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Factors that Influence Coping Following Residential Fire:
The Roles of Attributional Style and Family Functioning

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(ABSTRACT)

Investigations of children's adjustment following the experience of a residential fire or other disaster has indicated that the level of PTSD symptoms experienced by the child victims varies as a function of exposure and degree of loss incurred due to the trauma in a dose-response relationship. Additionally, other variables may interact with the level of exposure and loss to increase or decrease children's risk of posttraumatic symptomatology following the fire. Children's use of coping strategies has also been shown to significantly predict children's level of posttraumatic stress symptomatology. This study examined the mediating role of coping as well as the contributions of children's attributional style and family environment in the explanation of children's posttraumatic symptomatology following residential fire.

In the current study, 108 children and their parents were assessed approximately one to three months and again approximately seven to ten months following their experience of a residential fire. Results indicated that at the second assessment, attributional style served as a moderator between the degree of loss children experienced and children's use of coping strategies. Children with helpless attributional styles reported low levels of active and avoidant coping regardless of their level of loss due to the fire. Children with positive attributional styles reported using low levels of coping only if they also reported low levels of loss; in contrast, those children who reported positive attributional styles and high levels of loss reported using considerably higher levels of coping. In addition, the data indicated that coping acted as a mediator between loss and posttraumatic stress symptoms both at the first and the second assessments. Children's coping activities following a trauma like residential fire may be the avenue through which loss exerts its influence on children's psychological symptoms following residential fire.

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Factors that Influence Coping Following Residential Fire: The Roles of Attributional Style and Family Functioning

The psychological impact of traumatic experience on children has been increasingly investigated in recent years, confirming that children do, indeed, experience posttraumatic stress reactions similar to adults (Giaconia et al., 1995; Terr, 1991). The defining features of Posttraumatic Stress Disorder (PTSD) are three clusters of symptoms that persist for one month or longer: 1) re-experiencing of the traumatic event, 2) avoidance of stimuli associated with the event and blunting of general emotional reactivity, and 3) a heightened state of arousal (American Psychiatric Association, 1994). The latest edition of the DSM-IV indicates that children may exhibit re-experiencing symptoms through play or through drawings reflecting themes of the event. In addition, children may be more likely to report psychosomatic symptoms and nightmares with vague as opposed to event-specific content following a trauma than are adults.

In order to meet criteria for the diagnosis of Posttraumatic Stress Disorder, a child must have been exposed to a traumatic event that provokes terror or feelings of helplessness in the child. One community study by Giaconia et al. (1995) reported that 43 percent of teenagers surveyed had experienced at least one traumatic event in their lifetimes, and that 12 percent of these traumas had occurred before age ten. The adolescents who had experienced a trauma reported a wide range of posttraumatic stress symptoms, and 14.5 percent of them met criteria for a lifetime diagnosis of PTSD. This study confirmed that those adolescents who met criteria for PTSD were functioning more poorly on self-report measures with respect to internalizing, externalizing, and interpersonal problems. Furthermore, the results of this study are significant in that they emphasize the deleterious consequences of trauma for those adolescents who had experienced a trauma but who did not meet criteria for PTSD. This group was significantly more likely than those who had not experienced a trauma to evidence internalizing and externalizing problems in the clinical range. Thus, even adolescents who reported a trauma and who may have reported some symptoms of posttraumatic stress were at greater risk for these problems than their counterparts who had never experienced a trauma. These findings suggest that the sequelae of trauma may be debilitating even for those who do not meet the diagnosis of PTSD.

Investigations of disaster victims have provided unique opportunities to examine the consequences of a trauma that is sudden and unpredictable in onset and time-limited in nature. Unlike traumas such as abuse, that may be kept hidden until years after the experience, disasters are public events, the effects of which may be assessed immediately after their occurrences. The examination of a wide range of trauma including hurricanes, wildfire, nuclear accidents, floods, and dam breaks, has led to consistent findings concerning children's adjustment. Interviews with and assessments of children following various disasters have indicated that the level of psychological symptoms experienced by the child victims varies as a function of exposure and degree of loss incurred due to the trauma in a dose-response relationship (March, Amaya-Jackson, Terry, & Costanzo, 1997; Nader, Pynoos, Fairbanks, & Frederick, 1990). That is, as the degree of exposure and loss increases, so does the level of posttraumatic stress symptoms experienced by the child (Earls, Smith, Reich, & Jung, 1988; Jones, Ribbe, & Cunningham, 1994; La Greca, Silverman, Vernberg, & Prinstein, 1996).

In one investigation of children's adjustment following Hurricane Hugo, children and adolescents were assessed three months post-disaster (Shannon, Lonigan, Finch, & Taylor, 1994). Twenty-five percent of participants reported a decrease in school performance following the hurricane. Approximately 70 percent of the children endorsed a diagnosis-worthy number of symptoms in at least one of the three clusters mentioned above, and 5.42 percent of the sample reported symptoms in all three clusters (posttraumatic stress syndrome). Shannon and colleagues found that girls were more likely than boys to endorse symptoms in any one cluster and to report posttraumatic stress syndrome. In addition, the same pattern held true for children versus adolescents, with children reporting significantly more symptoms. Finally, after controlling for loss, exposure, and sociodemographic variables, African-American children and adolescents were significantly more likely to endorse symptoms in any one cluster than were Caucasian children; however, there was no difference between the two groups with respect to the posttraumatic stress syndrome. These findings are somewhat controversial, in that later studies of children following disasters have not replicated the group differences in symptoms reported that were found in this study.

March et al. (1997), in their study of children following a fire at a factory in their community that killed 25 people, found that exposure, or loss, was the greatest predictor of posttraumatic stress symptoms. This study also found a race by gender interaction such that there were no gender effects among African-American children with regard to posttraumatic stress symptoms, but among Caucasian children, girls were significantly more likely than boys to report symptoms. African-American children were more likely to report symptoms overall, but because the study did not control for socioeconomic status across the two groups, the conclusion that African-American children are at risk for posttraumatic stress symptoms appears tentative, at best. Overall, about 12 percent of the sample reported significant levels of posttraumatic symptomatology.

Other investigations of disaster victims have found similar results in terms of prevalence of posttraumatic stress symptoms (Nader et al., 1990). In an assessment of children seven months after Hurricane Andrew, 18 percent of the sample reported severe to very severe levels of posttraumatic stress symptomatology, and 23 percent reported moderate symptoms (Prinstein, La Greca, Vernberg, & Silverman, 1996). In follow-up studies with this sample, results showed that children who reported high levels of PTSD symptoms at the first assessment, three months after the hurricane, also reported high levels of symptoms at the second and third assessments, seven and ten months after the hurricane.

Exposure to Residential Fire

This investigation targets the psychological effects of residential fire on child victims. In 1999, approximately 383,000 residential fires were reported in the United States (Federal Emergency Management Agency, 2000). These fires resulted in 16,425 injuries, 2,920 deaths and over five billion dollars in loss and damages. Hundreds of thousands of Americans are affected each year by the potentially devastating consequences of these fires, yet investigation of the psychological impact of residential fire has been limited to date.

Most information thus far about the psychological impact of residential fire has come through studies of small numbers of fire victims that, while important in that they have yielded anecdotal evidence on which to base later research, are inadequate for the

systematic investigation of this devastating experience (Jones & Ribbe, 1991; Krim, 1976; Rosenfeld, 1989; Rosenfeld & Krim, 1983). The experience of residential fire is unique from that of other disasters in several ways. Fire strikes only a few individuals at a time, unlike other types of disasters in which entire communities are affected. Residential fires are isolated events that may not garner the community or media support of other larger-scale disasters (Greenberg, 1994; Rosenfeld, 1983). When families are forced to relocate, their support networks are likely to be disrupted or unavailable (Rosenfeld, 1989; Rosenfeld & Krim, 1983). Moreover, disasters may produce differential psychological effects based on such characteristics as abruptness of onset, extent of impact, potential for recurrence, and degree of geographical displacement (Green, 1982). Residential fire appears to embody the most critical aspects of disaster, inasmuch as the onset is sudden, there is potential for recurrence, and families are often displaced from their homes, many moving two or three times before settling in a new residence (Keane, Pickett, Jepson, McCorkle, & Lowery, 1994).

Greenberg's (1994) study of twelve children who had experienced a fire in their homes found that children were experiencing symptoms of posttraumatic stress three months after the fire. The children and adolescents in this study reported symptoms of anxiety, depression, hyperarousal, lack of concentration, social withdrawal, and guilt about the fire. One half of the participants suffered from sleep disturbances three months following the fire, and all but one reported considerable anxiety that another fire would occur.

In a study of adolescents four months after a dormitory fire at a boarding school, both residents of the dormitory and other adolescents who resided in other dormitories reported symptoms of posttraumatic stress disorder (Jones & Ribbe, 1991). Boys who were residents of the dormitory reported significantly more posttraumatic stress symptoms in the context of a clinical interview. The residents also reported higher levels of symptomatology on a self-report measure, but group differences were not significant. Both the residents and nonresidents reported elevated levels of intrusion and avoidance symptoms as compared to normative data. The fire had clearly affected the nonresidents, as well as the residents of the dormitory. The two groups did not differ in the number of other symptoms reported in a clinical interview, including symptoms of Oppositional

Defiant Disorder, Conduct Disorder, or Major Affective Disorder. Three of twenty-five residents met criteria for Posttraumatic Stress Disorder, while none of the nonresidents met criteria for the disorder.

One longitudinal study of children's adjustment following a destructive bushfire has been completed in Australia (McFarlane, Policansky, & Irwin, 1987). This investigation utilized multiple sources of information (teachers, parents, children) to assess approximately 500 children who lived in a region devastated by fire. As mentioned previously, one might expect the psychological effects of such a disaster to differ from the effects of an isolated house fire, yet the fact that the bushfires destroyed 40 homes and damaged many others suggests that the study should be recognized as lending some understanding to the phenomena of residential fire. These children may have experienced more community and peer support, however, than the typical child survivor. Approximately 15 percent of the children had experienced damage to their homes, and the homes of 6 percent of the children had been completely destroyed. In addition, many families experienced a loss of livelihood, losing livestock or crops because of the fire.

The study (McFarlane et al., 1987) found a delay in onset of symptoms of more than two months after the fire, with about one-third of the sample reporting an increase in symptoms eight months after the fire. In addition, symptoms present 8 months after the fire were still present 26 months after the fire in 64 percent of the children who had reported symptoms 8 months post-disaster, suggesting that for many children, the gradual remission of symptoms commonly thought to occur among disaster victims simply did not occur (Quarantelli, 1985). The data from this study are consistent with previous findings in that the majority of children did not experience increased levels of psychological symptoms following the disaster; however, the findings do underscore the need for intervention for those children who do experience symptoms so as to prevent long-term impairments in functioning.

Adjustment Following Disaster

Although some data have been collected that demonstrate the potential negative effects of residential fire, much needs to be done in terms of identifying children at risk

for PTSD and explaining the factors that may predict positive or negative psychological outcomes for children following such an event. Exposure to trauma does not necessarily lead to clinically significant impairment in functioning in children (Terr, 1983; Vernberg, La Greca, Silverman, & Prinstein 1996). In addition, symptoms may vary with the passage of time. For some children, symptoms will decrease with no intervention, but for others, symptoms persist and may worsen without treatment (Green et al., 1994; Nader et al., 1990). Investigation of the potential protective factors may illuminate which intervention strategies may be most effective in facilitating children's recovery from such traumatic stressors.

One model has been proposed to try to account for some of the factors that may predict children's adjustment and functioning following disaster. The model, put forth by La Greca et al. (1996) assumes that the factors that predict children's adjustment are multifaceted and include characteristics of the child, of the stressor, and of the post disaster recovery environment. This model, depicted in Figure 1, has been used in the explanation of children's psychological adjustment following Hurricane Andrew (Vernberg et al., 1996). In that investigation, the main factors in the model explained a total of 62 percent of the variance in children's posttraumatic stress symptoms as measured three months after the hurricane. In addition, each factor contributed significantly to the ability of the model to predict children's levels of PTSD symptomatology. The factors in the model that will be included in this investigation are described below and are depicted in Figure 2.

Exposure/Loss

Exposure and loss of possessions, as well as the loss of other immaterial goods such as quality of relationships and feelings of control, as a result of the disaster are thought to be the most critical factors associated with children's posttraumatic stress symptomatology following a disaster (Green, 1991; Jones & Ribbe, 1991; Lonigan, Shannon, Finch, Daugherty, & Taylor, 1991). Loss and disruption were strong predictors of children's reports of PTSD symptoms three months after Hurricane Andrew (Vernberg et al., 1996). In follow-up studies with these children, exposure and loss accounted for twenty percent of the variance in PTSD symptomatology as assessed seven months after

the hurricane. These variables accounted for twelve percent of the variance in PTSD symptoms ten months post-disaster (La Greca et al., 1996).

Coping

Children's coping styles and strategies have become important targets of investigation inasmuch as coping plays a critical role in how children respond in the face of a stressor. Coping has been eloquently defined in the transactional tradition by Lazarus and Folkman (1984) as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). This definition emphasizes the unique qualities of each situation that will determine, in conjunction with the individual's appraisal of the stressor, the individual's particular response. Research has demonstrated relationships between reports of coping strategies in response to a specified stressor and psychosocial outcome in children. A study by Compas, Malcarne, and Fondacaro (1988) found that problem-focused coping (coping efforts aimed at changing the circumstances of the situation) was negatively related to emotional and behavioral problems, while emotion-focused coping strategies (efforts aimed at reducing emotional distress) were positively related to these difficulties. Another study (Ebata & Moos, 1991), focusing on coping strategies in response to the problem each child in the study perceived as the most important of the past year, found that adolescents exhibiting depressive and conduct disordered symptomatology reported more avoidance coping (efforts to avoid thinking about the stressor or to manage emotional distress) than adolescents without these symptoms. Avoidance coping strategies have also been shown to be negatively related to psychological adjustment (Stern & Alvarez, 1992).

Consistent with the findings from situation-specific research, studies investigating coping as a more stable attribute across situations have also demonstrated a positive association between avoidant coping styles and symptoms of anxiety, depression, and conduct disorder (Ayers, Sandler, West, & Roosa, 1996; Gamble, 1994; Herman-Stahl, Stemmler, & Petersen, 1995; Sandler, Tein, & West, 1994). In contrast, active, or approach coping, characterized by efforts at problem-solving and attempts to change the circumstances of the situation, has been positively associated with such variables as self-

esteem and self-worth (Ayers et al., 1996; Causey & Dubow, 1992) and negatively associated with depression, internalizing symptoms, and psychological distress (Ayers et al., 1996; Glynnshaw, Cohen, & Towbes, 1989; Herman-Stahl et al., 1995; Sandler et al., 1994).

Sandler, Ayers, and colleagues (1990) have developed, through confirmatory factor analysis, a four-factor model of coping that can be applied to the discussion of both specific coping strategies as well as to more general coping styles (Ayers et al., 1989; Ayers et al., 1996). Through a thorough review of the literature and content analysis of children's coping responses in semi-structured interviews, ten dimensions of coping were identified. These ten dimensions fall under four types of coping strategies: active, distraction, avoidance, and support-seeking strategies. This conceptual model of coping departs from its predecessors in at least two important ways. First, the four-factor model recognizes the distraction and avoidance as two distinct coping strategies, which had previously been considered one factor. Distraction is described as engaging in an activity in order to avoid thinking about the stressor. Avoidance, however, is limited to attempts to avoid thinking about the problem. The separation of support-seeking strategies from other dimensions of coping is also unique to the four-factor model of coping. Active coping includes efforts to change the situation or think about the stressor more positively, while support-seeking involves soliciting social support for the purposes of solving problems or reducing negative affect. The authors do point out that the four factors are not mutually exclusive; individuals may often employ more than one type of strategy to cope with one stressor.

The four-factor model has been established in two samples of elementary school children (Ayers et al., 1996) and further validated with a sample of children who have experienced the divorce of their parents (Sandler et al., 1994). In the latter study, psychological outcome was assessed in addition to coping. Results supported the findings of previous studies in that avoidance coping was found to be positively associated with self-reported symptoms of anxiety and depression as well as with conduct problems. Sandler and colleagues propose that avoidance coping may mediate the relationship between stress and outcome, preventing children from problem-solving to change the situation or from pursuing strategies for alleviating negative affect or for

looking at the situation in a more positive way. Importantly, avoidance coping may be particularly detrimental in the case of a stressor with a long-term recovery period, such as a residential fire. Although the child may temporarily reduce anxiety through the use of avoidance coping strategies, he or she will not develop strategies for dealing effectively with the stressor in the over time (Sandler et al., 1994).

However, the research of Vernberg et al. (1996) suggests that, immediately following an intense trauma such as a natural disaster or a fire, active and avoidant coping may not show the expected relationships to psychological symptoms in children. Instead, children may access all available coping strategies following a disaster. In assessments of children three months after Hurricane Andrew, all types of coping (positive coping, blame-anger, wishful thinking, and social withdrawal) were positively correlated with increased levels of posttraumatic stress symptomatology. Following an extreme stressor with which children have no previous experience, they may utilize a range of coping strategies in an attempt to relieve distress brought on by the stressor. Thus, in the period of time shortly after a disaster, children who are experiencing symptoms of PTSD will employ every method of coping available to them.

In the conceptual model designed to predict children's responses following disaster, coping is thought to mediate the relationship between exposure/loss and the expression of PTSD symptoms. Seven months after Hurricane Andrew, coping accounted for ten percent of the variance in self-reported PTSD symptomatology, after loss/exposure, demographic characteristics of the children, major life events, and social support variables had been entered into the model (La Greca et al., 1996). Ten months after the hurricane, coping accounted for three percent of the variance in reported PTSD symptoms, after controlling for the previously mentioned variables. In this study, coping was measured three months after the hurricane and was used to predict children's later reports of symptomatology.

In the present study, coping is measured at both the first assessment and the second assessment, one and seven months after the experience of a residential fire. In this way, not only will we be able to examine coping soon after the fire as it relates to posttraumatic stress symptoms soon after the fire and at a later point in time, but we will also be able to examine coping as it changes over time. At the time of the first

assessment, the degree of loss is expected to be the overriding predictor of posttraumatic stress symptomatology in children, as their lives are thrown into chaos and they are attempting to sort through the losses incurred by the fire. Subsequently, we expect that coping will operate as a mediator between degree of loss and the expression of posttraumatic stress symptomatology at the second assessment (seven to ten months following the fire), after children have had time to adjust to the degree of loss incurred and the chaotic nature of the environment has had time to stabilize into some semblance of routine.

Attributional Style

Attributional style has been previously examined primarily in terms of its association with symptoms of depression. As the helpless explanatory, or attributional style has been found to be highly correlated with depression (Abramson, Seligman, & Teasdale, 1978), many studies have found it valuable to examine not only depressive symptoms, but also attributional styles. The learned helplessness model of depression has received much attention since its inception, and it has been modified and updated through continued research (Abramson et al., 1978; Peterson & Seligman, 1985; Seligman & Maier, 1967). The reformulated theory of learned helplessness is a model that explains certain deficits as a function of the perception that one's actions cannot or will not affect outcome. These include motivational (reduced task initiation and persistence), cognitive (reduced ability to recognize opportunities to exert control), and emotional (sadness, depressive symptoms, and lowered self-esteem) deficits. The perception that one is unable to effect change in the environment is shaped by causal attributions for events on three distinct dimensions: internality versus externality, stability versus instability, and globality versus specificity.

Internality-externality refers to whether the cause of the event is attributed to something about the person himself or herself or to something about the event. For example, imagine a college student learned that he had made a good grade on a test. He would be making an internal attribution if he thought, "I studied hard for this test." On the other hand, he would be making an external attribution if he said to himself, "That test was easy. I'm sure anyone could have done well on that test."

Stability-instability concerns whether or not the cause is seen as being temporally stable. Imagine that the student in the previous example had received a low grade on the test instead of a high one. He would make a stable attribution if he explained his low grade as the result of his ability, inasmuch as ability is seen as a relatively stable trait. He would make an unstable attribution if he explained his low grade as the result of the lack of effort he had put into studying for the test. Effort is considered an unstable characteristic. If this were, in fact, the cause of his poor grade, he could simply study more for the next test, and his grade would most likely improve. If a person attributes negative events to a stable cause, he or she will expect that the negative outcome is likely to occur in the future, thus developing chronic helplessness deficits.

Globality-specificity deals with the pervasiveness of the event. For example, the student may look at the low grade and surmise that he is just not "good" at that particular subject. Such an attribution would be considered a specific one. In contrast, the student would be making a global, or a more general, attribution if he explained the low test score by telling himself that he is not only incompetent in that subject, but also in every other subject. As demonstrated in the aforementioned examples, attributions are examined for both negative and positive events. One may evaluate negative and positive events separately and thus, differentially. If someone attributes a negative outcome to a global cause, the person will expect negative outcomes in multiple areas, thus producing helplessness deficits that generalize across many aspects of life. Lasting symptoms of helplessness are most likely to result when a person attributes negative events to internal, stable, and global causes and positive events to external, unstable and specific causes.

While the phenomenon of learned helplessness as described above has been extensively examined in adult populations, only relatively recently has research explored the construct of learned helplessness among children and adolescents. Investigations completed in school settings with children and adolescents have supported the reformulated model of learned helplessness (see Kaslow, Rehm, & Seigel, 1984; Nolen-Hoeksema, Seligman, & Girgus, 1986; Seligman et al., 1984). These studies have consistently demonstrated substantial positive correlations between depressive symptoms and the attributional style previously stated to be associated with learned helplessness: internal, stable, and global (Curry & Craighead, 1990; Joiner & Wagner, 1995).

In addition, and more importantly for this investigation, a helpless attributional style in children has been shown to be associated with decreased persistence on challenging tasks (Diener & Dweck, 1980). One may also hypothesize that the cognitive associates of the helpless attributional style may be associated with coping styles, especially for those children who feel powerless to exert control over their situations following a fire.

This study will investigate attributional style as a moderator of the relationship between exposure/loss and coping strategies used. As attributional style is acquired through learning history, we do not expect that children's attributional style will change from the first assessment, one month after the fire, to the second assessment, seven months after the fire. Attributional style is expected to affect coping, however, in that children with a positive coping style are expected to make use of more active coping strategies than children with a less positive attributional style, and children with a helpless attributional style are expected to employ more avoidant coping strategies than those with less helpless attributional styles. This relationship will be moderated by attributional style such that a more helpless attributional style will predict greater use of avoidance coping strategies and decreased use of active coping strategies for those children with high levels of loss. Coping strategies used by those children who experienced low levels of loss following the fire will use fewer coping strategies overall and their choice of coping strategies will be less affected by attributional style than those who experienced high levels of loss.

Family Functioning

According to the model proposed by La Greca et al. (1996), characteristics of the social environment may play a significant role in a person's adjustment following a disaster. Children with access to high levels of social support have been found to exhibit more successful coping efforts in the face of life stressors than those individuals who do not (Compas & Epping, 1993; Vernberg et al., 1996). Various sources may provide unique types of support, fulfilling different needs for each person. However, for children, the most relevant sources of support may be parents (Pynoos & Nader, 1988; Vogel &

Vernberg, 1993). Parental support has been shown to act as a protective factor for children experiencing stressful life events (Pryor-Brown & Cowen, 1989).

Research suggests that repeated exposure to parent conflict is a stressor for children and may contribute to emotional distress in children (Cummings & Cummings, 1988; Cummings & Davies, 1994). Conflict between parents may reduce their parenting capabilities and leave them unavailable as emotional regulators for their children (Egeland & Farber, 1984; Fauber & Long, 1991). Three months after Hurricane Andrew, children who reported their parents as more conflictual reported more symptoms of PTSD than those who reported their parents as less conflictual (Wasserstein & La Greca, 1998). Similarly, Gleser, Green, and Winget (1981) and Green et al. (1991) have shown the meaningful contribution of family structure on children's post-disaster functioning. Parental violence, irritability, and depression were among the variables shown to be significantly associated with child symptomatology.

Family functioning may influence children's symptoms via its impact on their coping. Parents may influence children's coping efforts both through the modeling of their own coping efforts and through the facilitation or obstruction of helpful coping efforts in their children. Thus, high levels of conflict between parents may leave children without the social support that may help them adjust successfully following a disaster such as residential fire. Conversely, parents who are able to devote resources to helping their children adjust to the aftermath of the fire and to comforting their children's fears may be offering the type of support that will ultimately help their children in the adjustment process.

The idea of other individuals helping children cope after a trauma has been described by Prinstein, La Greca, Vernberg, & Silverman (1996) in their work following Hurricane Andrew. Coping assistance refers to actions taken or support given by others that is specifically targeted toward helping the child in the process of coping with a stressful event. Parents, teacher, and friends may help children process an event by engaging in such activities as talking about the event, playing games related to the event, or reenacting the event through drawing or role-playing (Frederick, 1985). Following Hurricane Andrew, children reported that they received significantly more coping assistance from parents than from teachers or friends (Prinstein et al., 1996).

Additionally, coping assistance was significantly correlated with children's use of positive coping, but not with use of maladaptive coping. These results emphasize the importance of children's interactions with their parents in the recovery period following a disaster.

Disasters such as residential fire are unique in that all family members experience the direct effects of the fire. Children are attempting to cope and adjust to the aftermath of a fire at the same time as their parents are attempting to do so as well. Both parents and children may be experiencing posttraumatic stress symptomatology following such an event, therefore altering the pattern of interaction within the family. In research with child victims following Hurricane Andrew, low levels of social support, as reported by the child, predicted higher levels of posttraumatic stress symptomatology at three, seven, and ten months after the hurricane (La Greca et al., 1996; Vernberg et al., 1996). The child may not receive the same quantity or quality of support that had been present before the trauma, thus altering children's abilities and efforts to cope with the event in unknown ways.

In McFarlane's (1987) longitudinal study of children's adjustment following a bushfire, changes in family functioning (operationalized as irritability and withdrawal by family members) across time were significantly correlated with children's symptoms of Posttraumatic Stress Disorder 8 months and 26 months after the fire. To date, this is the only study that has examined the fluctuations in family functioning following disaster and how these changes might affect children's symptomatology. This investigation will attempt to examine changes in family functioning as they impact symptomatology via children's coping efforts. Parental report of family functioning will be assessed at two points in time following a residential fire.

Hypotheses

1. Increased use of both active and avoidant coping strategies at Time 1 will predict higher levels of PTSD symptomatology at Time 1 above and beyond the loss experienced as a result of the fire. Greater loss will predict increased use of both avoidant and active coping strategies at Time 1, as children are making attempts to regulate distress experienced as a result of the fire.

The relationship between loss and coping will be moderated by attributional style at both Time 1 and Time 2 assessments such that a more helpless attributional style will predict greater use of avoidance coping strategies and decreased use of active coping strategies for those children with high levels of loss. Children who experienced low levels of loss following the fire will use fewer coping strategies overall and their choice of coping strategies will be less affected by attributional style than those who experienced high levels of loss. This moderating relationship is expected to account for more of the variance in coping strategies used at Time 2 than at Time 1.

2. At Time 2, coping will serve as a mediator between loss and PTSD symptoms such that the relationship between degree of loss and posttraumatic stress symptomatology will be attenuated once the variance in PTSD symptoms accounted for by coping has been taken into consideration.

3. At both Time 1 and Time 2, family environment will significantly predict children's coping such that the more supportive and available the family is to address and process the emotions of the child following the fire (cohesion and expressiveness subscales of the Family Environment Scale), the more active coping strategies the child will endorse. In contrast, the more restrictive and conflictual the family environment is following the fire (conflict and control subscales of the Family Environment Scale), the more avoidant coping strategies the child will endorse.

Children are expected to utilize fewer coping strategies at the Time 2 assessment than at the Time 1 assessment, as the saliency of the event wanes and the level of posttraumatic symptomatology decreases. Changes in family environment will predict changes in coping from the Time 1 assessment to the Time 2 assessment above and beyond the variance accounted for by loss and by attributional style. Children whose families score higher on the control and conflict scales of the Family Environment Scale at the Time 2 assessment than at the Time 1 assessment will report an increase in the use of avoidance coping strategies more so than children whose families do not exhibit these changes. In contrast, children whose families score higher on the cohesion and expressiveness dimensions of the Family Environment Scale at the Time 2 assessment

than at the Time 1 assessment will report an increase in the use of active coping strategies more so than children whose families do not exhibit these changes.

METHOD

Participants

One hundred-eight children and their parents were assessed following their experience of a residential fire (Time 1 assessment). Sixty-two families were interviewed a second time approximately six months after the first interview (Time 2 assessment). Families who had experienced a loss of at least 15 percent of their home or belongings due to the fire and who included a child between the ages of eight and sixteen years old were identified through incident reports forwarded to the investigators by fire departments, news reports in the newspaper or on television, and information given out to fire victims about the project by Red Cross agencies. Potential participants were informed about the project through letters and telephone calls and then were asked if they would be interested in participating. Families were recruited from areas surrounding five cities: Blacksburg and Richmond, Virginia; Charlotte, North Carolina; Charleston, South Carolina; and Atlanta, Georgia.

The sample at Time 1 consisted of 57 girls and 51 boys. Additionally, the sample was bimodally distributed with respect to race: 41.7% were Caucasian, 50.9% were African-American, 5% were of other ethnicities including Hispanic and biracial, and the ethnicities of two children (1.8%) were unknown. Children ranged in age from eight to eighteen, with a mean age of 11.79. Socioeconomic status was estimated using the mother's level of education as a proxy variable.

The sample at Time 2 consisted of 31 girls and 31 boys. Children ranged in age from eight to eighteen, with a mean age of 11.68. Twenty-eight children were Caucasian (45.2%), 29 children were African-American (46.8%), and 5 children were of other ethnicities including Hispanic and biracial (8.1%).

Procedures

One child and one parent from each family were assessed approximately one to three months and again seven to ten months after they experienced a residential fire by

advanced graduate students who had been trained in the administration of all measures. The assessments took place either in the participants' homes or in public places such as Red Cross offices, libraries, or mental health clinics. Informed consent was obtained from parents for their child's as well as for their own participation. In addition, assent was obtained from each child. The assessment consisted of an unstructured interview during which the child or parent was asked to tell his or her story about the fire, the completion of several self-report measures examining the degree of exposure and loss experienced by the participant at the time of the fire and the participant's functioning since the fire, and portions of a structured clinical interview assessing several areas of psychopathology for the child and the parent. The entire assessment lasted between two and three hours, and families were compensated with 75 dollars for their participation at each interview. This project will examine data from only a subset of the completed interview.

Measures

The schedule of the administration of measures is included in Table 1. Each measure is included as an appendix.

Resource-Loss Scale for Children (RLSC: Freedy, Shaw, Jarrell, & Masters, 1992; adapted by Jones, 1994; Appendix A) This self-report measure consists of 47 items assessing loss following the fire on four factors: object loss (tangible possessions lost due to the fire such as clothing and toys), personal resource loss (quality of life variables such as "accomplishing your goals" or "sense of humor" that the child may perceive to have been diminished by the fire), condition resource loss (interpersonal resources that the child may have lost following the fire, such as "a good relationship with your parents" and "closeness with your friends"), and energy resource loss (the routine of the child that may have been lost after the fire, including "free time" . Children respond on a 4-point Likert scale as to how much of each item or resource they have lost as a result of the fire (0=none to 4=a lot). In previous research, Cronbach's alpha ranged from .815 to .833 for the four factors of this measure (Jones, 1994). In the present study, reliability estimates

are .81 for object loss, .54 for personal resource loss, .52 for condition resource loss, and .65 for energy resource loss. Children completed this measure at the Time 1 assessment.

Diagnostic Interview for Children and Adolescents (DICA-R-C; DICA-R-A; Reich & Taibleson, 1990; Appendix B). This structured clinical interview was used to diagnose psychiatric disorders in the child participants. In the current study, the diagnosis and symptoms of Posttraumatic Stress Disorder as a result of the fire are particularly relevant. Test-retest reliability for the DICA-R range from 57 percent to 100 percent (Reich et al., 1983). More recently, Cronbach's alpha of .93 was reported for the anxiety scales (Cunningham, Jones, & Yang, 1995). Inter-rater reliability of .78 was reported as measured by a kappa coefficient (Keppel-Benson & Ollendick, 1991). Children completed this measure at the Time 1 assessment.

Kiddie Longitudinal Interval Follow-up Evaluation (K-LIFE; Keller & Nielsen, 1995; Appendix C). This measure, orally administered by the examiner, was designed to assess the presence or absence of symptoms of psychiatric disorders over the course of the six months prior to the interview. It is administered at the Time 2 interview as a follow-up to the DICA-R. In this investigation, children's reports of posttraumatic stress symptoms are examined. Each symptom of Posttraumatic Stress Disorder, according to the criteria set forth in the DSM-IV (American Psychiatric Association, 1994) is assessed and tracked over the specified six-month period. However, in this study, only the symptoms that were endorsed during the week of the Time 2 interview will be examined. That is, the K-LIFE will be used in this case to assess symptoms of PTSD experienced by the child during the week of the second assessment.

Family Environment Scale (FES; Moos & Moos, 1981; Appendix D). This 90-item instrument was designed to assess interactions within and basic organizational structure of a family. The instructions ask an adult member of the family to decide whether a given statement is mostly true or mostly false when applied to his or her family. The measure includes ten factors: cohesion, expressiveness, conflict, independence, achievement orientation, intellectual-cultural orientation, active-recreational orientation, moral-religious emphasis, organization, and control. The control, cohesion, conflict, and

expressiveness subscales will be examined in this study, as these are the factors that are most theoretically most relevant to the examination of children's adjustment following a trauma. Internal consistencies across the four factors range from .61 to .78. This measure was administered to parents at both the Time 1 and the Time 2 assessments.

How I Coped Under Pressure Scale (HICUPS; Ayers et al., 1996; Appendix E). is a 45-item self-report checklist that asks children to indicate how often they have used each of a list of coping strategies based on a 4-point Likert scale (1 = Never, 2 = Sometimes, 3 = Often, 4 = Most of the time) in dealing with a single specified incident. Items for the scale were created to reflect the ten distinct categories, grouped into four factors, identified by Sandler, Ayers, and colleagues (Ayers et al., 1989; Ayers et al., 1996; Sandler et al., 1990) through content analysis of children's coping responses. A panel of raters independently categorized the items into categories, and only items for which there was at least 80% agreement were retained (Ayer et al., 1996). Confirmatory factor analysis completed on an independent sample confirmed the four-factor structure of the model, which was a better fit for the data than either the two-factor structure of problem versus emotion-focused coping set forth by Lazarus and Folkman (1984) or the two-factor structure of active versus passive coping submitted by Ebata and Moos (1991). The scale was found to demonstrate internal consistencies, as measured by coefficient alpha, ranging from .57 to .74 for the ten subscales. In addition, participants' responses did not vary as a function of age when participants were divided into two groups: ages 10 and under and ages 11 and older. Finally, the factor structure of the measure was supported for both boys and girls (Ayers et al., 1996).

In some studies specific to the prediction of psychological symptoms, Sandler and colleagues have examined the active and avoidant coping factors exclusively (Sandler et al., 1994; Sandler, Kim-Bae, & MacKinnon, 2000). These two factors have proven to be the strongest predictors of children's adjustment across studies, and this procedure will be followed in the present study. Children in this study were asked to complete the questionnaire at both the Time 1 and Time 2 assessments with reference to the strategies they utilized to help them cope with the fire.

Children's Attributional Style Questionnaire (CASQ; Kaslow, Tannenbaum, & Seligman, 1978; Appendix F). This instrument is a 48-item forced-choice that examines the attributions children make pertaining to the causality of good and bad events. The scale describes various situations and offers two possible explanations for each. The child is asked to choose the response that best describes why the situation may have happened to him or her. Half the items describe positive situations and half describe negative ones. Six subscales included in the scale assess the good and bad events with respect to three aspects of attribution: internal/external, stable/unstable, and specific/global. Three composite scores are computed including one for positive events, one for negative events, and one for attributional style collapsed across both types of events. These scores have been shown to have internal consistencies ranging from .47 to .64 across nine testing administrations for positive events and .42 to .61 for negative events (Nolen-Hoeksema et al., 1992). Test-retest reliability correlations as reported across the same nine administrations ranged from .44 to .61 for positive events and .37 to .60 from negative events. In addition, a more helpless attributional style as measured by the CASQ was also found to be a strong predictor of depressive symptoms in the aforementioned longitudinal study. In this study, reliability estimates for the positive composite are .51 at Time 1 and .56 at Time 2, and estimates for the negative composite are .46 at Time 1 and .65 at Time 2. Children in this study were asked to complete this measure at both the Time 1 and the Time 2 assessments.

Data Analyses

1. The hypothesis regarding the relationship between active and avoidant coping and PTSD symptoms at Time 1 was tested using hierarchical multiple regression, with degree of loss entered into the equation in the first step and active and avoidant coping strategies used at Time 1 entered into the equation in the second step, with PTSD symptoms as the dependent variable. The R^2 change was examined to determine whether or not increases in coping strategies used explained a significant portion of the variance in PTSD symptomatology above and beyond that accounted for by degree of loss.

The hypothesis regarding the moderating relationship of attributional style between degree of loss and type of coping strategy employed was examined in two

different analyses, both including the same steps, but with different dependent variables. The dependent variable was active coping in one analysis and avoidant coping in the other. In each analysis, degree of loss was entered as the first step, attributional style was entered as the second step, and the interaction of degree of loss and attributional style was entered as the third step. The moderating relationship was examined by considering the contribution of the interaction term as it accounted for variance in the type of coping strategy employed. These analyses were run using 1) attributional style as measured at Time 1 to predict coping as measured at Time 1, 2) attributional style as measured at Time 1 to predict coping as measured at Time 2, and 3) attributional style as measured at Time 2 to predict coping as measured at Time 2. The direction of the interaction was interpreted by examining the means of active and avoidant coping utilization for those children who reported more positive attributional style and low levels of loss, more positive attributional styles with high levels of loss, more helpless attributional styles and low levels of loss, and more helpless attributional styles and high levels of loss.

2. The hypothesis concerning coping as a mediator between degree of loss and PTSD symptoms was tested through hierarchical multiple regression using children's reports of coping and posttraumatic stress symptoms at the Time 2 assessment. In the first analysis, degree of loss was entered as a predictor and PTSD symptoms was entered as the dependent variable. Then, in a separate analysis, degree of loss was entered as the first step, and active and avoidant coping strategies were entered as the second step, with PTSD symptoms as the dependent variable. The mediator relationship was examined by looking at whether or not the relationship between degree of loss and PTSD symptoms was attenuated once coping had been added to the model.

3. The hypothesis regarding the relationship between family environment and type of coping strategy employed was tested in two separate analyses. The dependent variable in the first analysis was active coping strategies employed and in the second analysis was avoidant coping strategies employed. Hierarchical multiple regression was used. In each analysis, degree of loss was entered as the first step. Subscales of the Family Environment Scale (conflict, cohesion, control, and expressiveness) were then entered as

the second step. These analyses were run to examine the following relationships: 1) family environment as measured at Time 1 as it predicted coping as measured at Time 1, and 2) family environment at Time 2 as it predicted coping as measured at Time 2.

Changes in the utilization of both the active and the avoidant coping strategies across time were tested using paired samples two-tailed t-tests. In addition, three new change variables were calculated from the total score on the Family Environment Scale, avoidant coping, and active coping by subtracting the score at Time 1 from the score at Time 2. These variables were used to test part of the third hypothesis. Two analyses were run. The dependent variable in the first analysis was the change in active coping from Time 1 to Time 2. The dependent variable in the second analysis was the change in avoidant coping from Time 1 to Time 2. In both analyses, hierarchical multiple regression was used, with degree of loss entered as the first step, attributional style entered as the second step, and the change in family environment entered as the third step. In this way, the contribution of the change in family environment across time to the children's choice of coping strategies was examined.

RESULTS

Means, standard deviations, and internal consistency reliability estimates of all variables appear in Table 2. Measures of loss, coping, and posttraumatic stress symptoms demonstrated acceptable internal consistency reliability estimates, $\leq .78$. Attributional style as assessed at Time 1 demonstrated a reliability estimate consistent with that found in other studies using the measure, as did the Cohesion and Conflict factors of the Family Environment Scale at the Time 1 assessment, and the Conflict factors of the FES at the Time 2 assessment. However, the internal consistency reliability estimates for attributional style as assessed at Time 2 and for some subscales of the Family Environment Scale measured at both Time 1 and Time 2 were extremely low. The zero-order correlations among all Time 1 and Time 2 variables are shown in Table 3.

Resource Loss. The most commonly endorsed items on the Resource Loss scale were loss of clothing (65%), loss of furniture (63%), and loss of fun things such as toys or games (60%). T-tests were completed in order to test for group differences in reports of loss based on demographic variables. Children's reports of loss did not differ

significantly with respect to age, sex, or race of the child, or socioeconomic status as estimated by the level of maternal education.

Coping. At both the Time 1 and Time 2 assessments, children reported having used more avoidance coping strategies than active strategies in dealing with the fire. The mean score for both active and avoidance coping at both Time 1 and Time 2 assessments fell between “a little” and “somewhat” responses. T-tests were completed to check for any group differences in the utilization of coping strategies based on demographic variables. Results indicated that for coping reported at Time 1, there were no differences in avoidance or active coping reported based on sex, race, age, or socioeconomic status. At Time 2, there were no differences in avoidance or active coping strategies endorsed on the basis of sex, race, or socioeconomic status. In addition, no differences were found for children’s use of avoidance coping strategies based on age differences. However, adolescents (ages 12-18) reported more active coping than children (ages 8-11) at the Time 2 assessment ($M = 2.08$, $SD = .71$ for children, $M = 2.51$, $SD = .72$ for adolescents), $t(59.079) = -2.372$, $p = .021$.

Attributional Style. At the Time 1 assessment, 83.16% of the children reported positive attributional styles, and 16.84% reported negative attributional styles. Children’s reports of attributional style were examined for group differences based on demographic variables and were found to be invariant to age, sex, and race. Responses differed significantly, however, based on socioeconomic status: children of families with higher education levels reported significantly more positive attributional styles than children of families with lower education levels ($M = 7.47$, $SD = 4.78$ for high education level, $M = 4.25$, $SD = 4.00$ for low education level), $t(86.942) = -3.461$, $p = .001$.

At the Time 2 assessment, 89.83% of the children reported positive attributional styles, and 10.17% reported negative attributional styles. T-tests indicated that children did not differ in their reports of attributional style at the Time 2 assessment with respect to race, age, or socioeconomic status. However, girls reported significantly more positive attributional styles than boys at Time 2 ($M = 8.37$, $SD = 5.82$ for girls, $M = 4.89$, $SD = 5.31$ for boys), $t(56.118) = 2.399$, $p = .020$.

Family Environment. At the Time 1 assessment, parents endorsed the Cohesion factor most highly, followed by the Expressiveness factor, the Control factor, and the

Conflict factor. T-tests completed with each factor demonstrated that the four factors did not differ with respect to age at Time 1. Some differences on individual factors were found, however, with respect to socioeconomic status, race, and sex. At Time 1, parents with higher education levels reported significantly higher levels of cohesion than did parents with lower education levels ($M = 7.31$, $SD = 1.49$ for high education level, $M = 6.26$, $SD = 2.24$ for low education level), $t(54.958) = -2.415$, $p = .019$. With respect to race, a significant group difference was found for the Control factor. Parents of African-American children reported higher levels of control within the family than did parents of Caucasian children ($M = 6.16$, $SD = 1.41$, for African-American parents, $M = 4.85$, $SD = 1.58$ for Caucasian parents), $t(76.963) = -3.974$, $p = .000$. In addition, reports on the Control factor differed significantly with respect to sex of the child, in that parents of boys reported significantly higher levels of control than parents of girls ($M = 5.90$, $SD = 1.60$ for boys, $M = 5.21$, $SD = 1.63$ for girls), $t(82.605) = -2.008$, $p = .048$. The relationship of the interaction between race and sex to reports of control at Time 1 was tested in a regression analysis, but the interaction was not a significant predictor of control.

At the Time 2 assessment, responses on the Family Environment Scale were found to be invariant with respect to age. With respect to race, a group difference was found on the Expressiveness factor. Parents of Caucasian children reported significantly higher levels of expressiveness than did parents of African-American children ($M = 5.88$, $SD = 2.15$ for Caucasians, $M = 3.64$, $SD = 1.78$ for African-Americans), $t(28.995) = 3.175$, $p = .004$. With respect to sex, parents of girls and parents of boys differed with respect to their reports on the Cohesion factor. Parents of girls reported significantly higher levels of cohesion than parents of boys ($M = 7.95$, $SD = 2.39$ for parents of girls, $M = 5.38$, $SD = 2.53$ for parents of boys), $t(24.912) = 2.874$, $p = .008$. Group differences were found on the Cohesion and Conflict factors of the Family Environment Scale based on socioeconomic status. Parents with higher levels of education reported significantly higher levels of cohesion than parents with lower levels of education ($M = 8.06$, $SD = 2.82$ for higher levels of education, $M = 5.69$, $SD = 2.25$ for lower levels of education), $t(26.998) = -2.519$, $p = .018$. On the other hand, parents with lower levels of education reported significantly higher levels of conflict than parents with higher levels of

education ($M = 4.31$, $SD = 2.14$ for parents with lower levels of education, $M = 2.24$, $SD = 1.95$ for parents with higher levels of education), $t(24.683) = 2.732$, $p = .011$. The relationship between the interaction of sex and socioeconomic status and the Cohesion factor was tested in a regression analysis; however, the interaction did not significantly predict reports of cohesion at Time 2.

Posttraumatic Stress Symptoms. At Time 1, children reported posttraumatic stress symptoms in the context of a diagnostic interview. Overall, the sample reported a mild symptomatology. Fifty-eight percent of the sample reported no PTSD symptoms, 20.9% reported between one and four symptoms, and 13.2% reported between five and seventeen symptoms. When reports of PTSD symptoms were examined for group differences, t-tests demonstrated that they did not differ with respect to age, sex, race, and socioeconomic status.

At Time 2, PTSD symptoms were assessed in a follow-up interview. Again, the sample exhibited mild symptomatology as a group. Thirty-six percent of children reported no posttraumatic stress symptoms at Time 2, 26.2% reported between one and four symptoms, and 14.8% reported between five and seventeen symptoms. Children's reports of PTSD symptoms did not differ on the basis of sex or socioeconomic status. However, group differences in symptoms reports were evidenced on the basis of age and race. Children reported significantly more PTSD symptoms at Time 2 than did adolescents ($M = 2.14$, $SD = 3.00$ for children, $M = .84$, $SD = 1.63$ for adolescents, $t(42.260) = 2.066$, $p = .045$). Additionally, Caucasian children reported significantly more symptoms than African-American children ($M = 2.15$, $SD = 2.71$ for Caucasian children, $M = .76$, $SD = 2.03$ for African-American children), $t(48.036) = 2.158$, $p = .036$. The effect of the interaction of these two variables on PTSD symptoms was tested using a regression analysis, but the interaction variable was not found to be a significant predictor of children's reports of PTSD symptoms.

Changes in Variables Between Time 1 and Time 2

Paired t-tests were performed with the measures that were administered at both the Time 1 and the Time 2 assessments to test for significant changes in family environment, attributional style, utilization of coping strategies, and PTSD symptoms.

Tests of the four factors of the Family Environment Scale (Cohesion, Expressiveness, Conflict, and Control) indicated that no factor scores changed significantly from Time 1 to Time 2. Furthermore, reports of attributional style did not change significantly from Time 1 to Time 2. Children's reports of PTSD symptoms did not change significantly from the first assessment to the second. As for children's reports of coping, active coping did not change significantly from Time 1 to Time 2, but reports of avoidance coping did change. Children reported using significantly more avoidance coping strategies at Time 1 than at Time 2 ($M = 2.64, SD = .77$ at Time 1, $M = 2.40, SD = .79$ at Time 2), $t(61) = 2.991, p = .004$.

Group Differences in Change Variables

Change variables were computed by subtracting the report at Time 1 from the report at Time 2 for each of the following variables: family environment, attributional style, coping, and PTSD symptoms. These change variables were then tested for group differences based on the demographic variables. There were no differences found for coping, attributional style, or PTSD symptoms based on any of the demographic variables: race, sex, age, or socioeconomic status. There were no differences found on the Family Environment Scale based on age, socioeconomic status, or race. However, the Control factor of the Family Environment Scale did vary significantly based on sex of the child. Parents of girls reported an increase in control from Time 1 to Time 2, while parents of boys reported a decrease in control from the first to the second assessment ($M = .63, SD = 2.06$ for girls, $M = -.89, SD = 1.45$ for boys), $t(21.735) = 2.247, p = .035$. This was the only group difference found in any of the tests completed with the change variables.

Testing of Hypotheses

Hierarchical regression analyses were used to address various aspects of the conceptual model. Demographic variables will be included in the analyses for those variables for which group differences were found.

Coping as a Predictor of PTSD Symptoms at Time 1

To examine the contribution of coping as it predicts PTSD symptoms at the Time 1 assessment, a regression equation was run that included degree of loss due to the fire as the first step, active and avoidant coping as the second step, and children's reports of PTSD symptoms as the dependent variable (see Table 4). Results indicated that loss accounted for a significant portion of the variance in PTSD symptoms at the first assessment ($R^2 = .054$; $F(1, 88) = 5.012$, $p = .028$). Active and avoidant coping were also statistically significant predictors, accounting for an additional 11.3% of the variance in PTSD symptoms (R^2 change = .113; F change(2, 86) = 5.846, $p = .004$). The entire model including both steps accounted for a statistically significant 16.7% of the variance in PTSD symptoms at Time 1 ($R^2 = .167$; $F(3, 86) = 5.752$, $p = .001$).

Attributional Style as Moderator Between Loss and Coping

Three sets of regression analyses investigated the possible moderating relationship of attributional style between loss and coping in children following residential fire. The first analysis included loss as the first step, socioeconomic status as the second step, children's attributional style at Time 1 as the third step, the interaction between loss and attributional style as the fourth step, and active coping as the dependent variable. All variables included in this model accounted for 8.9% of variance in active coping, and the model did not account for a significant portion of the variance in active coping at Time 1 ($R^2 = .089$, $F(4, 83) = 2.030$, $p = .098$). In addition, none of the individual variables included in the model were significant predictors of active coping at Time 1, as seen in Table 5. The same model was tested with avoidant coping as the dependent variable. This model with all variables included was statistically significant, accounting for 15.6% of the variance in avoidant coping at Time 1 ($R^2 = .156$; $F(4, 83) = 3.825$, $p = .007$). Loss, entered as the first step in the model, accounted for a significant 9.7% of the variance in avoidant coping ($R^2 = .097$; $F(1, 86) = 9.271$, $p < .003$). However, after other variables were added to the model, loss was no longer a significant predictor of avoidant coping at Time 1 (see Table 6). Socioeconomic status did remain a significant predictor of avoidant coping at the first assessment even when all the variables in the model were included ($\beta = -.214$, $p = .045$).

The second set of analyses examined the relationship between attributional style as assessed at Time 1 and coping as assessed at Time 2. In the first equation, loss was entered as the first step, socioeconomic status and child age as the second step, attributional style at Time 1 as the third step, and the interaction between attributional style and loss as the fourth step. Active coping was the dependent variable in this equation. With all variables included, this model accounted for 41.2%, a significant portion, of the variance in active coping at Time 2 ($R^2 = .412$; $F(5, 45) = 6.319$, $p < .05$). Loss, entered as the first step, significantly predicted active coping at Time 2 ($R^2 = .295$; $F(1, 49) = 20.546$, $p < .05$). However, none of the subsequent steps, adding the demographic variables, attributional style at Time 1, and the interaction between attributional style and loss, added to the predictive power of the model, as shown in Table 7. Avoidant coping at Time 2 was the dependent variable in the second equation. Resource loss was entered as the first step in this equation, and this variable accounted for a significant portion of the variance in avoidant coping at Time 2 ($R^2 = .271$; $F(1, 49) = 18.214$, $p < .05$). In subsequent steps, socioeconomic status, added as the second step, was a significant predictor but did not remain significant once further steps were added. Attributional style at Time 1 was added as the third step, and the interaction between attributional style and loss was added as the fourth step. Neither of these two steps added significantly to the variance accounted for by the model (see Table 8). The full model including all steps accounted for 39.4%, a statistically significant portion, of the variance in avoidant coping at Time 2 ($R^2 = .394$; $F(4, 46) = 7.472$, $p < .05$).

The third set of analyses examined the relationship between attributional style as reported at Time 2 and coping also reported at Time 2. In the first equation, with active coping as the dependent variable, the model including all variables accounted for 28.4% of the variance in active coping at Time 2 ($R^2 = .284$; $F(5, 53) = 4.213$, $p = .003$), as shown in Table 9. The first step, loss, accounted for a significant portion of the variance in active coping ($R^2 = .169$; $F(1, 57) = 11.623$, $p < .05$). Neither the second step, which included the child's age and sex, nor the third step, in which the child's attributional style at Time 2 was entered, accounted for a statistically significant amount of additional variance in Time 2 active coping. The fourth step added the interaction between attributional style at Time 2 and loss. This step was statistically significant, explaining an

additional 7% of the variance in active coping at Time 2 (R^2 change =.070; F change(1, 53) =5.159, p =.027). The data suggests that for children with helpless attributional styles, active coping does not change according to level of loss. Children with positive attributional styles and high levels of loss engage in more active coping activities than children with positive attributional styles and low levels of loss. In the second equation, with avoidant coping at Time 2 as the dependent variable, the model including all variables accounted for 26.5% of the variance in avoidant coping at Time 2 (R^2 =.265; $F(4, 54)$ =4.861, p <.05), as shown in Table 10. The first step, loss, accounted for a significant portion of the variance in avoidant coping (R^2 =.177; $F(1, 57)$ =12.255, p <.05). The second (sex) and third (attributional style at Time 2) steps did not account for significant additional portions of the variance in avoidant coping at Time 2. However, the fourth step, in which the interaction between loss and attributional style was entered, was statistically significant (R^2 change =.056; $F(1, 54)$ =4.145, p <.05). A similar pattern of the data was evident in the prediction of avoidant coping at the Time 2 assessment as was exhibited in the prediction of active coping at Time 2.

Coping as a Mediator Between Degree of Loss and PTSD Symptoms at Time 2

To test coping as a mediator between level of loss and PTSD symptoms at Time 2, three relationships were examined, shown in Table 11. First, the relationship between loss and PTSD symptoms was tested, controlling for age and race. Results indicated that loss is a statistically significant predictor of posttraumatic stress symptomatology (β =.421, p =.004). Second, the relationship between coping at Time 2 and PTSD symptoms at Time 2 was tested controlling for age and race. Coping did significantly predict PTSD symptoms at Time 2 when active and avoidant coping were entered simultaneously (R^2 change =.266; F change(2, 52) =11.239, p <.05). Finally, a hierarchical regression analysis was completed in which loss was entered as the first step, sex and age were entered as the second step, and coping was entered as the third step. When all variables were considered, coping accounted for a significant portion of the variance in PTSD symptoms (R^2 change =.160; F change (2, 51) =6.863, p =.002). In addition, when coping was added to the model, the standardized beta coefficient for loss as a predictor of PTSD symptoms dropped from .421 (p =.004) to .189 (p =.189). Thus, support was found for

the mediating relationship of coping between level of loss and PTSD symptoms at Time 2.

Family Environment as a Predictor of Coping

Family environment was examined as a potential predictor of children's use of coping strategies following residential fire. In a model predicting active coping at Time 1, loss was entered as the first step in a hierarchical regression equation. Loss significantly predicted active coping ($R^2 = .058$; $F(1, 72) = 4.452$, $p < .05$). Subsequently, the demographic variables race, sex, and socioeconomic status were entered into the equation, and finally, scores on the Cohesion, Expressiveness, Conflict, and Control factors of the Family Environment Scale as measured at Time 1 were entered into the equation. Neither the second nor the third steps accounted for significant portions of the variance in active coping at Time 1, as shown in Table 12.

A second analysis was run with the same predictor variables but with avoidance coping as the dependent variable, as shown in Table 13. Loss was entered as the first step in the analysis, but did not significantly predict avoidance coping at Time 1 ($R^2 = .051$; $F(1, 72) = 3.831$, $p = .054$). As in the previous analysis, neither the second nor the third steps, demographic variables and family environment variables, respectively, accounted for significant portions of the variance in avoidance coping at Time 1.

Aspects of family environment at Time 2 were also examined in terms of their relationships to coping at the Time 2 assessment. The first regression equation in this set named active coping at Time 2 as the dependent variable. Loss was entered as the first step, but this variable did not account for a significant portion of the variance in active coping at Time 2 ($R^2 = .082$; $F(1, 24) = 2.149$, $p = .156$). The second step included child's sex, race, and socioeconomic status, and the third step included scores on the Cohesion, Expressiveness, Conflict, and Control factors of the Family Environment Scale as assessed at Time 2. Neither the second nor the third step added significantly to the variance accounted for in the first step, as shown in Table 14.

The second equation in this set named avoidance coping at Time 2 as the dependent variable. Loss was once again entered as the first step in the equation, and loss did not significantly predict avoidance coping at Time 2 ($R^2 = .119$; $F(1, 24) = 3.247$, $p = .084$). Demographic variables were entered in the second step of the equation, and the

four factors of the Family Environment Scale as measured at Time 2 were entered in the third step of the analysis. None of the variables were significantly associated with children's reports of avoidance coping at Time 2.

Attributional Style and Changes in Family Environment as Predictors of Changes in Coping

A hierarchical regression equation was completed with change in active coping from Time 1 to Time 2 as the dependent variable. Loss was entered as the first step, demographic variables (age, race, sex, and socioeconomic status) as the second step, attributional style at Time 1 as the third step, and change in family environment factors (Cohesion, Expressiveness, Conflict, and Control) as the fourth step. As shown in Table 16, none of the four steps explained a significant portion of the variance in the change in children's coping from Time 1 to Time 2. The same steps were entered into a second equation with the dependent variable changed to the change in avoidance coping over time. Again, as in the previous equation, none of the four steps was a significant predictor of the change in avoidance coping from Time 1 to Time 2, as shown in Table 17.

DISCUSSION

Overall, the findings in this study concerning the psychological impact of residential fire were consistent with those of previous investigations of children's response to trauma (Green et al, 1991; March et al., 1997), but overall, the sample reported more modest levels of PTSD symptoms in response to residential fire than other child samples have reported in response to different types of trauma. When children were assessed one to three months following the fire, 13.2% reported five or more PTSD symptoms, and when children were assessed seven to ten months after the fire, 14.8% reported five or more symptoms. This sample may have experienced lower levels of exposure to the trauma itself than did previous samples, as many of the children were not home when the fire occurred, and it is possible that the effects of the losses incurred due to the fire may have been reflected by the child's experience of psychological symptoms other than the narrow band assessed in this study. As in other studies, (Green et al.,

1991; Nader et al., 1990) PTSD symptoms experienced by children at the Time 1 assessment were predictive of PTSD symptoms reported at the Time 2 assessment, above and beyond the loss experienced by the children as a result of the fire (R^2 change = .153; F change = 10.631, p = .002). Such findings in this and other studies draw attention to the importance of identifying those children who may be at risk for PTSD and developing prevention and intervention efforts that target these children.

In this study, both loss and coping were significant predictors of PTSD symptoms at the Time 1 assessment, and coping did appear to serve as a mediator between loss and coping at the Time 2 assessment, as the strength of the relationship between loss and PTSD symptoms was lessened once coping was taken into consideration. This finding is consistent with the theoretical model put forth by Vernberg et al. (1996) describing children's adjustment following a trauma. Vernberg and colleagues posit that the strong association between coping and PTSD symptoms is indicative of a bi-directional relationship whereby children's distress following the fire influences their efforts at coping, which in turn is effective or is not effective in reducing children's distress.

When the standardized regression coefficients are taken into account at the Time 1 assessment, however, it appears that the effect was largely due to the influence of active coping following the fire. However, the relationships of both active and avoidant coping were in the positive direction. This finding is consistent with the findings of Vernberg et al. (1996) following Hurricane Andrew. Children who are experiencing distress following a trauma may be utilizing all possible coping resources in an attempt to reduce the distress. The stronger relationship between active coping and PTSD symptoms at Time 1 may be an indication that children who are experiencing distress are making efforts to use strategies that target the source of the distress and to take steps to change the upsetting or stressful situations.

When the relationships between the individual factors of coping and PTSD symptoms at Time 2 are examined, however, avoidant coping shows the stronger relationship to PTSD symptoms. The reversal of these relationships may indicate that for some children, engagement in active coping strategies at the first assessment was effective and consequently, symptoms decreased from the Time 1 to Time 2 assessments.

Children whose coping efforts were not effective, however, may have resorted to the use of avoidance coping strategies by the time of the second assessment. These children were still experiencing posttraumatic stress symptoms, but were showing increased levels of avoidant, as opposed to active, coping. Unfortunately, this cycle may continue perpetuate itself, as continuing to utilize avoidance coping strategies may preclude the child from engaging in problem-solving and other activities that may act to reduce children's distress. Furthermore, the child's experience of continued distress may lead the child to continue to avoid dealing with the things that are upsetting, especially if the child attempted to use active coping strategies immediately following the fire but found these strategies to be ineffective. This cycling relationship is consistent with the bi-directional relationship between coping and symptomatology posited in the theoretical model by Vernberg and colleagues (1996).

In addition, when children are assessed several months after the fire (at Time 2), one can see that the other hypothesized variables exert greater influence on children's choice of coping strategies than at the Time 1 assessment. At the Time 2 assessment, the interaction between loss and attributional style proved to be a significant predictor of both active and avoidant coping. The data indicate that differences in children's levels of loss did not predict changes in active or avoidant coping for those children who reported a helpless attributional style. On the other hand, children who reported a more positive attributional style reported levels of active coping similar to those children with a helpless attributional style when they also reported low levels of loss. However, children with more positive attributional styles and high levels of loss reported higher levels of both active and avoidant coping. This pattern may indicate that children who have experienced a great deal of loss due to the fire are still suffering considerable distress several months after the fire, as loss was a significant predictor of PTSD symptoms at Time 2. Those children who suffered low levels of loss were not using as many coping strategies at Time 2, perhaps due to their decreased need to alleviate distress. These children, for the most part, had put the event behind them.

The effect of attributional style is more evident at high levels of loss. Children with a positive attributional style and high levels of loss also reported high levels of active and avoidant coping. These children were still feeling stress from the fire, and

their patterns of coping were similar to those exhibited by all children at the Time 1 assessment. They continued to actively engage in a range of active and avoidant coping strategies in an effort to alleviate distress. In contrast, children who reported high levels of loss but who exhibited helpless attributional styles at the Time 2 assessment also reported low levels of both active and avoidant coping. Their reports of coping were similar to those of children with low levels of loss due to the fire. These children, who did not feel as though they were able to exert control over or effect change in their environments, did not engage in as many coping strategies to try to alleviate distress. These children may have given up and felt that their coping efforts were not helpful or effective in improving their posttraumatic symptoms. There seemed to be no obvious characteristics (e.g., demographic variables) that distinguished the children who reported helpless attributional styles. A statistically significant difference in either coping or posttraumatic stress symptoms was not evidenced; however, the number of children with positive versus helpless attributional styles was extremely disparate (53 and 6, respectively). The role of attributional style may be understood, in the context of the conceptual model, as a preexisting child characteristic that influences children's responses in the face of a stressor and that does not appear to be changed significantly by that stressor.

None of the predictions concerning the influence of family environment were supported by this study; however, limitations in the measurement of family environment as described below raise questions as to the viability of the analyses including this measure.

Taken as a whole, the results of this investigation emphasize that how children choose to cope with a stressor, especially a traumatic stressor such as residential fire, plays an important role in children's adjustment, but that these effects are not evident unless one follows the child over a period of at least several months following the event. In addition, the role of attributional style, previously overlooked in research studies examining children's adjustment following a disaster, deserves further consideration. This construct appears to play an important role in children's choices of whether or not to try and cope at all with events that happen in their lives. Children's views of their abilities to change situations may be most important to their adjustment at the very time

when children may be most at risk for PTSD symptoms; that is, when they have not only suffered a trauma, but have suffered high levels of loss because of the trauma. Thus, continued research to delineate the roles of attributional style as it affects children's use of various coping strategies following a trauma is warranted.

Summary of Findings

The variables in this study were examined for differences based on broad demographic characteristics of the sample. The differences found in this study may provide ideas and potential for future exploration of children's response to disaster. Some possible explanations for these findings are discussed below.

Child Age

Adolescents reported greater use of active coping strategies at the Time 2 assessment than did children ages 8-11. Such a finding may be explained by the fact that adolescents have more control over their daily lives and are more independent in their actions than do children. Thus, they are able to exert more influence over their environments and reduce the negative impact of the stressor more so than are children. This conclusion seems natural and unremarkable, except when considered together with the potential impact of this disparity: children were experiencing significantly more PTSD symptoms than adolescents when assessed at the second assessment. Generally speaking, children are not expected to act independently from their parents and family systems, and in many cases, are inhibited or protected from taking on too many responsibilities. However, this protection may actually put children at a disadvantage when it comes to coping with a novel and intense stressor like residential fire. Children may not be able to engage in as many active coping strategies that may help them reduce the levels of distress they experience as a result of the stressor, and they may depend heavily on their parents to reestablish a secure, consistent, and predictable environment following a trauma. Unfortunately, these limits may mean that children are more vulnerable than adolescents to the negative impact of trauma.

In addition, these findings raise the question of the family's role in engaging the younger child in recovery efforts. For example, younger children may feel powerless to control or to change their situations following a fire or other trauma. However, perhaps

children's adjustment would be facilitated if they were assigned specific, age-appropriate tasks related to the family's recovery. In this way, they may feel themselves a useful and effective part of the family's efforts. Each member of the family must cope with a shared trauma individually, but these the results of these efforts may be maximized if each member of the group feels that he or she is contributing to the communal well-being of the family.

Socioeconomic Status

With respect to SES, scores at Time 1 differed with on the dimension of attributional style, such that children at higher levels of socioeconomic status reported more positive attributional styles than did children at lower levels of socioeconomic status. Although this construct was measured in a general context and was not specifically addressed in the context of the fire, this finding may reflect the varying abilities of families at different ends of the socioeconomic spectrum to recover their former lifestyle and routine following the fire.

Families who are considered middle-class or above may be more likely to own their own homes and to have insurance to replace any furnishings and other belongings. In addition, these families may be able to immediately replace lost items before insurance completes the processing of the paperwork and reimburses the families for their losses. In contrast, families who are at the lower end of the socioeconomic spectrum may be more likely to be renting their homes and less likely to have insurance or the financial resources to replace their lost belongings. Moreover, because these families are renting and may be living in housing subsidized by the government, they may have less control over their living situations following the fire, dependent upon the availability of affordable housing. The combination of these factors may lead children from lower socioeconomic status to feel somewhat more than children from higher socioeconomic status that their actions do not affect their environment, especially immediately following the fire. They may feel that their futures following the fire are in the hands of other adults that they do not see or know. In addition, the experience of the fire may simply confirm any beliefs they may have had before that they (and/or their parents) are at the mercy of some bureaucratic or social system that is not navigable to them.

At the Time 2 assessment, girls reported significantly more positive attributional style than did boys. This finding may be considered in combination with the finding that parents of girls reported higher levels of Cohesion on the Family Environment Scale at Time 2. If parents are involving their daughters more in discussions about the fire or activities related to the family's recovery following the fire, it is possible that they may feel more positive about their ability to effect change in their environments. The findings concerning the Family Environment Scale at Time 2 must be interpreted vary cautiously, however, considering the measure's extremely low reliability coefficients at Time 2. Further investigation about parents' differential relationships with their sons versus daughters in terms of communication and involvement in family events is warranted to explore how these relationships may leave sons more vulnerable than daughters to symptomatology following a trauma.

Race of Child

Also of particular interest are differences in scores on factors of the Family Environment Scale based on race. Parents of African-American children reported higher levels of control at Time 1 than did parents of Caucasian children. Conversely, at Time 2, parents of Caucasian children reported significantly higher levels of expressiveness than parents of African-American children. Although these findings must be considered cautiously due to low reliability coefficients for some factors, they are consistent with previous, admittedly broad and generalized, descriptions of differences in the family structure of Caucasian families versus that of African-American families. Clinical investigations of African-American families have emphasized the important role that African-American mothers play in preparing their children to cope with the racism and unique stressors that they will face in society (Boyd-Franklin, 1995). At times, particularly following a time of intense stress, this worry and concern for their children's welfare and safety may prompt African-American parents to act in ways that are increasingly protective and vigilant. These actions may translate into African-American parents reporting higher levels of control in their families than do Caucasian parents following a residential fire. This difference was not maintained at the Time 2 assessment, however, which may indicate that this effect dissipates as families recover from the family and return to some semblance of their former routines.

Previous research has described the unwillingness in many African-American families to discuss adult matters or family issues with the children (Boyd-Franklin, 1989). This practice and belief that it is not helpful for children to hear about parental feelings or problems may lead African-American parents to rate their families lower on a measure of expressiveness within the family, as parents may consider the family's recovery from the fire a matter for adults to handle. Taken together, the finding regarding race and expressiveness on the FES at the Time 2 assessment and the finding that Caucasian children reported higher levels of posttraumatic stress symptomatology at Time 2 may point to a hypothesis regarding the influence of family communication following trauma. Intuitively, one might posit that families who were expressive would talk about the effects of the fire and different family members' feelings concerning the event. This process is traditionally considered a protective factor against posttraumatic stress symptomatology (Prinstein et al., 1996; Pryor-Brown & Cowen, 1989). However, it is important to consider that the report of the family environment obtained in this study is from the parent's, not the child's, point of view. One might hypothesize that, if a parent is under stress following the fire, and the parent expresses feelings of frustration or sadness to the child, the child may feel that he or she would be adding to the burden of the parent if he or she were to express negative emotions. Thus, in some cases, and perhaps more so in Caucasian than African-American families, the parent may feel that the expression of emotions is accepted within the family, while the child does not share this perception. The perception of the child that his or her own feelings are secondary to those of the parent may leave the child with no outlet for processing his or her feelings about the fire and put the child at risk for PTSD symptoms.

Group differences in change variables

The only group difference found in examining the changes in several variables from Time 1 to Time 2 was that parents of girls reported increased levels of control from Time 1 to Time 2, while parents of boys reported a decrease in control from Time 1 to Time 2, as measured by the Family Environment Scale. Once again, these findings must be interpreted cautiously due to the low internal consistency of the Family Environment Scale and the low number of participants who completed the Family Environment Scale

at the Time 2 assessment. However, these findings could help in the explanation of the finding that at Time 2, girls reported more positive attributional styles than did boys. Parents may be involving girls more in discussions or activities related to the family's recovery after the fire, but parents may also be more concerned with protecting their daughters than their sons. The result may be that parents of daughters may be more watchful, or more controlling, of their daughters after a disaster like a fire.

Limitations of the Study

One notable condition of this study is that the sample reported very mild levels of symptomatology overall. Thus, although we did assess children's coping in response to a novel stressor, there may not have been enough variability in children's responses to this particular stressor to capture the full range of children's coping following trauma. In addition, the use of the type of interview measures that were used in this study to assess PTSD symptoms may have limited the range of responses. Whereas the DICA and the K-Life record only a dichotomous positive or negative response based on whether or not the child reports the symptom, other self-report measures allow children to report the degree to which the child is experiencing the symptom by offering a range of responses to each symptom (e.g., A little, Some, A lot). Thus a greater range of symptomatology may have been observed with the use of measures providing for greater levels of differentiation for each symptom.

In addition, this investigation did not assess for children's or parent's level of psychological functioning prior to the fire. This information could have further informed children's adjustment to this particular stressor and may have influenced some of the other variables included in this study.

The low retention rate of families in the study is also a serious limitation of the study. Following a fire, families are highly mobile, often moving three or more times in the months following the event. This can make it very difficult to contact these families as time goes on and they move from place to place. Such was the case in our investigation, leading to a high drop out rate. In addition, missing data was a problem for some measures, particularly the Family Environment Scale, at the Time 2 assessment. The measure was typically administered at the end of the protocol, and parents may not

have been willing to complete the measure by that point or may have filled out the measure carelessly, skipping items or endorsing more than one answer for each item.

The potential problems with this measure also extend to the reliability coefficients, which were found to be unacceptably low for the Expressiveness and Control factors of the Family Environment Scale at Time 1, and for the Cohesion, Expressiveness, and Control factors at the Time 2 assessment. The measure was administered at the end of a lengthy protocol at both the Time 1 and the Time 2 assessments, and the measure, itself, is lengthy (90 items). As stated previously, this may have led to carelessness on the part of the participant. In addition, participants may have been more reluctant to ask questions to clarify items they did not understand if they were anxious to finish the assessment. Lastly, because participants had completed the Family Environment Scale at the Time 1 assessment, they may not have read the questions as carefully at the Time 2 assessment, making assumptions based on their recollections of the questions as presented at Time 1.

The same possibilities may explain the very low reliability coefficient obtained on the Children's Attributional Style Questionnaire at the Time 2 assessment. This measure was administered at the end of the lengthy protocol, and children may have had difficulty sustaining their attention over a long period of time. The measure is lengthy (48 items), and the questions are intended to be general in nature. Thus, children may not have taken this measure as seriously as some of the others, because the items included on the measure itself have little relevance to the fire. The children understood the fire to be the focus of the assessment, and may have been confused by the purpose of this measure. It is difficult for the interviewer to determine how seriously the child is considering each response, as the items are not quickly interpretable with respect to each other as the measure is being administered. It is not clear why the measure demonstrated lower internal consistency at the Time 2 assessment than at the Time 1 assessment, except that the experience was a novel one at Time 1 and children may have been more interested in the process. On the other hand, at Time 2, children knew what to expect and may have simply been more eager to finish the assessment.

Future Directions

This study served to point out the importance of assessing children at multiple points in time after the experience of a trauma like residential fire. During the time period immediately following the incident, children may be so overwhelmed by the extent of their exposure to the trauma, to the losses they have incurred due to the trauma (not only material losses but also losses of family routines and a sense of security) that the variables hypothesized to impact children's adjustment following a trauma do not show the expected relationships to adjustment. However, if these children are followed further along in time, the theorized relationships do begin to appear. It may be difficult to predict which children will continue to exhibit posttraumatic stress symptomatology after a trauma based on an assessment immediately following the event, but as assessment methods and procedures become more refined, the identification of the factors which may protect children from deleterious outcome or may portend poor adjustment will also continue to be refined.

Although the measurement of family environment was problematic in this study, the importance of this construct to children's adjustment cannot be underrepresented in future research. Assessment in future studies should be more specific to the family's handling and processing of the specific stressor in question. For example, open-ended questions directed toward the parents could more accurately and usefully obtain information about the family's communication about the event. Did the parents encourage or discourage communication about the trauma with each other and with the children? What are the parents' ideas about the best way to recover emotionally from a trauma? Similar questions should be asked to the children who were affected by the trauma, not only to gain a richer picture of the response to the trauma as a family, but also to obtain information concerning both the children's and the parents' perspectives on the value and acceptability of family communication after a trauma. In addition, information concerning the concurrence of parents' and children's perspectives on the family environment immediately after and several months after the trauma could be acquired.

In sum, this study provides continued support for longitudinal investigation of children's coping responses following a traumatic event. In addition, the significant role of children's attributional style, their views of themselves as competent actors on their

environments and feelings of control over various situations in their lives, has been demonstrated, and further investigation is warranted. Finding ways of keeping families involved with community resources and social support networks might also be a goal of future research in this area. Many of the participants in this study were not able to name three individuals who knew of their whereabouts or how to contact them at the time of the second assessment. The low retention rate of the participants in this study, even after repeated attempts at contact by the investigators, suggests that victims of residential fire may be at particular risk for symptomatology due to their lack of consistent support in the year following the fire. Although the children in this study reported mild posttraumatic symptomatology overall, this does not in any way detract from the importance of identifying children and families who may be at risk for poorer adjustment and posttraumatic symptomatology following a trauma such as residential fire.

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Figure 1.

The conceptual model proposed by La Greca and colleagues (1996) to help explain children's PTSD symptomatology following disaster.

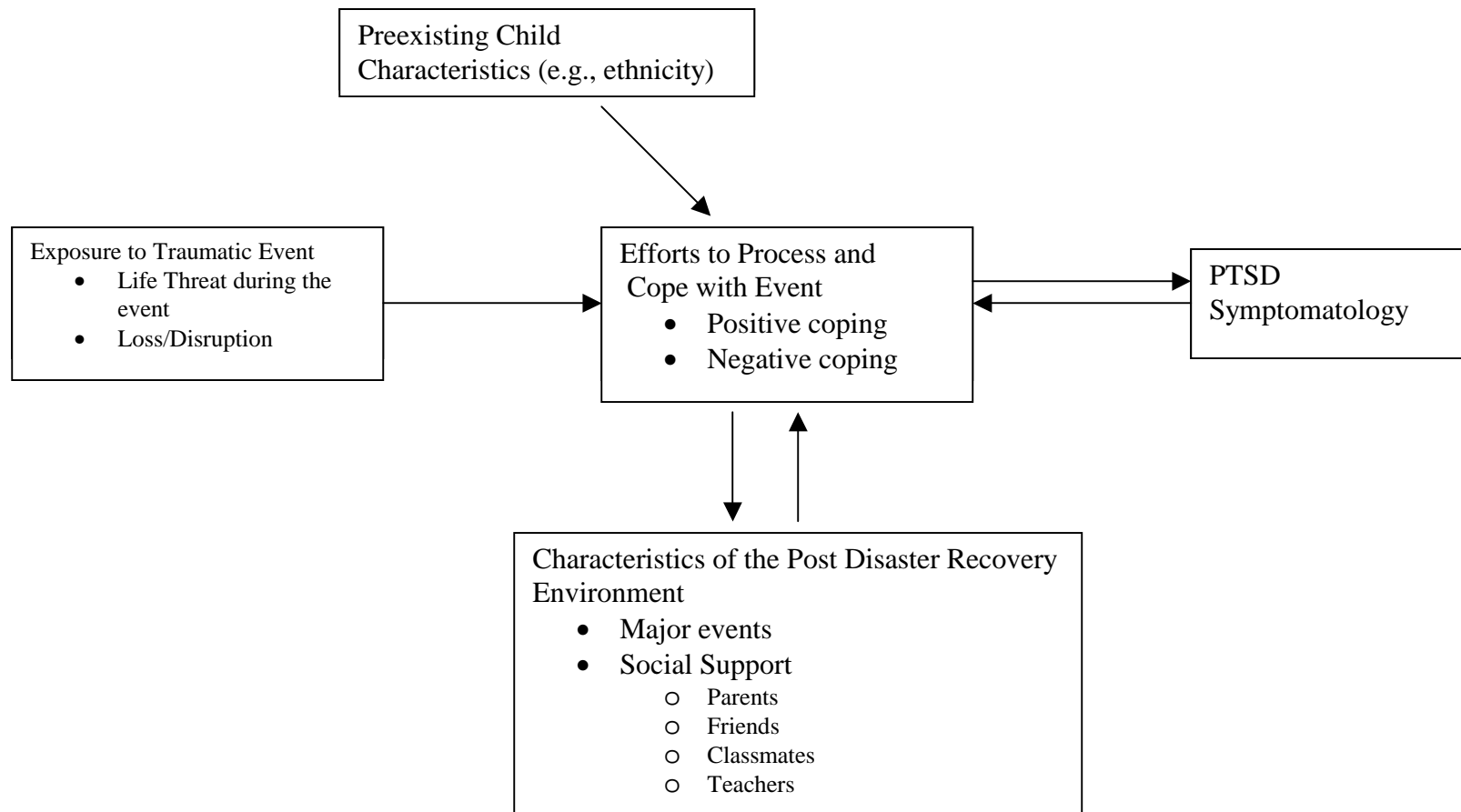


Figure 2.

A representation of the variables that will be the focus of this investigation.

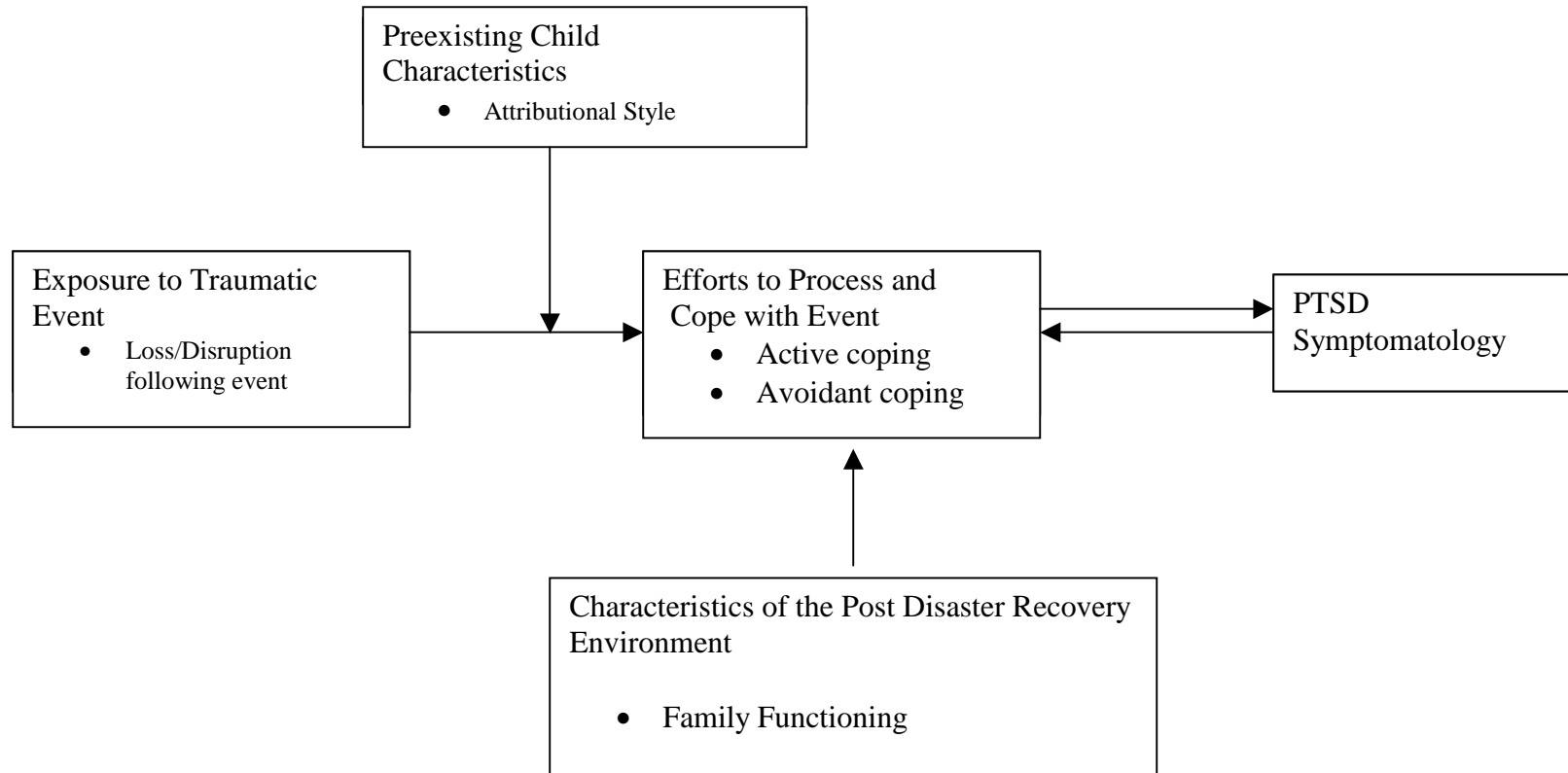


Table 1

Schedule of the administration of measures

Variable	Time 1	Time 2
Demographics		
Child Sex	X	
Child Age	X	
Child Race	X	
Maternal Education	X	
Resource Loss (RLS)	X	
Coping with fire (HICUPS)		
Avoidance coping	X	X
Active coping	X	X
Family Environment (FES)		
Cohesion	X	X
Expressiveness	X	X
Conflict	X	X
Control	X	X
Attributional Style (CASQ)	X	X
PTSD symptoms (DICA)	X	
PTSD symptoms (K-Life)		X

Table 2

Means, Standard Deviations, and Internal Consistency Reliabilities

Variable	M	SD	α
Time 1			
Child Age	11.85	2.96	
Maternal Education	4.52	1.20	
Resource Loss	15.74	9.06	.86
Avoidance coping	2.77	.72	.78
Active coping	2.44	.65	.87
Family Environment			
Cohesion	6.83	1.98	.64
Expressiveness	5.49	1.64	.45
Conflict	3.21	2.12	.69
Control	5.51	1.64	.33
Attributional Style	5.82	4.70	.43
Total PTSD symptoms	1.48	2.72	.89
Time 2			
Child Age	11.68	3.00	
Maternal Education	4.69	1.18	
Avoidance coping	2.40	.79	.82
Active coping	2.31	.74	.93
Family Environment			
Cohesion	6.91	2.73	.59
Expressiveness	4.97	2.23	.52
Conflict	3.09	2.21	.69
Control	6.21	2.01	.06
Attributional Style	6.60	5.79	.28
Total PTSD symptoms	1.46	2.45	.79

Table 3

Zero-Order Correlations Among All Time 1 and Time 2 Variables

	Age	Race	Sex	M. Edu.	Loss	PTSD T1
Age	1.00	.077	-.210*	.188	.120	-.108
Race		1.00	.019	-.030	-.182	-.150
Sex			1.00	-.123	-.137	.123
Maternal Education				1.00	-.116	-.155
Loss					1.00	.216*
PTSD symptoms at Time 1						1.00
Coping at Time 1						
Active						
Avoidant						
Family Environment Scale at Time 1						
Cohesion						
Expressiveness						
Conflict						
Control						
Attributional style at Time 1						
PTSD symptoms at Time 2						
Coping at Time 2						
Active						
Avoidant						
Family Environment Scale at Time 2						
Cohesion						
Expressiveness						
Conflict						
Control						
Attributional Style at Time 2						

Table 3 (continued)

	Active Coping at T1	Avoidant Coping at T1	FES: cohesion at T1	FES: expressiveness at T1	FES: conflict at T1	FES: control at T1
Age	.126	-.042	.064	.108	.082	-.205
Race	-.014	.090	.032	-.185	-.029	.405**
Sex	-.113	-.121	-.043	-.045	.138	.208*
Maternal Education	-.053	-.223*	.376**	.155	-.181	-.141
Loss	.234*	.261**	-.014	.291**	.050	-.122
PTSD symptoms at Time 1	.388**	.297**	.002	.042	-.015	.081
Coping at Time 1						
Active	1.00	.668**	.014	-.020	-.051	-.087
Avoidant		1.00	-.056	-.109	-.071	-.017
Family Environment Scale at Time 1						
Cohesion			1.00	.358**	-.561**	.052
Expressiveness				1.00	-.108	-.110
Conflict					1.00	-.023
Control						1.00
Attributional style at Time 1						
PTSD symptoms at Time 2						
Coping at Time 2						
Active						
Avoidant						
Family Environment Scale at Time 2						
Cohesion						
Expressiveness						
Conflict						
Control						
Attributional Style at Time 2						

Table 3 (continued)

	Attributional Style at T1	PTSD symptoms at T2	Active coping at T2	Avoidant coping at T2	FES: cohesion at T2	FES: expressiveness at T2
Age	-.015	-.244	.271*	.047	.059	-.179
Race	-.121	-.286*	.060	.040	-.201	-.501**
Sex	-.130	.100	-.172	-.205	-.469**	-.323
Maternal Education	.272**	-.292*	-.214	-.298*	.413*	.252
Loss	.036	.331**	.413**	.427**	.195	.306
PTSD symptoms at Time 1	-.036	.485**	.354**	.402**	-.076	-.156
Coping at Time 1						
Active	.097	.288*	.640**	.639**	-.022	-.046
Avoidant	-.024	.379**	.559**	.665**	-.170	-.177
Family Environment Scale at Time 1						
Cohesion	.126	-.168	-.047	-.136	.509**	.381
Expressiveness	.167	-.039	.097	.009	.280	.384*
Conflict	-.209	.146	.127	.080	-.166	-.272
Control	-.100	-.147	-.027	.027	-.273	-.314
Attributional style at Time 1	1.00	.046	-.042	-.196	.359	.252
PTSD symptoms at Time 2		1.00	.317*	.462**	.016	-.108
Coping at Time 2						
Active			1.00	.840**	.085	-.043
Avoidant				1.00	.066	-.088
Family Environment Scale at Time 2						
Cohesion					1.00	.553**
Expressiveness						1.00
Conflict						
Control						
Attributional Style at Time 2						

Table 3 (continued)

	FES: conflict at T2	FES: control at T2	Attributional style at T2
Age	-.053	.186	-.021
Race	.009	.264	-.115
Sex	.302	.001	-.303*
Maternal Education	-.285	-.036	.164
Loss	.065	.220	.013
PTSD symptoms at Time 1	-.046	-.046	-.056
Coping at Time 1			
Active	.028	.184	.156
Avoidant	.164	.255	.032
Family Environment Scale at Time 1			
Cohesion	-.377	-.007	.448**
Expressiveness	.021	-.010	.292*
Conflict	.739**	-.085	-.230
Control	.146	.383*	-.290*
Attributional style at Time 1	-.180	.116	.638**
PTSD symptoms at Time 2	.015	-.078	.019
Coping at Time 2			
Active	.080	.260	.107
Avoidant	.029	.255	.010
Family Environment Scale at Time 2			
Cohesion	-.435*	.125	.432*
Expressiveness	-.259	-.298	.379*
Conflict	1.00	.010	-.285
Control		1.00	.262
Attributional Style at Time 2			1.00

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 4

Hierarchical Regression for Variance in PTSD Symptoms at Time 1 Explained by Loss and Coping at Time 1

Step: Variables	R² change	<i>p</i>	R² Total	β	<i>p</i>
1: Loss	.054	.028	.054	.232	.028
2: Loss				.119	.257
Coping	.113	.004	.167		
Active				.315	.018
Avoidant				.058	.655

Table 5

Hierarchical Regression for Variance in Active Coping at Time 1 Explained by Loss and Attributional Style at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.066	.015	.066	.257	.015
2: Loss				.254	.018
Demographics: SES	.001	.742	.067	-.035	.742
3: Loss				.251	.019
Demographics: SES				-.064	.562
Attributional Style	.010	.331	.078	.106	.331
4: Loss				.053	.811
Demographics: SES				-.054	.625
Attributional Style				-.135	.609
Interaction between loss and attributional style	.011	.315	.089	.329	.315

Table 6

Hierarchical Regression for Variance in Avoidance Coping at Time 1 Explained by Loss and Attributional Style at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.097	.003	.097	.312	.003
2: Loss				.295	.004
Demographics: SES	.043	.042	.140	-.208	.043
3: Loss				.293	.005
Demographics: SES				-.225	.036
Attributional Style	.003	.563	.144	.061	.563
4: Loss				.089	.680
Demographics: SES				-.214	.045
Attributional Style				-.188	.459
Interaction between loss and attributional style	.012	.282	.156	.340	.282

Table 7

Hierarchical Regression for Variance in Active Coping at Time 2 Explained by Loss and Attributional Style at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.295	.000	.295	.544	.000
2: Loss				.469	.001
Demographics:	.056	.145	.351		
SES				-.233	.067
Age				.164	.218
3: Loss				.465	.001
Demographics:					
SES				-.278	.043
Age				.176	.188
Attributional Style	.012	.360	.363	.117	.360
4: Loss				.064	.789
Demographics:					
SES				-.249	.064
Age				.184	.158
Attributional style				-.430	.167
Interaction between loss and attributional style	.050	.057	.412	.697	.057

Table 8

Hierarchical Regression for Variance in Avoidance Coping at Time 2 Explained by Loss and Attributional Style at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.271	.000	.271	.521	.000
2: Loss				.496	.000
Demographics: SES	.087	.014	.357	-.295	.014
3: Loss				.496	.000
Demographics: SES				-.265	.039
Attributional Style	.006	.506	.364	-.084	.506
4: Loss				.186	.432
Demographics: SES				-.240	.060
Attributional style Interaction between loss and attributional style	.030	.137	.394	-.511	.104
				.544	.137

Table 9

Hierarchical Regression for Variance in Active Coping at Time 2 Explained by Loss and Attributional Style at Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.169	.001	.169	.412	.001
2: Loss				.338	.011
Demographics:	.041	.251	.210		
Sex				-.137	.267
Age				.146	.262
3: Loss				.339	.012
Demographics:					
Sex				-.114	.380
Age				.151	.252
Attributional Style	.005	.576	.215	.071	.576
4: Loss				-.069	.755
Demographics:					
Sex				-.085	.502
Age				.154	.226
Attributional Style				-.522	.076
Interaction between loss and attributional style	.070	.027	.284	.780	.027

Table 10

Hierarchical Regression for Variance in Avoidance Coping at Time 2 Explained by Loss and Attributional Style at Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.177	.001	.177	.421	.001
2: Loss				.394	.002
Demographics:	.029	.159	.206		
Sex				-.172	.159
3: Loss				.392	.002
Demographics:					
Sex				-.188	.146
Attributional	.002	.684	.208	-.051	.684
Style					
4: Loss				.026	.904
Demographics:					
Sex				-.162	.200
Attributional				-.586	.048
Style					
Interaction	.056	.047	.265	.702	.047
between loss and					
attributional style					

Table 11

Hierarchical Regression for Investigation of a Mediating Relationship of Coping at Time 2 Between Loss and PTSD Symptoms at Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.114	.010	.114	.338	.010
2: Loss				.421	.004
Demographics:	.132	.014	.246		
Age				-.352	.010
Race				-.089	.510
3: Loss				.189	.189
Demographics:					
Age				-.289	.031
Race				-.201	.114
Coping	.160	.002	.406		
Active				-.015	.942
Avoidance				.459	.034

Table 12

Hierarchical Regression for Variance in Active Coping at Time 1 Explained by Family Environment at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.058	.038	.058	.241	.038
2: Loss				.202	.084
Demographics:	.063	.184	.122		
Sex				-.146	.212
Race				-.016	.891
SES				-.223	.054
3: Loss				.238	.057
Demographics:					
Sex				-.160	.190
Race				-.068	.601
SES				-.228	.068
Family Environment:	.025	.757	.146		
Cohesion				.104	.488
Expressiveness				-.157	.246
Conflict				.011	.934
Control				.060	.652

Table 13

Hierarchical Regression for Variance in Avoidance Coping at Time 1 Explained by Family Environment at Time 1

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.051	.054	.051	.225	.054
2: Loss				.200	.088
Demographics:	.064	.182	.115		
Sex				-.144	.219
Race				.089	.441
SES				-.208	.074
3: Loss				.265	.033
Demographics:					
Sex				-.149	.215
Race				.027	.833
SES				-.192	.118
Family Environment:	.053	.400	.167		
Cohesion				.025	.863
Expressiveness				-.191	.155
Conflict				.144	.398
Control				.086	.513

Table 14

Hierarchical Regression for Variance in Active Coping at Time 2 Explained by Family Environment at Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.082	.156	.082	.287	.156
2: Loss				.276	.245
Demographics:	.124	.374	.206		
Sex				-.053	.817
Race				.149	.482
SES				-.302	.166
3: Loss				.164	.598
Demographics:					
Sex				-.025	.929
Race				.090	.723
SES				-.366	.150
Family Environment:	.055	.862	.261		
Cohesion				.315	.343
Expressiveness				-.114	.724
Conflict				.117	.657
Control				.062	.820

Table 15

Hierarchical Regression for Variance in Avoidance Coping at Time 2 Explained by Family Environment at Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.119	.084	.119	.345	.084
2: Loss				.272	.235
Demographics:	.147	.271	.266		
Sex				-.133	.551
Race				.067	.740
SES				-.382	.073
3: Loss				.303	.309
Demographics:					
Sex				-.064	.809
Race				.001	.997
SES				-.396	.104
Family Environment:	.070	.772	.336		
Cohesion				.336	.287
Expressiveness				-.346	.265
Conflict				.003	.990
Control				-.131	.612

Table 16

Hierarchical Regression for Variance in Change in Active Coping Explained by
Attributional Style and Change in Family Environment From Time 1 to Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.039	.404	.039	.197	.404
2: Loss				.519	.075
Demographics:	.303	.226	.342		
SES				.072	.785
Sex				.520	.066
Race				.331	.225
Age				.175	.448
3: Loss				.584	.054
Demographics:					
SES				-.111	.727
Sex				.509	.072
Race				.318	.245
Age				.136	.558
Attributional Style	.051	.316	.393	.296	.316
4: Loss				.460	.301
Demographics:					
SES				-.026	.950
Sex				.565	.124
Race				.267	.478
Age				.176	.588
Attributional Style				.167	.702
Change in Family Environment:	.037	.960	.430		
Cohesion				-.149	.756
Expressiveness				.127	.712
Conflict				-.016	.964
Control				.324	.541

Table 17

Hierarchical Regression for Variance in Change in Avoidance Coping Explained by
Attributional Style and Change in Family Environment From Time 1 to Time 2

Step: Variables	R² change	p	R² Total	β	p
1: Loss	.078	.234	.078	.279	.234
2: Loss				.180	.565
Demographics:	.079	.885	.157		
SES				-.082	.783
Sex				-.079	.794
Race				-.033	.913
Age				.262	.318
3: Loss				.238	.468
Demographics:					
SES				-.244	.507
Sex				-.088	.773
Race				-.045	.883
Age				.228	.397
Attributional Style	.040	.436	.196	.262	.436
4: Loss				.189	.707
Demographics:					
SES				-.189	.696
Sex				-.127	.751
Race				-.147	.735
Age				.147	.696
Attributional Style				.278	.586
Change in Family Environment:	.029	.986	.225		
Cohesion				-.225	.687
Expressiveness				-.111	.782
Conflict				.046	.910
Control				.183	.766

Curriculum Vitae of

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M.S. in psychology: Virginia Tech, Blacksburg, VA, anticipated May 2001.

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Professional Organizations:

Association for Advancement of Behavior Therapy, student member, 1998-present

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Awards and Honors:

Virginia Tech Graduate Research Development Project grant, 2000

University of Kentucky Honors Program

University of Kentucky Commonwealth Scholarship, 1993-97

Senior Honors Thesis in Psychology, 1996-1997

Undergraduate Research and Creativity Grant, Fall 1996

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University of Kentucky Dean's List, 1993-1997

College of Arts and Sciences Dean's Scholarship, 1995-96

Honors Program Sophomore Scholarship, 1994-95

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Research Experience:

Project Coordinator, NIMH-funded research grant, June 2000-present.

Duties: managing multi-site research grant examining psychological effects of residential fire on children and families, coordinating subject acquisition, dispensing of funds, supervising graduate students in collection of data and undergraduate students in management and entry of data. Supervisors: Russell T. Jones, Ph.D., and Thomas H. Ollendick, Ph.D.

Graduate Research Assistant, Virginia Tech, May 1998-May 2000.

Duties: completed interviews with individuals who had experienced residential fire, recruited and scheduled appointments for participating families, managed and gathered data from physicians and teachers of participating children, and supervised undergraduate research assistants as a part of the Residential Fire Grant project. Supervisors: Russell T. Jones, Ph.D., and Thomas H. Ollendick, Ph.D.

Senior Honors Thesis, University of Kentucky with Margo J. Monteith, Ph.D., 1996-97.

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Research Assistant, University of Kentucky, Multidisciplinary Research Center on Drug and Alcohol Abuse, April 1996.

Duties: subject enlistment for longitudinal study, including creating phone list of and contacting potential clients. Supervisor: T.K. Logan, Ph.D.

Research Assistant, University of Kentucky, Jan 1996-May 1996.

Duties: coding data, running experiments, script preparation, project development. Supervisor: Margo J. Monteith, Ph.D.

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Papers Submitted:

Jones, R.T., Rock, C., Canfield, D., & Kephart, C. (submitted 2000). Treatment of child survivors of residential fire: The role of rehearsal plus. *Fire Technology*.

Monteith, M.J., Ashburn-Nardo, L., Voils, C.I., & Kephart, C.M. (submitted 1999). Putting the brakes on prejudice: Toward understanding how stereotyping may be deautomatized. *Journal of Personality and Social Psychology*.

Jones, R.T., Kephart, C., Langley, A.K., Parker, M.N., Shenoy, U., & Weeks, C. (submitted 1999). Cultural and ethnic diversity issues in clinical child psychology. In C.E. Walker & M.C. Roberts, Eds. *Handbook of Clinical Child Psychology*. John Wiley & Sons: New York.

Poster and Paper Presentations:

Kephart, C., & Jones, R.T. (2000). Intermediary Factors for Abused or Neglected Children. Poster presented at the Sixteenth Annual Meeting of the International Society for Traumatic Stress Studies, San Antonio, TX.

Kephart, C., Chandler, H.K., Jones, R.T., & Ollendick, T.H. (2000). Children's Coping Strategies Predict PTSD Following Residential Fire. Poster presented at the 108th Convention of the American Psychological Association, Washington, DC.

Kephart, C., & Chandler, H.K. (2000). Risk of Suicidal Behavior in Gay and Lesbian Adolescents. Paper presented at the 33rd Annual Conference of the American Association of Suicidology, Los Angeles, CA.

Langley, A.K., Kephart, C., Jones, R.T., & Ollendick, T.H. (1999). Appraisal of Control and Coping Strategy Utilization Following a Traumatic Stressor in Youth: Relationships to depressive symptomatology. Poster presented at the 33rd Annual Convention of the Association for Advancement of Behavior Therapy, Toronto, ON.

Langley, A.K., Parker, M.D., Weeks, C., Seligman, L.D., Byrd, D.A., Shenoy, U., Kephart, C., Jones, R.T., Ollendick, T.H., & Lease, C. A. (1998). Children and Adolescents Exposed to Residential Fire:

Impact of trait anxiety on post traumatic symptomatology. Poster presented at the Fourteenth Annual Meeting of the International Society for Traumatic Stress Studies, Washington, DC.

Langley, A.K., Kephart, C., Byrd, D.A., Parker, M.N., Seligman, L.D., Weeks, C., Lease, C.A., Jones, R.T., & Ollendick, T.H. (1998). Effects of Residential Fires on Children: The impact of appraisal and coping on outcome. Poster presented at the 32nd Annual Convention of the Association for the Advancement of Behavior Therapy, Washington, DC.

Clinical Experience:

Externship at Christiansburg Middle School, Fall 1999-Spring 2000.

Duties: therapist for child clients in individual therapy context and co-leader of anger management group for adolescent boys. Supervisor: Bonita Sims-Gude, Ed.D.

Clinic Assistant, Virginia Tech, Psychological Services Center and Child Study Center, Fall 1998.

Duties: performed psychoeducational assessments with children as a part of the child assessment team and completed tasks related to the administration of the clinic (e.g., chart reviews, maintenance of assessment materials). Supervisor: Thomas H. Ollendick, Ph.D.

Clinical practicum, Psychological Services Center, Virginia Tech, Fall 1997-Spring 1998, Summer 1998, Fall 1998-Spring 1999, Fall 2000.

Duties: Therapist for various child, adult, and family clients. Supervisors (respectively): Russell T. Jones, Ph.D., Thomas H. Ollendick, Ph.D., Richard Eisler, Ph.D., Angela Scarpa, Ph.D., & George A. Clum, Ph.D.

Camp Counselor, Indian Summer Camp, Kentucky's Camp for Kids with Cancer, Irvine, KY, 1995, 1997, 1998.

Duties: recreational counseling and supervision of 7- and 8-year-old children who had been diagnosed with cancer. Supervisor: Julie Morgan.

Co-facilitator for a Social Skills Training Group for children with ADHD, Harris Psychological Services Center, Lexington, KY, Spring 1997.

Duties: implemented and managed a behavior modification program for a group of ADHD children learning appropriate social skills. Supervisor: Richard Milich, Ph.D.

Clinic Assistant, Harris Psychological Services Center, Lexington, KY, Aug 1996-Dec 1996.

Duties: receptionist and clerical work, including scoring of assessments. Supervisor: David Susman, Ph.D.

Volunteer/Service Activities:

CASA Volunteer with Roanoke Valley CASA, Roanoke, VA, October 1998-present. Duties: assess needs of children involved in the court system because of incidents of abuse or neglect and present recommendations to the court. Supervisor: Carol Key, M.A.

Camp Counselor, Camp WaKon'Da-Ho, Christian (Disciples of Christ) Church Camp, Yosemite, KY, 1993-1997, 1999. Duties: counseling, teaching, and supervision of children ages 9 to 13 at a Christian-based summer camp. Supervisor: Rick Loader, D.Min.

Professional/ Teaching Experience:

Teaching Assistant, Introductory Psychology, Virginia Tech, Blacksburg, VA, Fall 1997-Spring 1998.

Duties: taught two recitation sections each semester for the Introductory Psychology class. Supervisor, Jack W. Finney, Ph.D.