stress and comorbid symptoms than Caucasians or males, concluding that gender and race show important effects on risk for post traumatic psychological distress.

Thus, research indicates that differences exist in the level of post traumatic and comorbid symptomatology experienced by African American and Caucasian youth following a variety of natural and technological disasters. However, little research has delved into the important proximal factors affecting these reported differences, as ethnicity is better conceptualized as a distal variable that works through a variety of proximal variables to affect outcomes (Alvidrez,

Azocar, & Miranda, 1996). Researchers finding differences should seek to understand and explain them rather than implicitly suggesting that such differences are inherent (Betancourt & Lopez, 1993). The roles of acculturation level and socioeconomic status (SES) are two such proximal constructs, proposed to be investigated to insure that ethnicity is not simply used as a proxy variable in disentangling these reported effects. In fact, investigation of the roles of acculturation and SES in coping and distress following a disaster is nonexistent in the literature and are included in the current investigation as important components of adolescents' identities and contexts.

Socioeconomic Status

Regardless of ethnic identity, individuals from economically disadvantaged backgrounds are likely to think, believe, and act in ways which are consistent with their life circumstances. For example, due to differences in levels of perceived control over life circumstances, poor and more advantaged groups differ on a number of psychological constructs, such as locus of control (Heller, Quesada, & Chalfant, 1983) and coping style (Neighbors, Jackson, Bowman, & Gurin, 1983). Ethnic minority populations are more likely to be poor than majority populations; therefore, SES may account for differences among ethnic groups (Alvidrez et al., 1996).

Acculturation

Acculturation is defined as changes that groups and individuals undergo when they come into contact with another culture (Williams & Berry, 1991), and deals broadly with changes in cultural attitudes, values, and behaviors that result from contact between two distinct cultures (Berry, Trimble, & Olmedo, 1986). Acculturation includes the aspects of ethnic identity and "other group" orientation. Although acculturation is sometimes used synonymously with ethnic identity, they do not represent the same concept. Ethnic identity is one aspect of acculturation,

which focuses on how the individual relates to and feels a sense of belonging with members of his or her own ethnic group, based on shared characteristics (Phinney, 1990). It has also been defined as the part of an individual's self-concept that derives from his or her knowledge of membership in a social group (or groups) together with the value and emotional significance attached to that membership (Phinney, 1992). Common to ethnic identity of all group members are self-identification as a group member, a sense of belonging, and attitudes toward one's group (Phinney, 1992). The other aspect of acculturation is one's relationship to the majority culture, which is important in considering the psychological adjustment of bicultural individuals. Ethnic identity must be combined with experience and ability to function in the dominant culture in order for an individual to be considered biculturally competent. There is evidence that being identified with only a single culture whether ethnic or mainstream is generally more stressful for ethnic minorities than identification or involvement with both (Berry & Kim, 1988). In fact, research has shown that African Americans with traditional or highly acculturated (versus bicultural) levels of acculturation to the majority culture are at increased risk for experiencing depression (Arroyo & Zigler, 1995; Fordham & Ogbu, 1986) and low self-worth (Berry, 1993). This would predict increased stress levels for the individuals with high ethnic identity and low other group orientation, or conversely, individuals with low ethnic identity and high other group orientation. Alvidrez et al. (1996) recommend using measures that capture both adherence to traditional culture as well as exposure to dominant culture.

Phinney (1992) found that African American high school students scored higher than their Caucasian, Asian American, and Hispanic cohorts. Thus, it appears that racial distinctiveness and the factors associated with it, including a history of social disadvantage and discrimination, make this group more likely to have examined ethnicity as an identity issue and

to express a strong sense of belonging. Compared with members of the three minority groups, Caucasians scored lower in ethnic identity. Thus, ethnicity appears to be a subject which many Caucasian adolescents do not give much thought to and about which they are not very clear. However, Caucasian students may in fact become increasingly familiar with the concept of ethnicity due to the changing demographics throughout the country (Wetzel, 1987). Phinney (1992) concluded that ethnic identity can be conceptualized as a general phenomena and can be reliably measured in adolescents and young adults from diverse ethnic groups.

Acculturation and ethnic identity can be expected to have wide-ranging effects on the perception of coping resources and options because ideas about the proper way to handle threatening or challenging events vary greatly from culture to culture. Coping strategies, then, may partly reflect the ways of coping preferred by individuals because they are consistent with personal and/or cultural values, beliefs, and goals. For example, family role definitions may designate a specific member (e.g., the father) as the only one who should take charge of a problematic event. Cultures differ greatly in their beliefs about fate and these beliefs may have an effect on appraisal and coping options. Members of ethnic and/or socioeconomic minority groups may hold strong beliefs about racism and socioeconomic oppression in society and about the responsiveness of various social systems (e.g., police and fire officials, relief agencies, social services, hospitals, insurance companies) to the needs of members of their ethnic or socioeconomic group. Such beliefs strongly affect appraisals of the usefulness of some help-seeking and problem-solving efforts (Slavin, Rainer, McCreary, & Gowda, 1991). Thus, reported differences in outcome symptomatology based on race may in fact reflect cultural norms for responding to/coping with traumatic events (Steinglass & Gerrity, 1990). So, these differences

may be due to acculturation and its effects on coping, each of which may serve as protective and/or risk factors for the manifestation of post traumatic symptomatology.

Thus, differences in gender, ethnicity, acculturation, and SES, and how they relate to children's coping and post traumatic stress and comorbid symptomatology were carefully considered in the current investigation. These variables may be integral to the understanding of the relationship between coping with disaster and consequential psychological distress, and should be tested to see if they differentially predict relationships in the current theoretical model of post-disaster response in adolescence.

The Present Study

As each of the variables discussed above have not been looked at collectively in a model, Figure 1 once again represents the model which was tested in the current investigation, including direct and indirect effects where previous research or theory does not state cause for omission. It builds on Benight and colleagues' model (1998) of disaster response by adding exposure to loss, including a more complex model of coping specific to youth, and using an adolescent sample. Moreover, the current study proposes to use latent variable structural equation modeling which is advantageous over the path models previously employed in that variables are not assumed to be measured without error. Two competing models were tested: a more complex model including direct relationships between exposure and coping; and a more restricted, nested model, which eliminates those direct relationships (which are represented by dashed lines in Figure 1). As there is no theoretical evidence for the inclusion or omission, nor the direction of these relationships, the competing models were tested to determine if the more inclusive model provides a significantly better fit to the data.

Again, the major purposes of the present study were (a) to assess the global fit of the model including exposure/loss, coping efficacy, coping strategy, and PTSD, depression, and anxiety scores in the proposed model, (b) to assess the component fit of each hypothesized relationship, and (c) to test the included variables for differences across sociodemographic subgroups.

Hypotheses

At the outset of this study, it is expected that:

- (1) The proposed model (Figure 1) will provide adequate fit to the data.
- (2) Exposure and Loss will have a negative relationship with coping efficacy, wherein higher levels of exposure will lead to lower coping efficacy and lower levels of exposure will improve coping efficacy.
- (3) Coping Efficacy will be negatively related to post-traumatic distress and comorbid symptomatology such that the higher the coping efficacy, the lower the outcome symptomatology.
- (4) Coping efficacy will be positively related to active, distraction, and support seeking coping strategies, and negatively related to avoidant strategies.
- (5) Coping strategies will have differential effects on outcome; that is, active coping will be negatively related to PTSD, depression, and anxiety, while avoidant coping strategies will be positively related to PTSD, depressive, and anxious symptomatology.
- (6) The fit of the model may differ based on gender, acculturation, ethnicity, and SES, with girls, individuals with low acculturation, African Americans, and adolescents from low SES backgrounds showing decreased coping efficacy, increased avoidant coping, and increased negative symptomatology.

(7) Acculturation is proposed to be a more salient variable for African Americans than for Caucasians.

Method

The Wildfires

During the summer of 1998, Florida witnessed its worst forest fires in recorded history. The flames raged through northern and central Florida starting on Memorial Day, 1998 and lasted through a majority of the summer. The fires made national headlines and called upon nearly 10,000 fire fighters from multiple states. An estimated 300 million dollars worth of property damage, 275 million dollars worth of commercial timber, and 135 million dollars worth of crops were reportedly lost as a result of the fires. The most detrimental loss to individual Florida residents was evidenced by the nearly 400 homes which were destroyed in Volusia and its neighboring counties. Many residents of Volusia County were evacuated on more than one occasion throughout the duration of the blazes.

Participants

Participants were 9th graders recruited from the Volusia County Public High School which was most severely affected by the wildfires. Permission was granted from the school board of the Volusia County School District. Subsequently, permission for participation was obtained from the principal of Mainland High School. Consent forms (Appendix A), accompanied by a letter from the principal, were sent home with 585 9th grade high school students. Two hundred and fifty three (43%) of these students participated in the first wave of data collection in November, 1998, approximately 3.5 months after the wildfires. Two hundred and six (81% of the original sample) students participated in the second wave of data collection, approximately 6 months after wave 1 and 10 months after the 1998 wildfires.

Volusia County School District utilizes a full inclusion program (i.e., there are no special education classrooms). Thus, adolescents with varying degrees of intellectual ability were included in the sample.

Of the 206 students included in the current analyses, 60% were female and 40% male, with a mean age of 14 years 5 months (range 13 years 11 months to 16 years 0 months). Additionally, a representative number of students from ethnic backgrounds represented in the county were included: approximately 60% were Caucasian, 30% African American, 4% Hispanic, 3% Asian, and 3% biracial. In terms of SES, as measured by parental occupation, the sample included 19% unskilled, 44% paraprofessional, 30% professional, and 7% unreported.

Procedures

The measures were administered at the High School by the author and advanced undergraduate research assistants with prior training in the study procedures. Data collection occurred in the school's auditorium. The students arrived at the auditorium during their 9th grade English class period and were scattered throughout the auditorium in small groups, seated every other seat and every other row. Prior to commencing the administration, each child was handed and read an assent form (Appendix B). The measures were self-administered following an announcement of instructions over a microphone. There was one researcher for each group of 10-15 adolescents available to answer questions and proctor the administration. All materials were checked by a researcher before a student was given a pass to return to class, in order to reduce the occurrence of missing data. All measures were completed within approximately 50 minutes.

Measures

Table 1 presents the timetable for administration of each of the measures described below. A copy of each measure is included as an appendix.

Multigroup Ethnic Identity Measure (MEIM; Phinney, 1992) (Appendix C)

The MEIM is an objective 20-item acculturation measure to be used with adolescents and young adults from all ethnic groups. It includes 14 items that assess three components of ethnic identity: 1) sense of belonging to, and attitudes toward, one's ethnic group (5 items); 2) ethnic identity achievement, based on exploration and commitment (7 items); and 3) ethnic behaviors and customs (2 items). Also included in this measure are 6 items for other group orientation. Attitudes and orientation toward other groups are conceptually distinct from ethnic identity, but are included because they may interact with it as an aspect of one's social identity in the larger society. These items make up the second factor of acculturation as outlined in Berry's (1974) 2-dimensional model of acculturation.

All 20 of these items are rated on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). There is also one open-ended response for ethnic self-identification, which is not scored but used as a background variable.

A high score on the 14 ethnic identity items indicates a strong identification with one's ethnic group and a high score on the 6 other group orientation items indicates strong identity with other groups. For ethnic minorities, a high score on both the ethnic identity and the other group orientation would be consistent with integrated acculturation, while high scores on the ethnic identity alone is consistent with separation, a high score on the other group orientation alone (referring to the dominant culture) is consistent with assimilation, and low scores on both

dimensions would be consistent with an acculturation status of marginality. Overall internal consistency reliability for the 20-item scale for the current sample was estimated at $\alpha=.81$.

Fire-Related Traumatic Experiences (FRTE; Jones and Ollendick, 1996) (Appendix D)

The FRTE was adapted for fire from LaGreca and colleagues' (1994) Hurricane-Related Traumatic Experiences (HURTE) which has been shown to have solid psychometric properties. It is a self-report measure which assesses each child or adolescent's exposure to life threatening experiences during the wildfires and disruption-loss in the aftermath of the fires. All items are answered *yes* or *no*. This measure includes 12 exposure-related questions, assessing the number of threatening events the child or adolescent was exposed to, and 10 loss-related items, assessing the various types of loss incurred as a result of the fire. In addition, it includes specific questions regarding how scared/upset the child or adolescent was during the fire as well as how upset he or she has been since the fire, and the location of the child during the event. The internal consistency reliability for the current sample was estimated to be $\alpha=.61$.

The FRTE was also used to gather demographic data including participant age, gender, ethnicity, and parental occupation. Parental occupation was given a scaled score based on a hierarchy of job levels, unskilled, paraprofessional, and professional, similar to that assessed by the U.S. Census, and was used as a measure of socioeconomic status (SES).

Resource Loss Scale for Children (RLSC; Jones & Ollendick, 1994; modified for children from the Resources Questionnaire by Freedy, Shaw, Jarrell, & Masters, 1992) (Appendix E)

The RLSC operationalizes loss of resources into categories of object loss and personal-social loss. Thus subjects are asked 6 questions such as the amount of furniture, clothing, toys, etc. that was lost as a result of the fire, as well as 16 questions such as the amount of loss the fire has created in terms of motivation, free time, closeness with family or friends, etc. The

questionnaire consists of 22 items and asks participants to first respond yes or no, then, if yes, to rate the amount of resource loss on a 3 point scale where 1=a little, 2=some, and 3=a lot. Internal consistency reliability for the current sample was estimated at $\alpha=.94$.

Child Coping Efficacy Scale (CCES; New Beginnings Codebook, 1992) (Appendix F)

The CCES is a 7-item scale designed to assess children's self-perceived efficacy of coping and includes items regarding the extent to which a child thinks his or her coping has been successful and how well they will be able to handle problems as they arise in the future. The items which were future-oriented were included in analyses for the present study (3 items). The coefficient alpha for this scale for a sample of children of divorce (ages 9-13) was .74. For the current sample, $\alpha= .81$. The CCES can usually be completed within 3 minutes.

Fire Aftermath Coping Efficacy Measure(FACEM; Langley & Jones, 1999) (Appendix G)

The FACEM is a fire coping self-efficacy measure developed for this study in order to looking at children's and adolescents' recovery from wildfires. This measure is a 7-item scale which requires participants to rate themselves on how capable they think they are of successfully coping with the specific demands related to fire recovery (e.g., changing schools, relocating, losing a pet). Respondents answer items based on a 7-point Likert-type scale (not well at all to very well). Internal consistency reliability estimate for the current sample was $\alpha=.78$

How I Coped Under Pressure Scale (HICUPS; Ayers, Sandler, West, & Roosa, 1994) (Appendix H)

The HICUPS is a 45-item self-report inventory in which children report the extent to which they have used various coping strategies used to deal with a specific event, in this case the wildfires, based on a 4-point Likert-type scale (1=Never, 2= Sometimes, 3= Often, 4=Most of the time). The instructions read, "Now I want you to think about what you did to make things

better or to make yourself feel better as a result of the fires. Please tell me how much you thought or did EACH of the different things listed below to try and make things better or to make yourself feel better. There are no right or wrong answers. Just indicate how often you did each of these things as a result of the fire." The items form 10 subscales of 3-5 items each, which are grouped into 4 factors of coping identified in a content analysis of children's coping. For the current sample, coefficient alphas were as follows for the 4 factors: .88 Active, .81 Avoidant, .76 Distraction, .80 Support. This measure takes approximately 7 minutes to complete.

Posttraumatic Stress Disorder Reaction Index for Adolescents (RI; Frederick, Pynoos, & Nader, 1992) (Appendix I)

The RI is a 20-item self-report measure of adolescent's PTSD symptoms, which was initially developed as a semi-structured interview and later revised for use in a questionnaire format. Total RI scores and established cases of PTSD have shown correlations of .91 (Frederick, 1985). Total scores on the RI self-report measure have been shown to have good internal consistency with child and adolescent survivors of Hurricane Andrew ($\alpha=.89$; Vernberg et al., 1996) and Hurricane Hugo ($\alpha=.83$; Lonigan et al., 1991). For the current sample, $\alpha=.81$. Responses are rated on a 3-point scale (none of the time, some of the time, most of the time) and are scored 0, 2, and 4 respectively. Thus, the total RI scores had a possible range of 0-80, with higher scores indicating higher PTSD symptomatology. The severity of PTSD symptoms for total RI score are labeled as follows: doubtful=0-11, mild=12-24, moderate=25-39, severe=40-59, very severe=60-80 (Frederick et al., 1992).

Multidimensional Anxiety Scale for Children (MASC; March, 1997)(Appendix J)

The MASC is a 39-item instrument that assesses the severity of anxiety symptoms in youth corresponding to symptoms of anxiety disorders of the DSM-IV (APA, 1994). It asks

respondents to indicate the extent to which they feel each statement to be true about them and includes four factors: physical symptoms, harm/avoidance, social anxiety, and separation anxiety. It also provides an anxiety disorder index. The scale was validated with children who had experienced an industrial fire in their community and an outpatient clinic sample. Both samples included children and adolescents ranging in age from 7 to 17. Internal reliability coefficients for the four factors have ranged from .74 to .85 (March et al., 1997), with a total score internal consistency reliability for the current sample estimated at $\alpha = .90$.

Reynolds Adolescent Depression Scale (RADS; Reynolds, 1986)(Appendix K)

This 30-item instrument was designed to assess depressive symptomatology in adolescents between the ages of 13 and 18 in school and/or clinical settings. For each item the respondent is presented with a statement (e.g., "I feel happy") and asked to indicate how often they feel this way on a 4-point Likert-type scale where 1=almost never, 2=hardly ever, 3=sometimes, and 4=most of the time, and items 1, 5, 10, 12, 23, 25, and 29 are reverse scored. The total RADS score is calculated by summing the scores for each item. Thus, the possible range of RADS total scores is 30-120. The RADS requires between 5-10 minutes to complete. Although not a diagnostic measure, the RADS provides valuable clinical information on depression in adolescents. A cutoff score of 77 or above has been determined to delineate a level of symptom endorsement associated with clinical depression. Normative data on this instrument ($N=2,460$) revealed a mean of 60.18, $sd=14.29$ for total score. Additionally, descriptive data reported by the author showed a very similar distribution of RADS scores. Test-retest reliability has been reported at .80 after 6 weeks, .78 after 3 months, and .63 after one year. Coefficient alpha for the current study was .91.

Data Analyses

Analysis for Hypothesis 1 of the current investigation was aimed at testing the proposed model in order to assess its applicability to youth following natural and technological disasters. Since these variables have never been included together in a disaster-response model, testing the proposed model, and thus the conclusions drawn from it, called for the use of Structural Equation Modeling, with each of the hypothesized relationships being based on theoretical evidence as described in the introduction. For the direct relationships not based on current theory (specifically, between exposure/loss and coping strategy), an alternative (nested) model was tested, omitting these paths.

Data analyses were only conducted on complete data for the 206 adolescent participants. The computer program PRELIS 2 was employed for prescreening and for generating the covariance matrix that was subsequently analyzed by LISREL 8 (Jöreskog & Sörbom, 1993). List-wise deletion and a maximum likelihood estimation procedure were used to test the models.

The models tested were covariance structural models with multiple indicators for all latent constructs. One loading on each latent variable (construct) was set to a value of 1.0 to establish a common metric (Long, 1983) for the structural model, and for the measurement model I standardized the variance of a latent variable to 1.0 in the phi matrix. Each construct had multiple indicators to reduce measurement error.

Evaluation of Model Fit

Bollen and Long (1993) recommend choosing from different families of overall fit statistics to assess fit from different perspectives. Thus, the overall fit of the models was evaluated using a variety of indices, each of which provided some index of the departure of the model structure from the observed matrix. That is, model fit determines the degree to which the

structural equation model fits the sample data. Aside from the chi-square statistic, fit indices generally quantify the extent to which the variation and covariation in the data are accounted for by the model (Hu & Bentler, 1993). The indices selected for the current study were as follows: 1) likelihood ratio chi-square, 2) the root mean square error of approximation (RMSEA), 3) the non-normed fit index (NNFI), 4) Akaike's Information Criterion (AIC), and 5) the parsimony goodness of fit index (PGFI). Again, these criteria are based on differences between the observed (original, S) and model-implied (reproduced, Σ) covariance matrix.

Chi-square Although the chi-square ratio test is the only inferential test procedure, it is sensitive to sample size because as sample size increases (generally above 200), the chi-square has a tendency to indicate a significant probability level. A significant chi-square value relative to the degrees of freedom indicates that the observed and estimated matrices differ. Statistical significance indicates the probability that this difference is due to sampling variation. A chi-square/degrees of freedom ratio value of 2-3 will be interpreted as suggesting a plausible model (Carmines & McIver, 1981).

RMSEA RMSEA (root mean square error of approximation) yields an estimate of the average discrepancy per degree of freedom independent of the sample size. Thus, an RMSEA of zero would indicate a perfect fit, although no model is expected to fit a population perfectly. Browne and Cudeck (1993) propose that values under .05 indicate a close fit, values around .08 indicate a reasonable and acceptable approximation, and values of .1 or above indicate a poor fit.

NNFI The NNFI (Bentler & Bonnett, 1980) overcomes the underestimation of fit in smaller samples, and generates values between 0 and 1. This provides a measure of complete covariation in the data, with a value greater than .90 indicating an acceptable fit to the data. Again, the NNFI is not considered to be sensitive to sample size.

AIC AIC (Akaike, 1987) is an absolute fit index that was developed to adjust for the number of parameters estimated. AIC values close to zero indicate a more parsimonious model. Model selection employing the AIC criterion is based on determining the model among a range of alternative models which possess a minimum AIC value. It is strictly appropriate for maximum likelihood estimators.

PGFI Model parsimony, referring to the number of estimated coefficients required to achieve a specific level of fit, will be measured by the parsimony goodness of fit index (PGFI) which adjusts for degrees of freedom. Parsimony is achieved with a high degree of fit for fewer degrees of freedom in specifying coefficients to be estimated, where 0 = no fit and 1 = perfect fit.

Each of these provided some index of the departure of the model structure from the observed matrix. The degree of consensus global fit of the model amongst the various indices was examined.

The Latent Variable Path Model

The latent variable path model, depicted in Figure 2, describes the nature of the relationship between (a) the latent variables, or factors, and (b) the manifest indicator variables that measure those latent variables. The current model consisted of the 5 latent variables in the disaster-response model: exposure/loss, coping efficacy, active coping, avoidance coping, and psychological distress. Each of the latent variables were measured by multiple indicators or observed variables.

Results

Descriptive Statistics

Means, standard deviations, and internal consistency reliability estimates of all variables appear in Table 2. As noted in the previous section, internal consistency reliability estimates

were acceptable ($\geq .80$) for all included scales, except for the FRTE, which was somewhat low, $\alpha=.61$, but similar to results found in previous studies with this measure; and the FACEM, which was a newly constructed measure, $\alpha=.78$.

Exposure and Loss. When the wildfires were occurring, approximately 72% of participants were in their home, 15% were in a home in the same vicinity (i.e., visiting a friend or relative), and 13% were out of town. In terms of proximity and exposure to the fire, 70% of the participants saw the fire, 96% smelled the smoke, and 22% felt the fire, yet only 26% reported being somewhat close (21%) or very close (5%) to the fire, while 73% reported being at a safe distance. In terms of exposure to traumatic events, 63% of the sample reported 0 events, 31% reported one event, 4% reported 2 events, and the remaining 2% reported 3-7 events. The most frequently reported life-threatening events, endorsed by approximately 15-20% of the adolescents, were "thinking he/she might die" and "seeing someone else get hurt."

In terms of loss events, 72% reported 0 events, 22% reported 1 event, 3% reported 2 events, and the remaining 3% reported 3-10 events. The most frequently reported loss-disruption event, endorsed by 16% of the participating adolescents, was "having to live away from his/her parents for more than one day."

In terms of resource loss (which includes object as well as personal-social loss), the most frequently reported personal-social resource losses due to the wildfires were: "time to do normal everyday activities" (42%), "time to hang out with friends," "free time," "time for enough sleep" (35% each), and "a feeling that life is calm and peaceful" (30%). However, in terms of objective resource loss, the percentages were much lower: "furniture" (7%), "fun things" (9%), "personal things" (6%), "clothing" (8%), "a pet" (7%), "something else important to them" (8%).

Coping Efficacy. In response to the three questions on the CCES: "In the future, how good do you think you will be at handling your problems?," " Overall, how good do you think you will be at MAKING THINGS BETTER when problems come up in the future?," and " Overall, how good do you think you will be at handling your FEELINGS when problems come up in the future?" mean scores indicated an average response of "pretty good" (a 3 on the 1-4 scale where 1=not at all good and 4=very good).

For fire-related coping efficacy, mean responses indicated that on a scale of 1-7, one being able to cope "not very well at all" to seven being able to cope "very well," on average participants responded between "not too well" and "pretty well" at about the center of the scale (3.88). The lowest score indicated that participants would cope "not too well" with losing a pet, while the highest score indicated that participants would cope between "pretty well" and "very well" with having to get new neighbors.

Coping. Participating adolescents reported using distraction coping strategies most frequently, followed by avoidance coping, active coping, and support coping. The mean score for distraction fell between the "a little" and "somewhat" points on the 4-point HICUPS scale, and the mean for avoidance and active coping at the "a little" point. In contrast, the mean for support coping fell between "not at all" and "a little."

Psychological Distress. Using criteria for total PTSD symptom severity on the RI described earlier (Frederick et al., 1992), approximately 57% of the participants reported "doubtful" levels, 31% "mild," 10% "moderate," and 2% "severe." There were no reported scores in the "very severe" range. Overall, the mean level of PTSD symptoms was in the mild range. [Note: Time 1 PTSD symptoms indicated 33% doubtful, 54% mild, 11% moderate, 2% severe, and .5% very severe.]

Mean scores on the RADS fell just below the normative mean, with approximately 11% of the sample indicating scores in the clinical range. Mean scores on the MASC were again just slightly below the normative mean, with approximately 9% of the participants responding in the clinical range (t-score above 65) for total anxiety. For the physical symptoms subscale of the MASC, 5% of the current sample reported scores in the clinical range, .5 % scored in the clinical range on the harm/avoidance subscale, 10% for social anxiety, 5% on separation/panic, and approximately 4% were in the clinical range on the anxiety disorder index of the MASC.

Testing of the A Priori Proposed Model

Latent variable path analyses were used to test the proposed theoretical model accounting for all theoretically driven relationships. As structural equation modeling presupposes multivariate normality, the data were tested for skewness and kurtosis. Although it was expected that this assumption would be met given the sample size, it, in fact, was not. That is, the distributions for reported levels of exposure/loss and PTSD symptomatology for the current study were positively skewed. Maximum likelihood estimation techniques used in latent variable path analyses allow for greater power with a normal distribution, but are highly sensitive to skew. As the data become increasingly nonnormal, maximum likelihood estimators produce χ^2 values that become too large, and therefore significant (Hoyle, 1995). Nonnormality also leads to modest underestimation of fit indices (Curran, West, & Finch, 1994; as cited in Hoyle, 1995), and to substantial underestimation of standard errors of parameter estimates. Based on this, the following results should be interpreted with caution.

Although the factor loadings, and thus the measurement model, appeared to be solid, the proposed model did not provide a good overall fit to the data, $\chi^2 (81, N=206)= 230.49, p < 0.01$; RMSEA=.095; NNFI=.85; AIC=308.49; PGSI=.58. To test individual components of the model

as stated in Hypotheses 2-6, I referred to the path coefficients in LISREL8 output, presented in Figure 3, for each path to assess significance and direction.

Hypothesis 2: As predicted, the pathway between exposure/loss and coping efficacy was significantly negatively related.

Hypothesis 3: As hypothesized, the pathway from coping efficacy to psychological distress was significantly negatively related.

Hypothesis 4: While the path between coping efficacy was positively related to avoidant coping as predicted, the path from coping efficacy to active coping was not significant.

Hypothesis 5: Contrary to the original hypothesis, the paths between active and avoidant coping and Psychological Distress (PTSD, depression, and anxiety) were not significant.

Similarly, latent variable path analysis was used to test the more saturated a priori proposed model (including dashed lines in Figure 1). This model was untestable, as it could be run with either of the 2 paths (exposure/loss to avoidant coping or exposure/loss to active coping), but not with both of the proposed paths.

In order to utilize alternative estimation techniques, which remedy the problem of nonnormality in structural equation modeling, very large sample sizes (between 1,000 and 5,000) are needed (Hoyle, 1995). As the current sample did not provide this number of participants, post hoc regression analyses were run for the current model as the F test tends to be more robust in such circumstances.

Regression Analyses

Hierarchical regression analyses were run using the Statistical Package for Social Sciences, 8th version (SPSS 8.0). To assess the amount of variance in PTSD (based on the RI scores) accounted for by the proposed variables, each was entered into the analysis in order

based on the proposed conceptual model. The statistical significance of each successive step was assessed for the amount of variance it explained after partialing out variance accounted for by prior steps in the analysis. The Bonferroni adjustment procedure ($\alpha=.05/4$ sets of analyses) was used to establish the significance level of .0125. Three such analyses were run. The first examined the relationship between demographic variables, exposure/loss, coping efficacy, coping strategy and PTSD assessed at Time 1 (T1-T1); the second, demographics, exposure/loss, coping efficacy, and coping strategy at Time 1, and PTSD assessed at Time 2 (T1-T2; longitudinal model originally proposed); and the third, demographics and exposure/loss, and coping efficacy, coping strategy, and PTSD at Time 2 (T2-T2). Zero-order correlations among all variables entered into the regression analyses are presented in Tables 3, 4, and 5, respectively.

Demographic variables (including gender, ethnicity, parent job, and acculturation) were entered into each regression analysis in the first step as pre-existing child characteristics. Next, the Exposure/Loss, Coping Efficacy, and Coping Strategy variables were each entered as sets respectively, as presented in the correlation tables and in the proposed model. Residuals plots for each regression appeared amorphous, providing evidence that there was not a substantial variable missing from the model.

Time 1-Time 1 Regression Results

Using all four sets in the conceptual model, as presented in Table 6, approximately 51% of the variance in total PTSD symptoms was explained. The demographic variables did not account for a statistically significant amount of the variance in PTSD symptoms ($R^2 = .027$; $F(4,169)=1.17$, $p=.32$). The exposure/loss variables, entered as a set in the second step, accounted for a significant 31% of the variance (R^2 change=.312; $F(3,166)=26.083$, $p<.0125$) with increasing exposure/loss associated with higher PTSD scores. Adolescents' reported coping

efficacy was entered as the third step, accounting for an additional statistically significant 6% of the variance in PTSD symptoms ($R^2=.059$; $F(2,164)=8.002$, $p<.0125$) with lower levels of coping efficacy associated with higher PTSD scores. Finally, adolescents' coping (active, avoidant, distraction, and support) was entered as a set on the final step, accounting for approximately 12% of the additional variance in PTSD total symptoms ($R^2=.115$; $F(4,160)=9.435$, $p<.0125$) with greater reported coping strategies associated with higher PTSD scores. Follow-up analyses revealed avoidant ($t=2.559$, $p<.0125$) coping strategies accounted uniquely for a small but statistically significant amount ($\approx 2\%$).

Time 1-Time 2 Regression Results

Using all four sets in the conceptual model, 48% of the variance in total PTSD symptoms was explained. As shown in Table 7, again the demographic variables entered as the first set, did not account for a statistically significant amount of the variance in PTSD symptoms ($R^2=.053$; $F(4,172)=2.395$, $p=.05$). However, follow-up analyses indicated a statistically significant unique effect for ethnicity (unique R^2 change=.04), with African American adolescents reporting more overall PTSD symptoms than Caucasian adolescents ($t=2.60$, $p<.0125$). The exposure/loss variables, entered as a set in the second step, significantly accounted for an additional 33% of the variance (R^2 change=.325; $F(3,169)=29.421$, $p<.0125$) with increasing exposure/loss associated with higher PTSD scores. Adolescents' reported coping efficacy at Time 1, entered as the third step, did not account for a statistically significant amount of the additional variance in Time 2 PTSD symptoms ($R^2=.019$; $F(2,167)$, $p=.071$). Finally, adolescents' coping (active, avoidant, distraction, and support) was entered as a set on the final step, accounting for approximately 8% of the additional variance in PTSD total symptoms ($R^2=.083$; $F(4,163)=6.511$, $p<.001$), with greater coping efforts associated with higher PTSD scores.

Time 2-Time 2 Regression Results

As depicted in Table 8, using all four sets in the conceptual model, approximately 61% of the variance in total PTSD symptoms at Time 2 was explained. Similar to the Time 1 cross-sectional analysis, the demographic variables entered as the first set did not account for a statistically significant amount of the variance in PTSD symptoms ($R^2 = .046$; $F(4,178)=2.162$, $p=.07$). However, similar to the T1-T2 longitudinal regression, follow-up analyses indicated a statistically significant unique effect (unique R^2 change=.03) for ethnicity, with African American adolescents reporting more overall PTSD symptoms than Caucasian adolescents ($t=2.16$, $p<.0125$). The exposure/loss variables, entered as a set in the second step, significantly accounted for an additional 32% of the variance (R^2 change=.320; $F(3,175)=29.479$, $p<.0125$), with higher exposure/loss scores associated with greater PTSD scores. Adolescents' reported coping efficacy at Time 2, entered as the third step, accounted for a statistically significant 8% of the additional variance in Time 2 PTSD symptoms ($R^2=.078$; $F(2,173)$, $p<.0125$) with an inverse relationship between coping efficacy and PTSD scores. Finally, adolescents' coping (active, avoidant, distraction, and support) was entered as a set on the final step, accounting for approximately 16% of the additional variance in PTSD total symptoms ($R^2=.162$; $F(4,169)=17.324$, $p<.0125$), with greater reported coping scores associated with higher scores on the PTSD Reaction Index. However, most of this effect was due to the unique contribution (4% of the variance) of avoidant coping strategies ($t=4.266$, $p<.0125$).

Demographics and Acculturation

To address Hypothesis 6, interaction effects between each of the demographic variables and each of the independent variables in the model (T1-T2) were tested for significance. First nominal variables (ethnicity, gender, SES) were dummy coded. Standard regression analyses

using the TEST method of entry on SPSS, which provides change in R^2 as well as tests of R^2 change as if each variable (or set of variables) were entered into the last regression equation, were run for each demographic variable, entered with all other predictor variables, followed by the interactions of each variable with the demographic variable. No main or interaction effects were found for gender, acculturation, SES (as measured by parent job), or ethnicity.

To test Hypothesis 7, a similar regression analysis was run, revealing a significant interaction between race and acculturation, $F(4,188)=3.90$, $p<.001$. Further regression analyses based on splitting the data by race and examining the variance captured by acculturation on PTSD symptoms indicated that there was no significant relationship between acculturation and PTSD symptoms for Caucasians, while there was a significant negative relationship between acculturation and PTSD symptoms for African Americans. Moreover, although the sample size was small for Hispanic, Asian-American, and Biracial adolescents, it is noteworthy that although these were non-significant relationships, regression lines for Hispanic and Biracial adolescents were in a positive direction, and Asian-American adolescents, a negative direction. Thus, it is clear to see that by conglomerating each of the five ethnic categories across acculturation, the overall data cancel each other out in terms of showing a significant relationship between acculturation and outcome. However, as is noted here, acculturation does perform as a significant predictor of PTSD symptoms for African Americans. Thus, hypothesis 7 was confirmed in that it appears that acculturation is a more meaningful variable for African Americans than it is for Caucasians.

Discussion

Summary and Relevance

Aside from the poor fit of the overall model, the current study revealed several important findings. The component fit of the paths between exposure/loss, coping efficacy, and psychological distress, and the path from coping efficacy to avoidant coping add to our current understanding of these relationships. Moreover, regression analyses, both cross-sectional and longitudinal, indicated that the overall model explained a significant amount of the variance in PTSD symptomatology, with exposure/loss, coping efficacy, and coping strategy each adding a significant portion to the variance captured. Additionally, the ability to examine each of these variables over time provided some information that has rarely been available in this line of research.

Descriptively, it is interesting to note changes and consistencies apparent overtime. For example, the means for coping efficacy and coping strategy remained consistent from Time 1 to Time 2. Distraction coping strategies were the most frequently reported, followed by avoidant and active strategies, with support coping being the least reported strategy. Average coping efficacy scores also remained consistent and high across assessment waves. The prevalence of PTSD symptomatology, however, demonstrated a change across time. That is, from 3 months to 10 months after the fire, many adolescents in the current sample (approximately 20%) moved from the mild level of post traumatic distress to the doubtful level. During the same period, however, the same percentage of adolescents scoring in the moderate and severe range of post traumatic distress 3 months post-fires remained at those levels 10 months after the wildfires occurred. This suggests that those youth who are most affected initially, continue to show prolonged effects and may not either recover spontaneously or as rapidly as those with milder initial distress symptoms.

Hypothesis 1. Although the proposed latent variable path model did not provide a good fit to the data, it is the author's contention that this is due to the violation of the multivariate normality assumption integral to maximum likelihood estimation in structural equation modeling. That is to say, despite the results of the goodness of fit indices, the proposed model was based on solid theory for all proposed relationships. The fact that the more saturated model was unable to be run, did not allow us to compare it with the nested model.

Information provided by individual paths in the model confirmed some of the original hypotheses, and not others.

Hypotheses 2 and 3. Including coping efficacy in the current conceptual model, provided initial findings supportive of a link between exposure, coping efficacy, and outcome. Coping efficacy appears to play a significant role in mediating the relationship between the amount of exposure and loss an adolescent experiences after such an event and their subsequent outcome months later. This adds to previous research with adult disaster victims (Benight, Swift et al., 1998) supporting the role of exposure and loss in predicting outcome. In the case of the current investigation, an adolescent's beliefs about his or her ability to cope with the exposure and loss experienced had a differential effect on outcome, such that greater exposure and loss may have led to a decrease in coping efficacy while lower coping efficacy may have led to higher levels of post traumatic distress. These data with adolescents, then, are also consistent with Bandura's (1997) proposition that coping beliefs will largely determine one's response to the resource depletion brought about by a disastrous event. It may be the case, then, that youth would benefit from interventions which target their self-efficacy beliefs for coping with the stressors which follow an event such as a wildfire, with all the more benefit to those who have suffered greater exposure and loss.

Hypothesis 4. The component fit of the path from coping efficacy to avoidant coping also proved significant, indicating that those with higher coping efficacy tended to use less avoidant coping techniques while those with lower coping efficacy tended to report higher utilization of avoidant strategies. This suggests that children or adolescents with low coping efficacy for dealing with a disaster and its aftermath may dwell on their coping deficiencies and magnify the severity of possible threats. Perceived inefficacy to cope with the potential threats of the post-fire environment may lead children or adolescents to approach the situation anxiously, and therefore attempt to avoid it. Trying to avoid thoughts, feelings, situations, or people associated with the event, however, may increase one's sense of numbing, detachment from people and activities, etc., which themselves are symptoms of PTSD. Additionally, as previously stated, attempts at avoiding thoughts may actually increase one's rumination. In other words, telling oneself to not think about something, may simply serve to bring it to mind. Information provided by the regression analyses also revealed that avoidant coping contributed uniquely to the variance in PTSD captured both 3 months and 10 months after the fire after taking each of the other variables into account. The path from coping efficacy to active coping, although positive in direction as hypothesized, was not significant. This indicated no effect for active coping as a mediator of coping efficacy and psychological distress. Similarly, regression analyses showed no unique contribution of active coping to PTSD symptoms. This may have been a function of the high correlation between active and avoidant coping, as well as the fact that, contrary to theory, they were both positively correlated with PTSD. Thus, it appears that active and avoidant coping may not have been distinct from one another for the current sample. This may also account, in part, for the poor fit of the overall model, as well as the lack of

significance between the paths from coping efficacy to active coping and active and avoidant coping strategies to psychological distress.

Hypothesis 5. Component fit for the paths from active and avoidant coping to psychological distress were not significant, although they were in the hypothesized directions.

Overall, the regression analyses supported the utility of the proposed variables for explaining children's reactions over the 10 months following a wildfire. The current investigation, then, represents a further step toward including factors that are essential for understanding adolescent's differential reactions after such disasters as wildfires. Moreover, the current analyses provide information about the role of these variables in possible changes in PTSD symptomatology overtime.

Exposure/Loss appeared to be equally significant during all three analyses, contributing to the majority of the variance in PTSD symptoms. This is consistent with previous research. In fact, although the current sample reported low average levels of exposure and loss (object loss especially), this variable remained highly predictive both cross-sectionally and longitudinally. This provides support for the contention that events in the aftermath of such disaster (i.e., being separated from family, moving, evacuation), as well as more personal-social losses (time for school, time for sleep, change in daily routines), are stressful events in and of themselves, and contribute to outcome.

An interesting finding emerged with coping efficacy. For both cross-sectional analyses, coping efficacy accounted for a significant portion of the variance in PTSD. That is, coping efficacy reported at the 3 month assessment was predictive of PTSD reported at the same time, and coping efficacy reported at the 10 month assessment was predictive of PTSD reported at the

same time. However, coping efficacy 3 months post-wildfire was not predictive of PTSD symptomatology 10 months post-wildfire.

Although high levels of all coping strategies were predictive of outcome at Time 1 and Time 2 for both cross-sectional and longitudinal models, avoidant coping alone was a unique predictor of PTSD symptoms cross-sectionally. In other words, adolescents who reported using avoidant coping strategies in the immediate aftermath of the wildfires also reported higher PTSD symptomatology at that time. The current study also adds information about coping over time. That is, 10 months after the wildfires avoidant coping continued to be uniquely predictive of PTSD symptomatology reported at 10 months. It is also notable that longitudinally, avoidant coping 3 months post-wildfires was just short of being significant as a unique predictor of PTSD outcome 10 months post-wildfires.

Hypothesis 6. Similar to the work of Vernberg, LaGreca, and colleagues (1996) after Hurricane Andrew, demographic variables were not found to be predictive of PTSD symptoms 3 months post-wildfires. Ten months after the wildfires, however, ethnicity emerged with a unique contribution to the variance in PTSD outcome. La Greca et al. (1996) found a similar small, but significant, unique effect for ethnicity 10 months after Hurricane Andrew, concluding that Hispanic American and African American ethnic groups were less likely to evidence declines in PTSD symptomatology. For the current investigation, however, further analyses were warranted to help explain these effects. In fact, it was determined that the main effect of race hinted at in the hierarchical tests by its unique effects present in the Time 2 analyses, were uninterpretable due to the interaction of acculturation and ethnicity.

Hypothesis 7. The interaction between acculturation and ethnicity revealed that there was no significant relationship between acculturation and PTSD symptoms for Caucasians, while

African Americans who reported higher acculturation scores (indicative of both high "ethnic identity" and high "other group orientation") reported fewer PTSD symptoms and African Americans who reported low acculturation levels, reported higher PTSD symptoms. Thus, it is clear to see that by conglomerating ethnic categories across acculturation, the overall data cancel each other out in terms of showing a significant relationship between acculturation and outcome. However, as is noted here, acculturation does perform as a significant predictor of PTSD symptoms for African Americans. Thus, hypothesis 7 was confirmed in that it appears that acculturation is a more meaningful variable for African Americans than it is for Caucasians.

This is consistent with the work of Phinney (1992) which found that racial distinctiveness and the factors associated with it, including a history of social disadvantage and discrimination, may make African Americans more likely to have examined ethnicity as an identity issue and to express a strong sense of belonging to the group with which they identify. Beginning to include constructs such as acculturation in studies of this nature, is an important step in examining more proximal variables through which ethnicity operates to affect outcome. It reflects movement away from implicitly suggesting that ethnic differences reflected in outcome (such as the main effects described in the regression analyses) are inherent, and toward a better understanding and possible explanation for differences found.

Thus, in light of the central purposes of the current investigation, the following conclusions are offered: (a) assessment of the global fit of the model including exposure/loss, coping efficacy, coping strategy, and PTSD, depression, and anxiety scores revealed it to be a poor fit to the data; (b) assessment of the component fit of each hypothesized relationship provided initial information confirming a possible mediating role of coping efficacy between exposure/loss and psychological distress, as well as coping efficacy being associated negatively

with avoidant coping strategies, while post hoc regression analyses indicated an important role for each of these variables as they related to PTSD symptomatology in adolescents; and (c) the relationships between the proposed variables and PTSD did not interact with gender, acculturation, SES, or ethnicity, while there was a significant interaction between acculturation and ethnicity signifying that for African American youth, high acculturation levels were predictive of less PTSD symptomatology.

Limitations

It is important to note the limitations of the current study. The most obvious limitation, did not become apparent until diagnostic analyses for the current data were run. Namely, despite efforts to include subjects from the school in the area which received the most damage from the wildfires, there was little variance in the sample in terms of exposure/loss, and subsequent PTSD reactions. This may have been a function of highly affected families not consenting to have their children included in the study or, possible relocations or family displacements that omitted highly exposed families from the original sampling. However, school officials did not report a significant number of such incidents at the outset of the current study. To further assess the effects of such nonnormality, it may have been interesting to rerun the model after perform normalizing transformations on the observed indicators. Additionally, the 4-factor coping model used in the current study did not appear to breakdown as theorized, as evidenced by the high correlations between active and avoidant coping. Thus, it may have been fruitful to add a path correlating the two types of strategies to see if model fit was improved.

Secondly, the current study included only self-report information, whereas it may have been helpful to obtain parent and teacher report data to better assess and corroborate exposure, coping, family acculturative level, and outcome symptomatology. Another reason why parental

information may have been useful, is to obtain a better measure of SES. The current use of SES was operationalized as parent job category, and often youth were vague in their responses, making responses difficult to categorize.

Third, although steps were taken to read instructions for each measure carefully and to separate individual students from each other, decreasing the likelihood of responding to items based on perceived social desirability, the measures were not counterbalanced to rule out order effects. Finally, the current investigation did not take into account any treatment that may have been received by subjects at anytime after the fire.

Future Directions

Based on the current investigation, it is suggested that future research continue to include the constructs of coping self-efficacy and a conceptual model of coping strategies in disaster-response models for youth. Furthermore, the use of structural equation modeling to test both direct and indirect effects with models such as the one proposed in the current study should shed new light on the relationships between mediators of trauma and the role they may play in outcome.

Additionally, research must not be remiss in recognizing the added challenge of addressing post-traumatic response in a population of children and adolescents with tremendous variability in terms of developmental level, acculturative status, SES, and gender. Multigroup structural equation modeling can be used to test such a theoretical model for its applicability to different groups simultaneously (Hoyle, 1995).

Finally, future directions for research in the area of children's post-disaster stress response should begin to draw connections between coping efficacy and efforts as they relate to intervention strategies. This may include investigation of the mechanisms responsible for coping

strategy acquisition. For example, Compas (1998) proposes that one important area of inquiry will be identifying those aspects of coping that can be learned through simple modeling and those which require direct instruction and guided mastery practice. It is also suggested that intervention strategists draw from research on coping efficacy, such that those variables which are found to increase coping efficacy in youth can be targeted for increase in post-disaster treatment.

Additionally, interventions should be informed by the results of studies based on clear conceptual models of coping, as these data will have direct relevance to the types of coping strategies that should be promoted or reduced through intervention efforts. For example, avoidant coping has been found to be a relatively ineffective way of managing emotional distress associated with negative psychological outcome. Thus, interventions may include strategies aimed at reducing the use of avoidant coping and at increasing alternative ways of coping found to be more effective at maximizing levels of adjustment. Increased understanding of the role of coping, then, will be essential in furthering our knowledge of the most effective ways to identify and predict those children and adolescents most at risk following exposure to a disaster. It will also advance the precision with which appropriate intervention models may be accommodated to meet the needs of individual children and adolescents.

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Table 1

Timeline for administration of measures

<u>Construct</u>	<u>Measure</u>	<u>Time Administered</u>	
		<u>T1</u>	<u>T2</u>
Acculturation	MEIM		X
Exposure/Loss	FRTE	X	
(Demographics	FRTE	X)	
Coping Efficacy	CCES	X	X
	FACEM		X
Coping Strategy	HICUPS	X	X
	Kidcope	X	
PTSD	RI	X	X
Depression	RADS		X
Anxiety	MASC		X

Table 2

Means, Standard Deviations, and Internal Consistency Reliabilities

	Variable	M	SD	α
1.	Exposure/Loss			.92
	Total Exposure	.40	.96	.57
	Resource Loss	9.28	12.89	.94
	Total Loss	2.69	1.43	.66
2.	Coping Efficacy			.72
	General	9.61	2.03	.81
	Fire-related	27.17	10.43	.78
3.	Active Coping	33.27	10.59	.88
	Decision making	7.01	2.98	.77
	Problem solving	7.24	2.87	.72
	Seek understanding	9.98	3.74	.73
	Cognitive restructure	8.97	3.19	.63
4.	Avoidant Coping	16.56	5.98	.81
	Cognitive avoid	9.40	3.60	.73
	Avoid. Actions	7.13	3.07	.68
5.	Psych. Distress			.94
	PTSD	16.69	10.51	.81
	Depression	55.48	14.71	.91
	Anxiety	36.98	16.68	.90

Table 3

Zero-Order Correlations Between PTSD symptom, Exposure/Loss, Coping Efficacy, and CopingStrategy at Time 1

Variable/Measure	PTSD Sxs	Tot Exp	Exposure/Loss		Coping Efficacy		Coping			Sup Cop
			Res. Loss	Tot Loss	Gen. CE	Fire CE	Act Cop	Avoid Cop	Distr Cop	
Exposure/Loss										
Total Exposure	.44**	1.00	.25**	.57**	-.17*	-.07	.30**	.29**	.12	.23**
Resource Loss	.31**	.25**	1.00	.15*	-.07	-.12	.19**	.22**	.04	.18**
Total Loss	.46**	.57**	.15*	1.00	-.21**	-.02	.29**	.22**	.09	.29**
Coping Efficacy										
General	-.31**	-.17*	-.07	-.21**	1.00	.04	.06	-.07	-.07	.01
Fire-related	-.18*	-.07	-.12	-.02	.04	1.00	-.24**	-.31**	-.05	-.14*
Coping										
Active	.46**	.30**	.19**	.29**	.06	-.24**	1.00	.76**	.33**	.63**
Avoidance	.49**	.29**	.22**	.22**	-.07	-.31**	.76**	1.00	.33**	.50**
Distraction	.13	.11	.04	.09	-.07	-.05	.33**	.33**	1.00	.19**
Support Seeking	.36**	.23**	.18**	.29**	.01	-.14*	.63**	.50**	.19**	1.00

Note: N=174 for all analyses. *p<.05. **p<.01.

Table 4

Zero-Order Correlations Between PTSD symptoms at Time 2, Exposure/Loss, Coping Efficacy, and Coping Strategy

Variable/Measure	PTSD Sxs	Tot Exp	Exposure/Loss		Coping Efficacy		Coping			Sup Cop
			Res. Loss	Tot Loss	Gen. CE	Fire CE	Act Cop	Avoid Cop	Distr Cop	
Exposure/Loss										
Total Exposure	.38**	1.00	.25**	.57**	-.17*	-.07	.30**	.29**	.12	.23**
Resource Loss	.44**	.25**	1.00	.15*	-.07	-.12	.19	.22**	.04	.18**
Total Loss	.40**	.57**	.15*	1.00	-.21**	-.02	.29**	.22**	.09	.29**
Coping Efficacy										
General	-.17*	-.17*	-.07	-.21**	1.00	.04	.06	-.07	-.07	.01
Fire-related	-.21**	-.07	-.12	-.02	.04	1.00	-.24**	-.31	-.05	-.14*
Coping										
Active	.39**	.30**	.19**	.29*	.06	-.24**	1.00	.76**	.33**	.63**
Avoidance	.42**	.29**	.22**	.22**	-.07	-.31**	.76**	1.00	.33**	.50**
Distraction	.16**	.12	.04	.09	-.07	-.05	.33**	.33**	1.00	.19**
Support Seeking	.31**	.23**	.18**	.29**	.01	-.14*	.63**	.50**	.19**	1.00

Note: N=177 for all analyses. *p<.05. **p<.01.

Table 5

Zero-Order Correlations Between PTSD symptoms, Exposure/Loss, Coping Efficacy, andCoping Strategy at Time 2

Variable/Measure	PTSD Sxs	Tot Exp	Exposure/Loss		Coping Efficacy		Coping			Sup Cop
			Res. Loss	Tot Loss	Gen. CE	Fire CE	Act Cop	Avoid Cop	Distr Cop	
Exposure/Loss										
Total Exposure	.38**	1.00	.25**	.57**	-.12	-.07	.13	.14	.10	.09
Resource Loss	.44**	.25**	1.00	.15*	-.20**	-.12	.24**	.30**	.04	.27**
Total Loss	.40**	.57**	.15*	1.00	-.18**	-.02	-.16*	.18**	.07	.08
Coping Efficacy										
General	-.42**	-.12	-.20**	-.18**	1.00	.20**	-.03	-.07	.16*	-.08
Fire-related	-.21**	-.07	-.12	-.02	.20**	1.00	-.15*	-.19**	-.07	-.07
Coping										
Active	.46**	.13	.24**	.16*	-.03	-.15*	1.00	.77	.36**	.70**
Avoidance	.53**	.14	.30**	.18**	-.07	-.19**	.77**	1.00	.33**	.57**
Distraction	.12	.10	.04	.07	.16*	-.07	.36**	.33**	1.00	.29**
Support Seeking	.38**	.09	.27**	.08	-.08	-.07	.70**	.57**	.29**	1.00

Note: N=183 for all analyses. *p<.05. **p<.01.

Table 6

Hierarchical Regression for Variance in PTSD Symptoms at Time 1 explained byDemographics, Exposure/Loss, Coping Efficacy, and Coping strategy at Time 1

Step: Variables	R ² chg	p	R ² total	β	Unique R ² chg	p
1: Demographics	.027	.32	.027			
Gender				.57	.00	.73
Ethnicity				1.46	.02	.07
SES				-.94	.00	.38
Acculturation				-1.05	.01	.09
2: Exposure/Loss	.312	<.01	.339			
Total Exposure				1.56	.03	.01
Resource Loss				.141	.03	.01
Total Loss				3.44	.06	<.01
3: Coping Efficacy	.059	<.01	.398			
General				-1.09	.04	<.01
Fire-related				-1.09	.01	.06
4: Coping	.115	<.01	.513			
Active				.22	.02	.02
Avoidance				.39	.02	.01
Distraction				-.12	.00	.26
Support Seeking				-.004	.00	.80

Table 7

Hierarchical Regression for Variance in PTSD Symptoms at Time 2 explained byDemographics, Exposure/Loss, Coping Efficacy, and Coping strategy at Time 1

Step: Variables	R ² chg	p	R ² total	β	Unique R ² chg	p
1: Demographics	.053	.05	.053			
Gender				-.76	.00	.65
Ethnicity				2.19	.04	.01
SES				1.13	.01	.32
Acculturation				-1.20	.01	.15
2: Exposure/Loss	.325	<.01	.378			
Total Exposure				1.98	.01	.09
Resource Loss				.28	.11	<.01
Total Loss				3.38	.06	<.01
3: Coping Efficacy	.019	.07	.397			
General				-.33	.00	.31
Fire-related				-.12	.02	.04
4: Coping	.083	<.01	.480			
Active				.13	.01	.19
Avoidance				.35	.01	.03
Distraction				.001	.00	.93
Support Seeking				.13	.00	.48

Table 8

Hierarchical Regression for Variance in PTSD Symptoms at Time 2 explained byDemographics, Exposure/Loss, Coping Efficacy, and Coping strategy at Time 2

Step: Variables	R ² chg	p	R ² total	β	Unique R ² chg	p
1: Demographics	.046	.08	.046			
Gender				-.64	.00	.70
Ethnicity				2.04	.03	.01
SES				.97	.00	.37
Acculturation				-1.03	.01	.19
2: Exposure/Loss	.320	<.01	.366			
Total Exposure				.85	.01	.13
Resource Loss				.29	.12	<.01
Total Loss				3.35	.06	<.01
3: Coping Efficacy	.078	<.01	.444			
General				-1.44	.06	<.01
Fire-related				-.009	.01	.13
4: Coping	.162	<.01	.606			
Active				.13	.01	.13
Avoidance				.54	.04	<.01
Distraction				-.003	.00	.74
Support Seeking				-.004	.00	.73

Figure Caption

Figure 1. Proposed conceptual model.

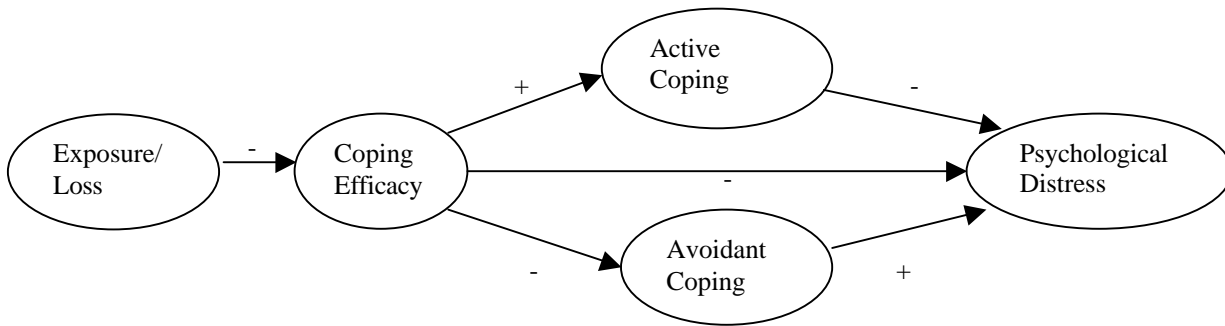


Figure Caption

Figure 2. Proposed Latent Variable Path Model.

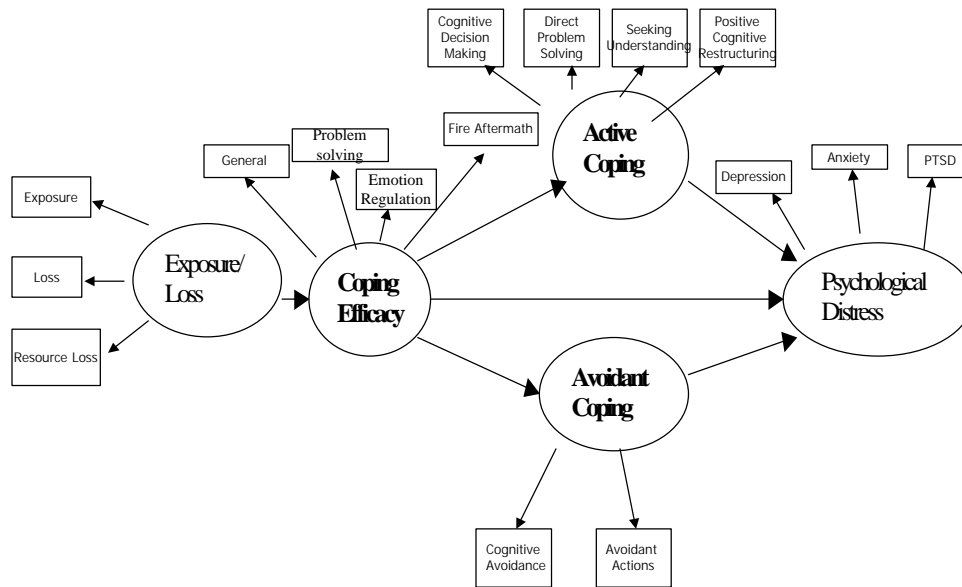
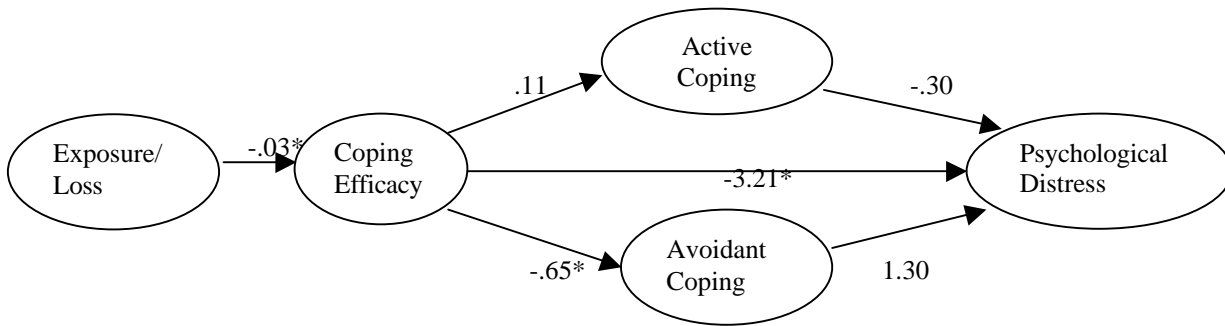


Figure Caption

Figure 3. Maximum likelihood estimated path coefficients included in the proposed model.
* $p < .05$.



CURRICULUM VITAE

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Personal

Birthdate: March 5, 1971
Birthplace: La Mesa, California
Citizenship: United States

Work Address: Child Study Center/Psychological Services Center
Department of Psychology
3110 Prices Fork Road
Blacksburg, Virginia 24060

Education

Candidate, Doctor of Philosophy, August 1997 - present

Clinical Psychology
Clinical Child Psychology Specialization
Virginia Polytechnic Institute and State University
Major Professor: Russell T. Jones
Dissertation: Coping Efforts and Efficacy, Acculturation, and Post-Traumatic Symptomatology in Children and Adolescents following Wildfire: A Latent Variable Path Analysis

Master of Arts, May 1995

General/Experimental Psychology
Hollins University
Major Professor: Randall K. Flory
Thesis: The Effects of Phototherapy Intensity on Symptoms of Seasonal Affective Disorder

Bachelor of Arts, May 1993

Psychology Major
Westmont College, Santa Barbara, CA

Bachelor of Arts, May 1993

English Major, women and minority writers emphasis
Westmont College, Santa Barbara, CA

Professional Affiliations

American Psychological Association (APA)

APA Division 12, Section 1, Clinical Child Psychology
Association for the Advancement of Behavioral Therapy (AABT)
AABT Special Interest Group for Cross-Cultural Research
Society for the Psychological Study of Social Issues
World Congress of Behavioral and Cognitive Therapies

Academic Honors and Awards

- ◆ Diversity Research/Mentoring Grant, October, 1999
- ◆ Graduate Research Assistantship and Tuition Waiver, Virginia Tech, August, 1997-present
- ◆ Diploma for Participation in Cultural Immersion Program (Summers 1997 & 1998) from Centro Tlahuica de Lenguas e Intercambio Cultural, Cuernavaca, Mexico
- ◆ F.J. McGuigan Award for Excellence in Graduate Psychology, 1995
- ◆ Graduate Fellowship and Tuition Waiver, Hollins University, 1994-1995
- ◆ Writing Excellence Award, 1991-1992, Westmont College
- ◆ Graduated Cum Laude, Westmont College
- ◆ Dean's List, 1991-1993
- ◆ Psi Chi National Honor Society-member

Research Experience

Project Director, April 1999 – present

National Institute of Mental Health Residential Fire Grant
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061
Supervisors: Russell T. Jones, Ph.D.
Thomas H. Ollendick, Ph.D.

Project director for a NIMH grant investigating the psychosocial correlates and effects of residential fires on children, adolescents, and their parents. Duties include supervising site managers (3), graduate (7) and undergraduate (10) research assistants, daily coordination of grant activities, data management and analysis, preparation of data and manuscripts for presentation and publication.

Principal Investigator, Author, April, 1999

Natural Hazards Grant research entitled, "Post-Traumatic Distress in Children and Adolescents following a Tornado: The Examination of Predictive Variables"

Wrote and received grant to investigate the roles of acculturation, exposure and loss, sociodemographic variables, coping self-efficacy, and coping strategy in psychological distress following a major natural disaster.

Co-Investigator April 1998-present

Meta-Analysis of Anxiety Assessment in Children
Child Study Center

Virginia Tech
3110 Prices Fork Rd.
Blacksburg, VA 24060

Co-Investigators: Thomas H. Ollendick & Laura D. Seligman

Planned and implemented a meta-analysis of anxiety assessment in children focusing on the following questions: a) Do anxiety measures discriminate between anxiety-disordered and non-disordered children, b) Do they discriminate within anxiety disorders, and between anxiety and other disorders, c) who are the best informants (self-, parent, or teacher- report), and d) what are the moderating roles of developmental level, SES, ethnicity, and gender?. Supervised 6 research assistants in the literature review from 1980-1998 and the coding of relevant articles; conducted inter-rater reliability estimates; preparing manuscripts for presentation and publication.

Co-Investigator, September 1998-May 1999

Natural Hazards Grant funded study of the Effects of Wildfires on Children and Adolescents in Volusia County, Florida
Co-Investigator: Russell T. Jones

Led in the design, data collection, data management, and statistical analyses of a study of the roles of hope, social support, and coping as mediators of post-traumatic effects in African American and Caucasian youth.

Research Assistant, August 1997 – July 1999

National Institute of Mental Health Residential Fire Grant
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061
Supervisors: Russell T. Jones, Ph.D.
Thomas H. Ollendick, Ph.D.

Research assistant on a NIMH grant investigating the psychosocial correlates and traumatic effects of residential fires. Duties include conducting interviews with children and parents who had experienced a residential fire, spreadsheet production, data management, supervising undergraduate research assistants, conducting reliability estimates for measures used, preparing data for presentation, assisting in the preparation of a grant proposal for a related investigation.

Team Leader, Graduate Research Team, 1998-present

Mentor: Russell T. Jones
Department of Clinical Psychology
Virginia Tech
Blacksburg, VA 24060

Active member in graduate research team emphasizing interests in the areas of Multicultural Psychology research, Ethnic Minority Issues in relation to Health and Anxiety

Disorders, and Stress and Coping in childhood and adolescence. Assisted more advanced students with Prelim and dissertation data collection, reliabilities and pilot testing; Included and assisted newer students in poster presentation and manuscript preparation; Co-authored book chapters with research team; Reviewed prelim and dissertation proposals and defenses.

Dissertation Proposal, May, 1999

Title: Coping Efforts and Efficacy, Acculturation, and Post-Traumatic Symptomatology in Children and Adolescents following Wildfire: a Latent Variable Path Analysis.

Committee Chair: Russell T. Jones, Ph.D.

Department of Psychology

Virginia Tech

Blacksburg, Virginia 24060

Preliminary Examination, January-March, 1999

Title: Coping, Sociodemographic Characteristics, and Post Traumatic Symptomatology in Children and Adolescents following Disaster: An Integration and Critical Review of the Literature

Committee Chair: Russell T. Jones

Department of Psychology

Virginia Tech

Blacksburg, VA 24060

The preliminary examination is a 50-60 page conceptual paper which merges two bodies of literature in a meaningful way that has not been previously examined, and results in the proposal of a new conceptual model. Responsibilities included preparing a written and oral proposal and defense of this original paper, extensive literature reviews of the relevant theories and topics, and the creation of a testable (using structural equation modeling) conceptual model based on the integration and critical review. The paper was written in 8 weeks (given a 10 week deadline, between proposal approval and defense) without faculty assistance, in compliance with departmental rules.

Thesis Research, August 1994 – May 1995

Title: The Effects of Phototherapy Intensity on Symptoms of Seasonal Affective Disorder

Department of Psychology

Hollins University

Roanoke, Virginia 24020

Chairperson: Randall K. Flory, Ph.D.

Designed and conducted two experiments investigating the efficacy of phototherapy at varying intensities in treating symptoms of Seasonal Affective Disorder.

Research Assistant, August 1994-May 1995

Department of Psychology

Hollins University

Roanoke, VA 24020

Advisor: Randall K. Flory, Ph.D.

Assisted in collaborative research on phototherapy and its application for affective and neuropsychological disorders, biofeedback research, human learning devices; received training in basic circuitry and electronics.

Undergraduate Honors Thesis, August 1992-May 1993

Title: The effects of culturally different story content and story organization on recall
Westmont College
Chairperson: Brenda S. Smith, Ph.D.

Proposed, conducted, analyzed, and wrote up original research experiment which culminated in the presentation of a poster at a professional conference.

Clinical Practicum Experience

Graduate Supervisor and Clinician, August 1999 – Present

Psychological Services Center and Child Study Center
3110 Prices Fork Road
Blacksburg, Virginia 24060

Supervisor: Lee D. Cooper, Ph.D., Clinic Director

Duties: Serve as primary supervisor for 3 graduate clinicians, and serve as primary therapist for individual, group, and family outpatient psychotherapy and assessment for children, adolescents, and adults; participate in clinical practicum teams, and give and receive individual supervision. Current supervision caseload includes: adolescent with social anxiety and ODD, and a 30 year old female with PTSD from childhood physical abuse. Current treatment caseload includes: 52 year old woman with adjustment disorder, 49 year old female with MDD and PTSD, 18 year-old female with Bulimia Nervosa. Formulate conceptualizations of client cases, develop and implement treatment plans, and administer psychological assessment measures, including 2 adult personality assessments.

Intern-Clinical Psychology, May 1999-August 1999

Columbia Lewis Gale Hospital
Center for Behavioral Health
Salem, Virginia

Supervisor: Dr. John Todd, Ph.D., Director of Clinical Services

Duties: Worked primarily on the child and adolescent wards of a private psychiatric hospital providing inpatient and day treatment services to an ethnically and socioeconomically diverse patient population. Participated in staffing and intake meetings with a team of health care providers which included psychiatrists, psychologists, social workers, nurses, and expressive, experiential, and recreational therapists. Served as therapist or co-therapist for individual (10), family (5), and group (16) treatment for adolescents and children. Received group and individual supervision. Most adolescent and child patients in this facility were hospitalized due to

depression, anxiety, suicidal ideation/ attempts, adjustment disorders, psychotic episodes, or impulse/anger control. The average length of stay was 7-10 days.

Graduate Clinician, August 1998 – May 1999

Psychological Services Center and Child Study Center
3110 Prices Fork Road
Blacksburg, Virginia 24060

Supervisors: Richard Eisler, Ph.D. and Angela Scarpa, Ph.D.

Duties: individual, group, and family outpatient psychotherapy and assessment for children, adolescents, and adults; participation on weekly practicum teams; individual supervision. Served as primary therapist for adult male with Generalized Anxiety Disorder, adult female with anger management and marital adjustment difficulties, a preschool age male with ADHD and epilepsy, an adult male with Gender Identity Disorder and Post Traumatic Stress Disorder, an adult female with Public Speaking phobia/Social Phobia. Served as lead therapist for group treatment of adolescent males with Conduct Disorder, and co-led group treatment of severely emotionally disturbed middle school students with various internalizing and externalizing disorders. Conducted one comprehensive psychoeducational assessment with a learning disabled adult male with anxiety and gender identity disorders. Formulated conceptualizations of client cases, developed and implemented treatment plans, administered psychological assessment measures to child and adolescent clients, provided in depth client case presentations to supervisors and fellow practicum team members.

Graduate Therapist-Intern, May-August 1998

Universidad Autonoma del Estado de Morelos (UAEM)
Campus Medical Clinic
Cuernavaca, Mexico

Supervisor: Dr. Santiago Scoto

Duties: individual short-term outpatient psychotherapy for adolescents and adults in an outpatient medical clinic serving an underprivileged Mexican population. Served as primary therapist for 3 adolescent females, one with depression, one with adjustment difficulties, and one with Post Traumatic Stress Disorder. Served as co-therapist for depressed adult male. Received individual supervision.

Graduate Clinician, August 1997 – May 1998

Psychological Services Center and Child Study Center
3110 Prices Fork Road
Blacksburg, Virginia 24060

Supervisor: Russell T. Jones, Ph.D.

Duties: Formulated conceptualizations of individual and family cases, developed and implemented treatment plans, administered psychological assessment measures to child and adolescent clients. Active participant in weekly group supervision meetings, providing in depth client case presentations to supervisors and fellow practicum team members. Served as primary long-term outpatient therapist for dysfunctional family with two school age children; mother diagnosed with Borderline Personality Disorder, both male children with Oppositional Defiant Disorder and ADHD. Conducted 5 comprehensive psychological evaluations, one for a 6 year old male with cerebral palsy, adopted from a Ukrainian orphanage at age 3, one for a 7 year old female with attentional difficulties, one for a 9 year old male with ADHD and test anxiety, one for a male college student with Antisocial Personality Disorder, and one for a male college student with Body Dysmorphic Disorder and a history of substance abuse.

Other Professional Experience

Journal Reviewer

Journal of Clinical Child Psychology: August, 1998-present

Research Specialist, June 1994-June 1998

Virginia Twin Study of Adolescent Behavioral Development
Department of Human Genetics, Medical College of Virginia
Richmond, VA

Principal Investigator: Lyndon Eaves, Ph.D.

Primary Supervisor: Bonnie Dedeian

Duties: interviewed twins (between the ages of 8 and 18) and their parents in a longitudinal, NIH-funded study; administered and coded semi-structured clinical questionnaires and diagnostic interviews (i.e. Child and Adolescent Psychiatric Assessment, Slosson Oral Reading Test, JC Raven Standard Progressive Matrices, Fear Survey Schedule for Children); collected buccal cells for DNA analysis.

Client Advocate, September 1989-September 1990

Shelter Services for Women

Santa Barbara, CA

Supervisor: Susan Ferrant, Ph.D.

Duties: responded to a 24-hour crisis line; determined eligibility for residency and carried out intake interviews; assisted residents in weekly short and long term goal planning; led various support groups for women and children; public speaking on domestic violence and related issues at a shelter for battered women and their children; interacted with various community resources such as Child Protective Services, Community Mental Health, Social Services, and Legal Aid.

Volunteer, September 1990-September 1992

Early Prevention Program

Santa Barbara Council on Alcoholism and Drug Abuse

Santa Barbara, CA
Supervisor: Leslie Wolfson

Duties: worked in a bilingual early prevention program for children in preschool and kindergarten, which offered them healthy ways of coping with familial stress, sought to assist teachers in identifying high-risk children, and presented parenting skills for their families.

Volunteer, September 1992-May 1994
AIDS Counseling and Assistance Program
Santa Barbara, CA

Duties: provided practical and social support to people living with AIDS; assisted with AIDS education and prevention program.

Teaching Experience

Instructor, May 1999-July 1999
Department of Psychology
Virginia Polytechnic Institute and State University
Blacksburg, Virginia

Duties: Instructor for undergraduate level course in Principles of Psychological Research (Research Methods).

Selected appropriate textbook and adjunct materials; planned course syllabus; prepared and delivered lectures; created, administered, and graded examinations and assigned papers; supervised research projects; held office hours for student consultation.

Adjunct Instructor, October 1995-March 1996
Department of Psychology and Department of English
National Business College
Salem, VA 24153

Instructor for undergraduate courses in Introduction to Psychology, Personal Development, Business English, and Literature at a four-year college. Prepared syllabus; created and carried out lectures; prepared and graded examinations, papers, and assignments; held office hours for student consultation.

Graduate Teaching Assistant, August 1994 –May 1995
Department of Psychology
Hollins University
Roanoke, VA 24020
Supervisors: Randall K. Flory, PhD
Ronald Webster, Ph.D.

Teaching assistant for laboratory section associated with an advanced undergraduate course in research methods. Duties included leading and facilitating class discussions, demonstrating biofeedback, human learning devices, and associated computer programs; administering and grading exams, and providing individual assistance to students.

Professional Publications

Langley, A.K., & Jones, R.T. (1999). **Integrating Coping Efforts and Efficacy into Disaster-Response Modeling in Youth: a Revised Model.** Manuscript submitted for publication to Clinical Psychology Review.

Langley, A.K., Kaiser, L., & Jones, R.T. (1999). **The Relationship between Hope and Post Traumatic Stress in Youth.** Manuscript submitted for publication to the Journal of Traumatic Stress.

Jones, R.T., Kephart, C., Langley, A.K., Parker, M.N., Shenoy, U.A., Weeks, C. (1999). **Cultural and Ethnic Diversity Issues in Clinical Child Psychology.** In Michael C. Roberts (Ed.), Handbook of Clinical Child Psychology (In-Press).

Jones, R.T., Langley, A.K., & Penn, C. (1999). **Firesetting: Issues in Conceptualization and Treatment.** In H. Orvaschel, J. Faust, & M. Hersen (Eds.), Handbook of Conceptualization and Treatment of Child Psychopathology (In-Press).

Jones, R.T., Ribbe, D.P., Cunningham, P.B., Weddle, J.D., & Langley, A.K. (1999). **Psychological Impact of Fire Disaster on Children and Their Parents.** Behavior Modification, (In-Press).

Professional Presentations

Langley, A.K., & Jones, R.T. (1999, November). African American youth exposed to wildfire: predictors of post-traumatic stress levels. **Poster presented at the Annual Meetings of the Association for the Advancement of Behavior Therapy, Toronto, Canada, 1999.**

Langley, A.K., Kephart, C., Jones, R.T., & Ollendick, T.H. (1999, November). Appraisal of control and coping strategy utilization following a traumatic stressor in youth: Relationships to depressive symptomatology. **Poster presented at the Annual Meetings of the Association for the Advancement of Behavior Therapy, Toronto, Canada, 1999.**

Langley, A.K., Kaiser, L., & Jones, R.T. (1999, November). **The relationship between hope and post-traumatic stress in youth.** Poster presented at the Annual Meetings of the Association for the Advancement of Behavior Therapy, Toronto, Canada, 1999.

Langley, A.K., & Jones, R.T. (November, 1999). **Coping Efforts and Efficacy, and PTSD in Youth following Disaster: An Integration and Critical Review of the Literature.** Poster presented at the Annual Meetings of the International Society for Traumatic Stress Studies, Miami, Florida, 1999.

Langley, A.K., Kaiser, L., & Jones, R.T. (November, 1999). **PTSD in Children and Adolescents: Symptom Expression and Demographic Components.** Poster presented at the Annual Meeting of the International Society for Traumatic Stress Studies, Miami, Florida, 1999.

Jones, R.T., Ollendick, T.H., Byrd, D.A., & Langley, A.K. (November, 1999). **The Impact of Exposure and Resource Loss on Children and Adolescent Functioning Following a Residential Fire.** Poster presented at the Annual Meeting of the Association for the Advancement of Behavior Therapy, Toronto, Canada, 1999.

Langley, A. K., Seligman, L. D., Byrd, D. A., Parker, M. N., Weeks C., Jones, R. T., Ollendick, T.H., Lease, C. A. (1998, October). **Adaptive functioning and post traumatic distress in youth following a residential fire.** Paper presented at the 8th Annual Virginia Beach Conference: Children and Adolescents with Emotional, Behavioral, and Developmental Disorders.

Langley, A.K., Kephart, C., Parker, M.N., Shenoy, U.A., Jones, R.T. **Children and Adolescents Exposed to Residential Fire: Impact of Trait Anxiety on Post Traumatic Symptomology.** Poster presented at the Annual conference of the International Society for Traumatic Stress Studies, Washington, D.C., USA, November, 1998.

Langley, A.K., Kephart, C., Jones, R.T. **Effects of Residential Fire on Children: The Impact of Appraisal and Coping on Outcome.** Poster presented at the Annual conference for the Association for the Advancement of Behavior Therapy, Washington, D.C., November, 1998.

Weeks, C. Langley, A. Parker, M. N., Byrd, D. A., Seligman, L. D., Jones, R. T., Ollendick, T. H., & Lease, C. A. (1998, November). **Effect of familial variables on children's outcome following residential fire.** Poster presented at the International Society for Traumatic Stress Studies, Washington, D.C.

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