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The Role of Peers in the Relation between Hurricane Exposure and Ataques de Nervios among Puerto Rican Adolescents

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Abstract

Although a relation between disaster exposure and ataques de nervios (*ataques*) has been established in adult samples, little is known about this among youth, including factors that may moderate this relation. This study examined the role of the peer context in the relation between exposure to Hurricane Georges and experiencing a past year and lifetime *ataques* among a representative community sample of 905 youth (N = 476 boys and 429 girls; ages 11–18) residing in Puerto Rico. Data were gathered from 1999–2000 in Puerto Rico, 12–27 months following Hurricane Georges. Logistic regression analyses found that peer violence significantly predicted experiencing an *ataque* in the past year. Hurricane exposure and peer violence were both significant predictors of a lifetime experience of an *ataque*. An interaction was found between hurricane exposure and peer violence, indicating that hurricane exposure was significantly related to a lifetime experience of an *ataque* among adolescents who do not report associating with violent peers. For participants reporting high levels of peer violence, hurricane exposure did not add additional risk for a lifetime experience of an *ataque*. Understanding the influence of peers in the relation between hurricane exposure and experiencing an *ataque* may assist in planning developmentally and culturally sensitive response plans.

Keywords

Hurricane Exposure; Ataques de Nervios; Peer Deviance; Social Support

Ataques de nervios, or, “attack of the nerves” (hereafter referred to as *ataques*) are a cultural idiom of distress most commonly reported among Latinos in the Caribbean (American Psychiatric Association, 2013). *Ataques* represent a reaction to acute, severe distress, and are often preceded by actual or threatened loss, such as the death or injury of a loved one (Febo San Miguel et al., 2006; Guarnaccia, Canino, Rubio-Stipec, & Bravo, 1993). Natural disasters, such as hurricanes, with their acute, intense disruption to daily life; threat, or actual loss, of life and property; potential for missing loved ones; and increased familial stress during the aftermath, may be precursors of *ataques* among Latino survivors. Indeed,

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among a representative sample of adults following a mudslide disaster in Puerto Rico, 13.8% reported an *ataque*, making it one of the most common syndromes found post-disaster in this group (Guarnaccia et al., 1993). Little is known about the relation between disaster exposure and *ataques* among youth, including factors that may moderate this relation. However, previous research suggests that aspects of the peer context may influence the development of mental health symptoms in youth following exposure to natural disasters (e.g., Rubens, Vernberg, Felix, & Canino, 2013; Vernberg et al., 1996). Examining whether aspects of the peer context play a role in the relation between hurricane exposure (HE) and *ataques* is an important step in understanding how Latino youth may respond to exposure to natural disasters and to inform post-disaster intervention efforts. This study examines the role of the peer context, including social support from friends and peer deviance, in the relation between exposure to Hurricane Georges and *ataques* among a sample of Puerto Rican youth.

Description of Ataques de Nervios

Ataques include numerous internalizing and externalizing symptoms (Febo San Miguel et al., 2006; Guarnaccia et al., 1993, 2005). Guarnaccia and colleagues (1996) noted four categories of symptoms related to *ataques*: emotional expressions (e.g., crying, feeling anxious and/or depressed); physical sensations (e.g., heart palpitations, stomachaches); changes in feelings of consciousness (e.g., dizziness); and actions (e.g., suicidal ideation/attempts, self-injurious behavior). The *ataques* often occur in the presence of others, and brings social support from the afflicted person's social network (Guarnaccia et al., 1993). After the episode, the person may report feeling relieved (Lewis-Fernández et al., 2002).

Ataques are commonly comorbid with a range of psychiatric disorders, particularly internalizing disorders (Guarnaccia et al. 1993). Among a community and clinical sample of youth, an experience of *ataques* was associated with comorbid anxiety, depressive, and disruptive behavior disorders (Guarnaccia et al., 2005). Further, youth with *ataques* were more likely to have a family history of *ataques*, and more girls than boys had an experience of *ataques* (Guarnaccia et al., 2005). Note that the current study uses a subset of the community sample reported on by Guarnaccia and colleagues (2005). In addition, in a study of Puerto Rican youth living in Puerto Rico compared to those living in the US, *ataques* was associated with global impairment in functioning and a range of psychiatric disorders (Lopez et al., 2009), including somatic complaints (Lopez, Ramirez, Guarnaccia, Canino, & Bird, 2011). For the US sample (South Bronx, New York), *ataques* were correlated with greater exposure to violence and stressful life events (Lopez et al., 2009). However, this study did not find a gender difference in prevalence of *ataques*. Although these studies begin to help understand factors that may contribute to *ataques* among youth, there remains a paucity of literature in this area. Furthermore, despite its association with internalizing symptoms, *ataques* represents a separate construct that warrants further exploration in order to better serve Latino survivors of disaster (Guarnaccia et al. 1993).

The Role of Peer Relationships

Little research has examined factors that influence the relation between exposure to disasters and *ataques* among youth, such as peer relationships. According to the developmental contextual model (Lerner, 1991; Lerner & Castellino, 2002), aspects of the peer context may interact with an individual's experiences to influence psychological well-being. Social support, a type of coping that can be used in response to stress (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001), is one aspect of the peer context that has been considered in post-disaster research. Social support from friends may protect youth from developing internalizing symptoms following disaster exposure (La Greca, Silverman, Vernberg, & Prinstein, 1996; Moore & Varela, 2010; Pina et al., 2008; Vernberg et al., 1996). Given the social support associated with *ataques* (Guarnaccia et al. 1993), it may be an important area to consider in youth exposed to disasters.

Among adolescents in particular, friends who provide social support and care during stressful experiences (Thoits, 1995) may be an important resource following disaster exposure. Friends may help normalize adolescents' emotional reactions and interpretations of disaster exposure and post-disaster disruptions by discussing their experiences; spending time with those familiar to the adolescent may also provide a sense that normal activity is resuming (Vernberg & Vogel, 1993). However, post-disaster experiences, such as family relocation, school destruction, or time away from friends to support family recovery, disrupt access to socially supportive peers (Kilmer, Gil-Rivas, & MacDonald, 2010). The risk of experiencing *ataques* following a disaster may thus increase for adolescents who have limited access to social support from friends.

Other aspects of the peer context, such as associations with deviant peers, may also play a role in the relation between disaster exposure and *ataques.* Deviant behaviors, such as substance use and violence, increase during adolescence and typically occur with peers (Moffitt, 1993). Associating with deviant peers is related to symptoms of internalizing and externalizing disorders (e.g., Tandon & Solomon, 2008; Fite et al., 2010). Further, research suggests that disaster exposure is related to increases in deviant behaviors among youth, such as substance use and aggression, even when considering pre-hurricane behavior (Khoury et al., 1997; Rohrbach, Grana, Vernberg, Sussman, & Sun, 2009; Rowe, La Greca, & Alexandersson, 2010). Some evidence shows that associating with deviant peers may contribute to the development of internalizing symptoms overall; however, the role of deviant peers in reaction to HE appears less straightforward (Rubens et al., 2013). This study attempts to expand the understanding of the development of *ataques* among youth exposed to a natural disaster by examining the role of peer deviance, including peer substance use and peer violence, in the relation between exposure to Hurricane Georges and an *ataque*.

Present Study

Hurricane Georges struck Puerto Rico as a category 3 hurricane in 1998, killing nine people and causing major disruptions to water and electricity access (Centers for Disease Control and Prevention, 1998; National Climatic Data Center, 1999). The hurricane occurred just prior to the start of an island-wide epidemiological study of youth psychopathology.

Previous research with this sample found that 9% of youth ages 4–17 years reported *ataques* (Guarnaccia et al., 2005). The present study examined a subset of this sample, adolescents ages 11–17 years. First, we examined the overlap between *ataques* and meeting DSM-IV symptom criteria for an internalizing disorder to further understand post-disaster responses among Latino youth. We also sought to determine whether social support from friends and peer deviance (i.e., peer substance use and peer violence) are related to reports of experiencing an *ataque*, while taking into consideration levels of HE. We expected to see additive risk for lower levels of social support from friends and higher levels of peer deviance over and above the risk presented by HE. We also evaluated whether the relationship between HE and *ataques* was moderated by social support from friends or peer deviance.

Methods

Participants

Participants include 905 adolescents, ages 11–17 years, and their primary caretakers. These youth were part of an epidemiological study of a representative community sample in Puerto Rico designed to provide data on prevalence rates of DSM-IV diagnoses among children and adolescents (Canino et al., 2004). A detailed description of recruitment and enrollment for the entire sample can be found elsewhere (Canino et al., 2004). Briefly, the original sample was selected using block groups based on US Census Bureau's 1990 Census of Puerto Rico; a random sampling of clusters of families with at least one child between the ages of 4–17 were included. Clusters were created based on economic level and size, and then urban versus rural settings. Within each household, one child was randomly selected to participate. Youth who were homeless or transient, those who would normally reside in the household but who had been living away from home for more than 6 months, and those living in institutions without families in the community were excluded from the study. From the 2,102 eligible families, a total of 1,886 caretaker-child dyads completed the interview.

Since youth under the age of 11 years were not asked questions about peer deviance, this study only included the 911 youth ages 11–17 years and their caretakers from the original sample. A total of 905 participants were included in the analysis; six adolescents were dropped from the analysis because they endorsed "don't know" on most items of the deviant peer behaviors questionnaire. The final sample of participants in the current analyses included 476 boys and 429 girls with a mean age of 14.17 (SD = 1.97; range = 11–18).

Procedures

Interviews were conducted between September 1999 and December 2000 (approximately 12–27 months following the hurricane) with the participating adolescents and their primary caretaker. The primary caretaker (89.4% mother) was determined based on who had regular and close contact with the youth for the longest time frame in the past six months and who was at least 18 years old. Caretakers provided written consent and adolescents provided written assent. Interviews were completed in participants' homes or the home of a relative for those whose residences were destroyed by the hurricane. The original study was approved by the Institutional Review Board of the University of Puerto Rico. Different

interviewers conducted the parent and adolescent interviews, and the interviewers did not see the results of the corresponding interview for each dyad. Interviews were audio taped and quality control was conducted on 15% of the tapes of the entire sample.

Measures

A multi-stage method was used for cross-cultural adaptation and translation of study measures (Bullinger et al., 1998). The result was a translated version of the instrument that tackles the major dimensions of cross-cultural equivalence: content, semantic, technical, criterion and concept equivalence (Canino & Bravo, 1994; Bravo, Canino, Rubio-Stipec, & Woodbury, 1991; Matías-Carrelo et al., 2003).

Hurricane exposure—Hurricane exposure was reported by both adolescents and their caretaker. The questionnaire was developed using items from other studies of disaster exposure, namely a questionnaire from a study in Puerto Rico following exposure to a mudslide disaster (Bravo, Rubio-Stipec, Canino, Woodbury, & Ribera, 1990), a hurricane exposure questionnaire used in North Carolina (Norris & Kaniasty, 1992), and a hurricane exposure questionnaire developed by Vernberg et al. (1996). Caretakers answered 15 yes/no items assessing the extent of the damage to their home and belongings and youth answered 5 yes/no items that overlapped with the caretakers' questions.

Items assessed participants' exposure both during and following the hurricane. Parents and youth were both asked about items assessing threat to life (e.g., physical injury to adolescent or someone close to the adolescent; death of someone close to the adolescent) and loss of belongings (e.g., loss of clothing, books, toys). Parents were also asked about disruption to the adolescent's daily activity (e.g., separation from family during the hurricane; spending nights outside the house due to the hurricane), loss or damage to the home (e.g., did trees fall on your house; did you lose your house), and their own experience during the hurricane (e.g., fear of dying or getting injured; getting sick during hurricane). A continuous measure of exposure was created by summing the experiences reported by either the caretaker, the adolescent, or both.

Ataques de Nervios—Since the interviews occurred between 12–27 months post-disaster, a past year time frame only may have missed cases of *ataques.* Therefore, participants were asked about lifetime and past year experiences of *ataques*. First, caregivers and adolescents were asked a single yes/no question about whether or not the participant ever had an *ataque*. This question has been used in studies of prevalence of *ataques* with Puerto Rican adults (Guarnaccia et al. 1993; Liebowitz et al., 1994). Participants were considered to have experienced *ataques* in their lifetime if either they or their caregiver endorsed that the adolescent had experienced an *ataque*. Participants and caregivers who endorsed that the adolescent had experienced an *ataque* ever in their lifetime were then asked if the adolescent had experienced an *ataque* in the past year. Participants were considered to have experienced an *ataque* in the past year if either they or their caregiver endorsed the item.

Social support from friends—Social support from friends was measured using a questionnaire based on the work of Thoits (1995) and which was used in a previous study of Puerto Rican youth (Bird, Canino, et al., 2006; Bird, Davies, et al., 2006). In this analysis, three items were summed together, with higher scores indicated more social support. Two questions (i.e., Can you share your happiness and your pain with friends? Can you talk to your friends about your problems?) were measured using a four-point likert scale from 0 (never) to 3 (always). One question (How many friends can you count on to talk about your problems?) was originally asked as an open-ended question where participants could write in a number, but was coded using a four-point scale (0, 1, 2, 3 or more friends) for this analysis so that it was on a metric similar to the other two questions. The resulting friend social support subscale had adequate internal consistency ($\alpha = .68$). Previous research using these items with Puerto Rican youth residing in San Juan, Puerto Rico, and in New York City demonstrated adequate internal consistency (Bird, Canino, et al., 2006).

Peer deviance—Past-year peer deviance was assessed using eight yes/no items (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998). Two subscales were created for the current study: peer substance use and peer violence. Peer substance use was measured with four items rated as “yes” or “no” about friends selling drugs and using alcohol and other drugs. Peer violence was measured with four items rated as “yes” or “no” about friends getting into physical fights, using a weapon, stealing things/robbing someone, and belonging to a gang. Items within each subscale were summed, with higher scores indicating higher levels of peer violence and substance use. Internal consistency within this sample was adequate ($\alpha = .63$ for peer substance use and $\alpha = .77$ for peer violence). Previous research using these items with Puerto Rican youth residing in San Juan, Puerto Rico, and in New York City demonstrated good internal consistency (Bird, Canino, et al., 2006).

Diagnostic Interview Schedule for Children (DISC-IV)—Past-year symptoms of DSM-IV internalizing disorders, including Social Phobia, Separation Anxiety, Panic Disorder, Generalized Anxiety Disorder, PTSD, Major Depressive Disorder, and Dysthymia, were assessed through caretaker and youth interviews using the most recent version of the DISC-IV translated into Spanish (Bravo et al., 2001; Bravo, Woodbury-Farina, Canino, & Rubio-Stipec, 1993). Translation and back translation procedures for the Spanish version of the DISC-IV are reported by Bravo et al. (2001, 1993). Test-retest reliability for the DISC-IV has been reported in both Spanish and English-speaking clinic samples. Reports of parents and youth in community samples have shown a test-retest reliability ranging between .22–.85 for symptom counts across disorders in English-speaking samples and .29–.88 for different diagnoses in Spanish-speaking samples (Bravo et al. 2001, Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). In this analysis, internalizing disorders were coded as present when symptom endorsement met DSM-IV criteria for any internalizing disorder based on either adolescent or caretaker report, regardless of level of impairment reported. A dichotomous variable indicating the presence of symptoms of any one or more of the measured internalizing disorders was used in the analysis.

Results

Descriptive Statistics

Table 1 provides descriptive statistics of study variables. Fifty-one (6%) participants reported having a past-year *ataque* and 98 (11%) endorsed having a lifetime experience of *ataques*, based on caretaker or adolescent report. Among the 51 participants with a past-year *ataque*, only five participants showed agreement between the parent and the adolescent. Of the remaining 46 participants, parents and adolescents each reported that 23 adolescents had experienced an *ataque* that was not endorsed by the other reporter. Among the 98 participants who had a lifetime experience of *ataques*, twelve of those participants showed agreement between the parent and adolescent; 44 experienced an *ataque* per parent report only; and 41 adolescents experienced an *ataque* by their report only. Of the 51 participants who endorsed a past-year *ataque*, 23 (45%) met DSM-IV symptom criteria for an internalizing disorder in the past year. Of participants who endorsed a lifetime occurrence of an *ataque*, 37 (38%) also met DSM-IV symptom criteria for an internalizing disorder in the past year.

Sixty-two percent of youth (or their caretaker) endorsed at least one HE item. Forty-three percent of the adolescents responded “yes” to at least one item about peer substance use and 37% responded “yes” to at least one item about peer violence. Reports of social support from friends resulted in a mean of 5.13 (SD = 2.46).

Bivariate Correlations

Bivariate correlations were calculated to examine the relations between study variables (Table 1). Youth with higher levels of HE reported less peer social support ($r = -.10$) and at least one lifetime experience of *ataques* ($r = .07$). Participants who reported higher levels of peer violence reported higher levels of peer substance use ($r = .48$), at least one past-year *ataque* ($r = .12$), and at least one lifetime experience of *ataques* ($r = .12$). Those with higher levels of peer substance use reported at least one past-year experience of *ataques* ($r = .12$), at least one lifetime experience of *ataques* ($r = .11$), and higher peer social support ($r = .10$). Older participants were more likely to report higher peer social support ($r = .08$), higher peer violence ($r = .15$), higher substance use ($r = .43$), at least one past-year *ataque* ($r = .07$), and at least one lifetime experience of *ataques* ($r = .10$). Girls were more likely to report peer social support ($r = -.18$), at least one past-year experience of *ataques* ($r = -.11$), and at least one lifetime experience of *ataques* ($r = .14$).

Relationship between Hurricane Exposure, Peer Context, and Past-Year Experience of an *Ataque*

A hierarchical logistic regression was run to predict the presence of a past-year *ataque* from the three peer context variables and HE, while controlling for age and gender (0 = girls, 1 = boys). HE, age, and the three peer variables were mean centered for this regression to aid in the interpretation of the interactions. Based on tests for multicolinearity, none of these variables were highly correlated and thus could be included within the same regression model.

Results indicated that both age, Odds Ratio (OR) = 1.19, 95% CI [1.02, 1.38], and gender, OR = 2.90, 95% CI [1.56, 5.38], were significant predictors of endorsing an *ataque* in the past year (Table 2). Next, when examining the additive effects of HE, social support from friends, and peer deviance in endorsing an *ataque*, peer violence, OR = 1.40, 95% CI [1.04, 1.89], was the only significant predictor of a past-year *ataque*. The interaction effects of HE by each of the peer variables were then examined; no significant interactions were found.

Relationship between Hurricane Exposure, Peer Context, and Lifetime Experience of an *Ataque*

A second hierarchical logistic regression was run to predict the lifetime presence of an *ataque* using the same variables and steps from the previous regression that predicted a past-year *ataque* (Table 3). Age, OR = 1.20, 95% CI [1.07, 1.34], and gender, OR = 2.61, 95% CI [1.67, 4.05], were significant predictors of endorsing a lifetime experience of *ataque*. When HE and the peer variables were added, HE, OR = 1.08, 95% CI [1.01, 1.15], and peer violence, OR = 1.33, 95% CI [1.04, 1.68], significantly predicted a lifetime experience of an *ataque*, while peer social support and peer substance use were not significant predictors of a lifetime experience of an *ataque*. Finally, when examining the interactions between HE and the peer context, a significant interaction was found for HE and peer violence, OR = .92, 95% CI [.84, .99]. No other interactions were significant. To aid in interpretation, the significant interaction was probed using high and low levels (+1 SD and −1 SD from the mean-centered values) of peer violence (Aiken & West, 1991). Findings indicated that for those who endorsed a high level of peer violence, HE was not related to experiencing an *ataque* during their lifetime (B = .001, p = .99). For those who reported low levels of peer violence, HE was significantly related to experiencing an *ataque* during their lifetime (B = .15, p = .002). These findings suggest that HE plays a role in the prediction of lifetime experience of an *ataque* for those who do not report associating with violent peers. In contrast, adolescents who do report associating with violent peers are more likely to experience an *ataque* during their lifetime regardless of HE.

Discussion

This study examined the relation of HE, social support from friends, and peer deviance on reports of an *ataque* among adolescents exposed to Hurricane Georges. To our knowledge, this is one of the first studies to examine the peer context in relation to exposure to a natural disaster and *ataques* among youth. The finding of the relation between HE and *ataques* builds on previous literature indicating a relation between natural disasters and *ataques* among adults (Guarnaccia et al., 1993) by demonstrating this association among a representative adolescent community sample. Age and gender were also significant predictors of *ataques*, which is consistent with the adult literature on *ataques* (Guarnaccia et al., 1993, 2010).

Hurricane Exposure and Ataques de Nervios among Adolescents

Findings demonstrate that, although there was some overlap between *ataques* and meeting DSM-IV symptom criteria for an internalizing disorder in the past year, many participants endorsed experiencing an *ataque* without meeting DSM-IV symptom criteria for an

internalizing disorder in the past year. Assessing Latino youth for both internalizing symptoms and *ataques* may be important following a disaster to better understand post-disaster responses. Interestingly, adolescents and parents in this study did not share much agreement in their reports of the adolescents experiencing an *ataque.* It would be important clinically to obtain both adolescent and parent reports of mental health symptoms following disaster exposure in order to identify youth who may benefit from intervention following a disaster. Further, although the current sample only examined Puerto Rican youth living on the island of Puerto Rico, previous research indicates that mental health outcomes may be similar in both island-bound and mainland Puerto Rican youth (Duarte et al., 2008). This provides some support to the generalizability of the findings of the current study to mainland populations. *Ataques* has also been documented in other Latino groups (e.g., Liebowitz et al., 1994). Given the heterogeneity of Latino populations both within and outside the United States, future research should consider studying *ataques* across diverse samples of Latino youth.

The Role of Peer Contextual Factors

Participants who endorsed associating with violent peers were more likely to endorse experiencing an *ataque*. This builds on previous disaster research, which suggests that youth who exhibit deviant behaviors or those who associate with deviant peers are more likely to report symptoms of internalizing disorders (Rowe et al., 2010; Rubens et al., 2013). An interaction was also found in the current study suggesting that, among youth whose peers were lower in violent behavior, HE was significantly related to experiencing an *ataque* during their lifetime. For those participants whose peers were highly involved in violent behavior, HE did not increase the risk for youth reporting a lifetime experience of *ataque.* Previous research suggests that *ataques* are related to exposure to stressful life events and violence among youth (Lopez et al., 2009). Participants who reported associating with violent peers may have been at risk of experiencing an *ataque* regardless of HE, as associating with deviant peers may increase the risk of violence exposure among youth (Halliday-Boykins & Graham, 2001). In another post-disaster study, Salloum and colleagues (2011) found that, among those exposed to high rates of community violence and high exposure to Hurricane Katrina, exposure to Hurricane Gustav was not significantly related to the development of posttraumatic stress symptoms. The authors of that study posit that the high level of cumulative stress these youth already experienced may lead to high symptom levels regardless of subsequent trauma. Similarly, in the present study, it may be that HE did not add significantly more stress than that experienced by associating with violent peers, thus providing no increased risk of experiencing an *ataque* following HE.

Our results suggest that associating with peers who engage in substance use was not associated with experiencing an *ataque.* Research on adults suggested that an *ataque* was comorbid with a substance use disorder (Guarnaccia et al., 2010), therefore, we expected a relation with associating with friends who use substances. However, previous research with this sample revealed that peer substance use did not interact with HE in predicting internalizing symptoms (Rubens et al., 2013). More research on the role of peer substance use in experiencing an *ataque* is warranted in order to better understand the peer context of experiencing an *ataque.*

Surprisingly, social support from friends was not related to having an *ataque*, nor was the interaction between HE and social support from peers significant. Previous research on post-hurricane responses suggests that social support can mitigate the influence of a hurricane on mental health outcomes (e.g., Vernberg et al., 1996). As this is one of the first studies examining peer social support post-disaster in relation to experiencing *ataques*, more research is needed to replicate this finding before conclusions can be drawn. Given the importance of the peer context among adolescents (Lerner & Castellino, 2002), research should continue to examine the role of peer social support in the development of *ataques* following exposure to natural disasters in order to develop age-appropriate interventions for adolescents exposed to these disasters.

Strengths, Limitations, and Future Directions

This study filled a gap in the adolescent disaster mental health literature by empirically examining a culture-bound syndrome common among Latinos and the role of the peer context in moderating the relation between HE and *ataques*. The research design and sampling strategy represent an improvement upon much prior disaster research, which often relies on convenience samples. The measures of peer deviance and social support were validated measures that have been used previously with similar populations; however, they were limited in length. This may influence the depth of understanding that can be gained from these variables. Therefore, future research should explore these constructs in greater depth in order to better understand the role of peers in post-disaster experiences among youth. In addition, pre-hurricane involvement with deviant peers was not examined in the current study. Establishing pre-disaster functioning can be a challenge given the unpredictable nature of disasters. Previous research with pre-disaster information on adolescents' involvement with deviant peers has shown that deviant behavior can increase from previous levels after disaster exposure (Khoury et al., 1997; Rohrbach et al., 2009). Future research should continue to examine the role of peer deviance on mental health development among disaster-exposed youth. For instance, post-disaster research across the first and second year of recovery is needed to further understand how the role of peer relationships may change. Examining specific hurricane-related changes in an adolescent's life may also help explain some of their associations with different peer groups. Finally, although the prevalence of *ataques* was higher among hurricane-exposed adolescents in this representative sample, we do not have information on how many of the *ataques* experiences were directly due to the hurricane or stressors related to hurricane recovery. Future disaster research among Latinos would benefit from obtaining more specific information about the timing and cause of post-disaster *ataques*.

Despite these limitations, this study supported the relation between disaster exposure and *ataques* among Latinos and extended it to adolescents. In addition, this is one of the first known studies to examine the peer context in the relation between exposure to a natural disaster and experiencing an *ataques* among youth. HE increased the risk for *ataques* when adolescents had little or no association with violent peers, but did not have a relation when adolescents associated with peers engaging in high levels of violence. Those youth were already at higher risk for experiencing *ataques* at some point in their life. Overall, this suggests that after a disaster, mental health professionals should assess for culturally

influenced expressions of distress as well as peer contextual factors in order to improve the developmentally and culturally sensitive nature of post-disaster interventions.

References

Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Thousand Oaks, CA: Sage Publications, Inc; 1991.

American Psychiatric Association. Diagnostic and Statistical Manual. 5. Washington, DC: American Psychiatric Association; 2013.

Bird HR, Canino GJ, Davies M, Duarte CS, Febo V, Ramírez R, Loeber R. A study of disruptive behavior disorders in Puerto Rican youth: I. Background, design, and survey methods. Journal of the American Academy of Child & Adolescent Psychiatry. 2006; 45:1032–1041. [PubMed: 16926610]

Bird HR, Davies M, Duarte CS, Shen S, Loeber R, Canino GJ. A study of disruptive behavior disorders in Puerto Rican youth: II. Baseline prevalence, comorbidity, and correlates in two sites. Journal of the American Academy of Child & Adolescent Psychiatry. 2006; 45:1042–1053. [PubMed: 16926611]

Bravo M, Canino G, Rubio-Stipec M, Woodbury M. A cross-cultural adaptation of a diagnostic instrument: The DIS adaptation in Puerto Rico. Culture, Medicine, and Psychiatry. 1991; 15:1–18.10.1007/BF00050825

Bravo M, Ribera J, Rubio-Stipec M, Canino G, Shrout P, Ramírez R, Fábregas L, et al. Test-retest reliability of the Spanish version of the Diagnostic Interview Schedule for Children (DISC-IV). Journal of Abnormal Child Psychology. 2001; 29(5):433–444. [PubMed: 11695544]

Bravo M, Rubio-Stipec M, Canino GJ, Woodbury MA, Ribera JC. The psychological sequelae of disaster stress prospectively and retrospectively evaluated. American Journal of Community Psychology. 1990; 18:661–680. [PubMed: 2075896]

Bravo M, Woodbury-Farina M, Canino GJ, Rubio-Stipec M. The Spanish translation and cultural adaptation of the Diagnostic Interview Schedule for Children (DISC) in Puerto Rico. Culture, Medicine and Psychiatry. 1993; 17(3):329–344.

Bullinger M, Alonso J, Apolone G, Leplege A, Sullivan M, Wood-Dauphinee S, Ware JE. Translating health status questionnaires and evaluating their quality: The IQOLA project approach. Journal of Clinical Epidemiology. 1998; 51:913–923.10.1016/S0895-4356(98)00082-1 [PubMed: 9817108]

Canino G, Bravo M. The adaptation and testing of diagnostic and outcome measures for cross-cultural research. International Review of Psychiatry. 1994; 6:281–286.10.3109/09540269409023267

Canino G, Shrout PE, Rubio-Stipec M, Bird HR, Bravo M, Ramirez R, Martinez-Taboas A. The DSM-IV rates of child and adolescent disorders in Puerto Rico: prevalence, correlates, service use, and the effects of impairment. Archives of General Psychiatry. 2004; 61:85. [PubMed: 14706947]

Centers for Disease Control and Prevention. Deaths associated with Hurricane Georges - Puerto Rico, September 1998. 1998 Oct 30. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/00055476.htm

Compas BE, Connor-Smith JK, Saltzman H, Thomsen AH, Wadsworth ME. Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. Psychological Bulletin. 2001; 127:87–127. [PubMed: 11271757]

Duarte CS, Bird HR, Shrout PE, Wu P, Lewis-Fernandez R, Shen S, Canino G. Culture and psychiatric symptoms in Puerto Rican children: Longitudinal results from one ethnic group in two contexts. Journal of Child Psychology & Psychiatry. 2008; 49:563–572. [PubMed: 18400061]

Febo San Miguel VE, Guarnaccia PJ, Shrout PE, Lewis-Fernandez R, Canino G, Ramirez RR. A quantitative analysis of *Ataques de Nervios* in Puerto Rico: Further examination of a cultural syndrome. Hispanic Journal of Behavioral Sciences. 2006; 28:313–330.

Fite PJ, Vitulano M, Wynn P, Wimsatt A, Gaertner A, Rathert J. Influence of perceived neighborhood safety on proactive and reactive aggression. Journal of Community Psychology. 2010; 38:757–768.

Guarnaccia PJ, Canino G, Rubio-Stipec M, Bravo M. The prevalence of *Ataques de Nervios* in the Puerto Rico disaster study: The role of culture in psychiatric epidemiology. The Journal of Nervous and Mental Disease. 1993; 181:157–165. [PubMed: 8445374]

Guarnaccia PJ, Lewis-Fernandez R, Pincay IM, Shrout P, Guo J, Torres M, Canino G, Alegria M. *Ataques de Nervios* as a marker of social and psychiatric vulnerability: Results from the NLAAS. International Journal of Social Psychiatry. 2010; 56:298–309. [PubMed: 19592438]

Guarnaccia PJ, Martinez I, Ramirez R, Canino G. Are *Ataques de Nervios* in Puerto Rican children associated with psychiatric disorder? Journal of the American Academy of Child and Adolescent Psychiatry. 2005; 44:1184–1192. [PubMed: 16239868]

Halliday-Boykins CA, Graham S. At both ends of the gun: Testing the relationship between community violence exposure and youth violent behavior. Journal of Abnormal Child Psychology. 2001; 29:383–402. [PubMed: 11695541]

Khoury EL, Warheit GJ, Hargrove MC, Zimmerman RS, Vega WA, Gil AG. The impact of Hurricane Andrew on deviant behavior among a multi-racial/ethnic sample of adolescents in Dade County, Florida: A longitudinal analysis. Journal of Traumatic Stress. 1997; 10:71–91. [PubMed: 9018678]

Kilmer, RP.; Gil-Rivas, V.; MacDonald, J. Implications of major disaster for educators, administrators, and school-based mental health professionals: Needs, actions, and the example of Mayfair Elementary. In: Kilmer, RP.; Gil-Rivas, V.; Tedeschi, RG.; Calhoun, LG., editors. Helping Families and Communities Recover from Disaster: Lessons Learned from Hurricane Katrina and its Aftermath. Washington, DC: American Psychological Association; 2010. p. 167-191.

La Greca AM, Silverman WK, Vernberg EM, Prinstein MJ. Symptoms of posttraumatic stress in children after Hurricane Andrew: A prospective study. Journal of Consulting and Clinical Psychology. 1996; 64:712–723. [PubMed: 8803361]

La Greca AM. Understanding the psychological impact of terrorism on youth: Moving beyond Posttraumatic Stress Disorder. Clinical Psychology: Science and Practice. 2007; 14:219–223.

Lerner RM. Changing organism-context relations as the basic process of Development: A developmental contextual perspective. Developmental Psychology. 1991; 27:27–32.

Lerner RM, Castellino DR. Contemporary developmental theory and Adolescence: Developmental systems and applied developmental science. Journal of Adolescent Health. 2002; 31:122–135. [PubMed: 12470909]

Lewis-Fernandez R, Guarnaccia P, Martinez IE, Salman E, Schmidt A, Liebowitz M. Compartive phenomenology of *Ataques de Nervios*, panic attacks, and panic disorder. Culture, Medicine, Psychiatry. 2002; 26:199–223.

Liebowitz MR, Salman E, Jusino CM, Garfinkel R, Street L, Cardenas DL, et al. *Ataques de Nervios* and panic disorder. American Journal of Psychiatry. 1994; 151:871–875. [PubMed: 8184996]

Loeber, R.; Farrington, DP.; Stouthamer-Loeber, M.; Van Kammen, WB. Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence. Hillsdale, NJ: Lawrence Erlbaum Associates; 1998.

Lopez I, Ramirez R, Guarnaccia P, Canino G, Bird H. *Ataques de Nervios* and somatic complaints among Island and mainland Puerto Rican children. CNS Neuroscience & Therapeutics. 2011; 17:158–166. [PubMed: 20370802]

Lopez I, Rivera F, Ramirez R, Guarnaccia PJ, Canino G, Bird H. *Ataques de Nervios* and their psychiatric correlates in Puerto Rican children from two different contexts. Journal of Nervous and Mental Disease. 2009; 197:923–929. [PubMed: 20010029]

Matías-Carrelo LE, Chávez LM, Negrón G, Canino G, Aguilar-Gaxiola S, Hoppe S. The Spanish translation and cultural adaptation of five mental health outcome measures. Culture, Medicine and Psychiatry. 2003; 27:291–313.10.1023/A:1025399115023

Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. Psychological Review. 1993; 100:674–701. [PubMed: 8255953]

Moore KW, Varela RE. Correlates of long-term Posttraumatic stress symptoms in children following Hurricane Katrina. Child Psychiatry and Human Development. 2010; 41:239–250. [PubMed: 19949973]

National Climatic Data Center. Georges pummels Caribbean, Florida Keys, and US Gulf Coast. 1999 Apr 12. Retrieved from http://lwf.ncdc.noaa.gov/oa/reports/georges/georges.html

Norris FH, Kaniasty K. Reliability of delayed self-reports in disaster research. Journal of Traumatic Stress. 1992; 5:575–588.

Pina AA, Villalta IK, Ortiz CD, Gottschall AC, Costa NM, Weems CF. Social support, discrimination, and coping as predictors of posttraumatic stress reactions in youth survivors of Hurricane Katrina. Journal of Clinical Child & Adolescent Psychology. 2008; 37:564–574. [PubMed: 18645747]

Rohrbach LA, Grana R, Vernberg E, Sussman S, Sun P. Impact of Hurricane Rita on adolescent substance use. Psychiatry: Interpersonal and Biological Processes. 2009; 72:222–237.

Rowe CL, La Greca AM, Alexandersson A. Family and individual factors associated with substance involvement and PTS symptoms among adolescents in Greater New Orleans after Hurricane Katrina. Journal of Consulting and Clinical Psychology. 2010; 78:806–817.10.1037/a0020808 [PubMed: 20919759]

Rubens SL, Vernberg EM, Felix ED, Canino G. Peer Deviance, Social Support, and Symptoms of Internalizing Disorders among Youth Exposed to Hurricane Georges. Psychiatry: Interpersonal and Biological Processes. 2013; 76:169–181.

Salloum A, Carter P, Burch B, Garfinkel A, Overstreet S. Impact of exposure to community violence, Hurricane Katrina, and Hurricane Gustav on posttraumatic stress and depressive symptoms among school age children. Anxiety, Stress, and Coping. 2011; 24:27–42.

Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME. NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. Journal of the American Academy of Child and Adolescent Psychiatry. 2000; 39:28–38. [PubMed: 10638065]

Tandon DS, Solomon BS. Risk and protective factors for depressive symptoms in urban African American adolescents. Youth Society. 2008; 41:80–99.

Thoits PA. Stress, coping, and social support processes: Where are we? What Next? Journal of Health and Social Behavior. 1995; 35:53–79. [PubMed: 7560850]

Vernberg EM, Vogel JM. Part 2: Interventions with children after disasters. Journal of Clinical Child Psychology. 1993; 22:485–498.

Vernberg EM, La Greca AM, Silverman WK, Prinstein MJ. Prediction of posttraumatic stress symptoms in children after Hurricane Andrew. Journal of Abnormal Psychology. 1996; 105:237–248. [PubMed: 8723005]

Table 1

Descriptive Statistics and Correlations of Study Variables

	1	2	3	4	5	6	7	8
1. Gender	—	.04	.02	−.18**	.06	.03	−.11**	−.14**
2. Age		—	−.05	.08*	.15**	.43**	.07*	.10**
3. Hurricane Exposure			—	−.10**	.01	−.05	.01	.07*
4. Peer Social Support				—	.002	.10**	−.01	.01
5. Peer Violence					—	.48**	.12**	.12**
6. Peer Substance Use						—	.12**	.11**
7. Past year *ataques*							—	.70**
8. Lifetime *ataques*								—
Mean	-	14.17	2.44	5.13	.54	.78	-	-
Std. Deviation	-	1.97	3.04	2.46	.89	1.15	-	-

Note.

*p <.05,

**p <.01

Table 2

Relationship between Hurricane Exposure, Peer Variables, and Past-Year Ataques de Nervios

Predictors	B	SE	Wald	OR	95% CI
Step 1					
Age	.17	.08	5.08	1.19*	1.02–1.38
Gender	1.06	.32	11.33	2.90**	1.56–5.38
Step 2					
Hurricane Exposure	.01	.05	.08	1.01	.92–1.12
Social Support from Friends	−.08	.06	1.49	.93	.82–1.05
Peer Violence	.34	.15	4.90	1.40*	1.04–1.89
Peer Substance Use	.19	.14	1.90	1.21	.92–1.59
Step 3					
Hurricane Exposure x Social Support from Friends	−.01	.02	.30	.99	.95–1.03
Hurricane Exposure x Peer Violence	−.08	.06	2.12	.92	.83–1.03
Hurricane Exposure x Peer Substance Use	.01	.05	.10	1.01	.93–1.11

Note. OR = odds ratio; CI = confidence interval.

* $p < .05$,

** $p \leq .001$.

Table 3

Relationship between Hurricane Exposure, Peer Variables, and Lifetime Ataques de Nervios

Predictors	B	SE	Wald	OR	95% CI
Step 1					
Age	.18	.06	9.90	1.20**	1.07 – 1.34
Gender	.96	.23	17.68	2.61***	1.67 – 4.09
Step 2					
Hurricane Exposure	.07	.03	4.54	1.08*	1.01–1.15
Social Support from Friends	−.03	.05	4.54	.97	.89–1.06
Peer Violence	.28	.12	5.34	1.33*	1.04–1.68
Peer Substance Use	.08	.11	.58	1.09	.88–1.35
Step 3					
Hurricane Exposure x Social Support from Friends	.01	.01	.38	1.01	.98–1.03
Hurricane Exposure x Peer Violence	−.09	.04	4.18	.92*	.84–.99
Hurricane Exposure x Peer Substance Use	−.002	.04	.003	.99	.93–1.07

Note. OR = odds ratio; CI = confidence interval.

* $p < .05$,

** $p < .01$,

*** $p < .001$.