



Published in final edited form as:

Psychiatry. 2013 ; 76(2): 169–181. doi:10.1521/psyc.2013.76.2.169.

Peer Deviance, Social Support, and Symptoms of Internalizing Disorders among Youth Exposed to Hurricane Georges

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Abstract

This study examined the influence of peers in meeting DSM-IV symptom criteria for an internalizing disorder in adolescents exposed to Hurricane Georges. Participants included a representative community sample of 905 youth ($N = 476$ boys) ages 11-17 residing in Puerto Rico. Data were gathered on hurricane exposure, symptoms of internalizing disorders, peer social support, peer violence, and peer substance use through in-person structured interviews with adolescents and caretakers from 1999-2000 in Puerto Rico, 12-27 months after Hurricane Georges. Hurricane exposure, peer violence, and peer substance use predicted whether adolescents met DSM-IV symptom criteria for a measured internalizing disorder. An interaction was found between hurricane exposure and peer violence, which indicated that hurricane exposure was significantly related to meeting DSM-IV symptom criteria for an internalizing disorder among adolescents who do not report associating with violent peers. However, for participants who reported high levels of peer violence, hurricane exposure did not convey additional risk for meeting DSM-IV symptom criteria for an internalizing disorder. With the increasing role peers play in adolescents' lives, understanding the influence of peers on the development of internalizing symptoms following hurricane exposure may assist in planning developmentally sensitive response plans.

In 1998, Hurricane Georges struck land across the Caribbean and southeast United States. Puerto Rico suffered over \$2 billion in damages from the hurricane (National Climatic Data Center, 1999). Over 30,000 homes were destroyed, nine people died from direct or indirect events related to the hurricane, and a large portion of major crops were destroyed (National Climatic Data Center, 1999). According to the Centers for Disease Control and Prevention

(1998), reports from Puerto Rico two days following the storm found that approximately 700,000 people did not have access to water and over 1 million people lost their electricity.

Natural disasters such as Hurricane Georges increase risk for developing internalizing disorders among children and adolescents living in affected areas (Felix et al., 2011). Multiple factors influence connections between disasters and mental health outcomes, and features of social subsystems (e.g., peers, family, community) are thought to be prominent among these (Bonnano, Brewin, Kaniasty, & La Greca, 2010). This study used data from an epidemiological study of children and adolescents conducted in Puerto Rico following Hurricane Georges to address questions about the possible roles of two features of peer subsystems (social support, peer deviance) within the context of disaster recovery. Prior research with this sample examined rates of mental disorders among the entire sample of child and adolescent participants (Canino et al., 2004). More recently, a longitudinal study examined internalizing and externalizing disorders in relation to hurricane exposure (Felix et al., 2011). Results indicated that exposed adolescents are at higher risk for meeting diagnostic criteria for an internalizing disorder than non-exposed adolescents; however, roles that peer social relationships might play in post-disaster internalizing disorders have not been previously examined.

Internalizing Symptoms Following Hurricane Exposure

For many children and adolescents, hurricane exposure can be, or seem to be, life-threatening, as it may include experiencing threats to one's own life and the lives of others, intense fear, loss of family members or friends, and destruction to property. Given the traumatic nature of these types of threat and loss experiences, and the resulting stress responses to these experiences (Vogel & Vernberg, 1993), it is not surprising that many studies have found a relationship between hurricane exposure and symptoms of post-traumatic stress disorder (PTSD) in children and adolescents (Blaze & Shwalb, 2009; Goenjian et al., 2001; La Greca, Silverman, Vernberg, & Prinstein, 1996; Vernberg, La Greca, Silverman, & Prinstein, 1996). Children and adolescents' responses following exposure to a disaster may also include intense fears, sadness, and anxiety about separating from parents (Vogel & Vernberg, 1993), which could represent symptoms of other types of internalizing disorders, such as separation anxiety disorder, panic disorder, or depressive disorders (Hoven et al., 2005; Liu et al., 2011; Thienkrua et al., 2006). These symptoms can reach the disorder-level for some youth for an extended period of time post-disaster (Felix et al., 2011). However, few studies have assessed the impact of disaster exposure on mental health outcomes aside from PTSD.

In addition, few prior studies on adolescents' post-disaster mental health have assessed whether symptoms actually meet criteria for clinical disorders (Bonanno et al., 2010). Assessing whether symptoms meet clinically-meaningful levels of DSM-IV symptom criteria for specific disorders provides a reliable standard for determining the presence of psychopathology, compared with sometimes arbitrary and varying symptom cut off points used in some disaster studies (Bonanno et al., 2010). Also, many studies on the effects of disaster have used convenience samples rather than representative samples, which may result in an overestimation of the rate of psychopathology (Bonanno et al., 2010). This study

overcomes these limitations by using individually-administered diagnostic interviews with adolescents and their parents to measure symptoms of internalizing disorders and by using a representative community sample.

Social Support from Friends in Post-Hurricane Environment

Social resources, such as support from friends, may influence adolescent's post-disaster responses. Social support, in general, is a resource used to cope during stressful times. Having significant people available, such as friends and family, serves a number of functions, including instrumental, informational, and emotional assistance (Thoits, 1995). With regard to emotional assistance, access to friends who provide a sense of being valued, understood, and cared for may be a particularly important resource (Thoits, 1995). Friends may help to normalize an adolescent's emotional reactions and interpretations of hurricane exposure and post-disaster disruptions through opportunities to discuss their experiences and may provide a sense that normal activity is resuming by spending time with those familiar to the adolescent (Vernberg & Vogel, 1993). However, this support may also get disrupted following hurricane exposure due to potential post-disaster experiences such as family relocation, school destruction, or time away from friends to support family recovery.

There is some evidence that social support from friends and classmates may protect elementary school-age children from developing persistent PTSD symptoms (La Greca et al., 1996; Moore & Varela, 2010; Pina et al., 2008; Vernberg et al., 1996). Following Hurricane Andrew, lower social support from classmates and close friends was associated with higher levels of PTSD symptoms (Vernberg et al., 1996). Similarly, Moore and Varela (2010) found a significant relationship between increased classmate support and fewer PTSD symptoms following Hurricane Katrina. Although younger children tend to rely more on their parents for support after exposure to trauma (Vernberg & Varela, 2001), adolescents may turn more to their friends in stressful moments. Despite the increasing importance of social support from friends over the course of adolescence, little is known about the role of social support from friends in the development of symptoms of internalizing disorders in adolescents following hurricane exposure. Understanding whether social support from friends relates to symptoms of internalizing disorders following exposure to hurricanes among adolescents may assist in planning developmentally sensitive response plans.

Deviant Behaviors of Friends

Other social resources, such as associations with deviant peers, have not been closely examined among youth in post-disaster research. Deviant behaviors, such as substance use and violent aggression, tend to increase as children enter adolescence and to occur in the company of peers (Moffitt, 1993). In addition, associating with deviant peers has been shown to relate to symptoms of internalizing disorders (Tandon & Solomon, 2008). It is important to explore whether disaster exposure and associations with deviant peers may together influence hurricane responses in adolescents, as this may improve understanding of the role of peers in adolescents' post-disaster recovery.

Research has yielded some evidence that hurricane exposure is related to increases in deviant behaviors in youth, such as substance use and aggression, even when taking into

account pre-hurricane behavior (Khoury et al., 1997; Rohrbach, Grana, Vernberg, Sussman, & Sun, 2009). For example, among early adolescents exposed to Hurricane Andrew, hurricane-related stress was significantly related to post-hurricane deviant behavior, such as aggression and stealing, after controlling for pre-hurricane deviant behavior (Khoury et al., 1997). Furthermore, youth who are involved in deviant behavior may be more likely to have internalizing symptoms following disaster exposure than those who have less involvement. In one of the few studies to address this connection directly, research conducted following Hurricane Katrina with a clinical sample of youth found that adolescents reporting posttraumatic stress symptoms also reported higher involvement in delinquent behaviors, demonstrating a possible link between disaster exposure, deviant behavior, and internalizing symptoms (Rowe, La Greca, & Alexandersson). Overall, little research has explored the role of externalizing behaviors such as deviant behaviors in the aftermath of a disaster (La Greca, 2007; Felix et al., 2011), and even less is known about whether associating with peers who engage in deviant behaviors may play a role in the development of mental health symptoms among children exposed to disaster. Further, the research that has examined the role of externalizing behaviors in the aftermath of disasters has focused on main effect outcomes. However, the risk of exposure to hurricanes may combine with the risks associated with having peers who engage in deviant behaviors in the development of internalizing symptoms. Therefore, this study attempts to examine this new area of research as a way to further our understanding of post-disaster recovery among youth.

Present Study

This study examined whether two specific aspects of social relationships with friends, social support and deviant behaviors, are related to meeting DSM-IV symptom criteria for an internalizing disorder in adolescents who varied in their level of hurricane exposure. Consistent with Bonnano and colleagues' (2010) finding that the combination of risk and resilience factors is a better predictor of disaster outcome than individual factors, we anticipated additive risk for lower levels of social support from friends and higher levels of peer deviance over and above the increased risk presented by hurricane exposure. We also evaluated whether the relation between hurricane exposure and symptoms of internalizing disorders was moderated by social support from friends or peer deviance. We controlled for gender and age in the analysis since prior research within this sample has found effects for both (Felix et al., 2011).

Methods

Participants

Participants for this study include 905 adolescents, ages 11-17 years, and their primary caretakers. These participants were part of an epidemiological study designed to provide data on prevalence rates of DSM-IV diagnoses among children and adolescents in a representative community sample in Puerto Rico (Canino et al., 2004). The original sample was selected through a random sampling of clusters of families with at least one child between the ages of 4-17 years using block groups based on the US Census Bureau's 1990 Census of Puerto Rico. Clusters were established based on economic level and size, and then urban versus rural. One child from each household was randomly selected to participate. A

total of 1,886 caretaker-child dyads completed the interview, out of a total of 2,102 eligible families. A more detailed description of recruitment and enrollment for the entire sample can be found elsewhere (Canino et al., 2004).

This study began with 911 adolescents and their caretakers from the original sample, as youth under the age of 11 were not asked questions on peer deviance and were therefore excluded from this analysis. Six adolescents were dropped from this subset because they endorsed “don’t know” on most items of the deviant peer behaviors questionnaire, leaving a total of 905 participants for this study. The final set of participants in the analyses included 476 boys and 429 girls with a mean age of 14.17 years ($SD = 1.97$; range = 11-18). The primary caretaker (89.4% mother) of each participant was determined based on who had regular and close contact with the child for the longest period of time in the past six months and who was at least 18 years old. Caretakers provided written consent and adolescents provided written assent. The original study was approved by the Institutional Review Board of the University of Puerto Rico.

Procedures

Community-based interviews were conducted with the participating adolescents and their primary caretaker between September 1999 and December 2000, approximately 12-27 months following the hurricane (50% of the interviews were conducted by 18 months post-hurricane). Different interviewers conducted the parent and adolescent interviews, and the interviewers could 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

Hurricane exposure questionnaire—Hurricane exposure was reported independently by caretakers and adolescents. Exposure items were drawn from a questionnaire used in a study conducted in Puerto Rico following exposure to a mud slide 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). The caretaker version of the interview included 15 yes/no items assessing the extent of the damage to their home and belongings. The youth version included five yes/no items. All of the questions asked to adolescent participants overlapped with questions asked to caretakers.

Items assessing hurricane exposure examined the adolescents’ and family’s exposure both during and in the aftermath of the hurricane. Parents and youth were both asked about items assessing for 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 material objects (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 hurricane exposure (e.g., fear of dying or getting injured; getting sick during hurricane). A sum of experiences reported by the parent and youth was

used to create a continuous measure of exposure, because increased levels of exposure has been found to relate to increased mental health symptom levels (e.g., Vernberg et al., 1996). Experiences reported by either the adolescent or the caretaker, or both, were included in the sum total.

Diagnostic Interview Schedule for Children (DISC-IV)—Symptoms of DSM-IV internalizing disorders in the past year 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). The DISC-IV test-retest reliability has been reported in both Spanish and English-speaking clinic samples. In community samples, reports of parents and youth 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 (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000; Bravo et al. 2001). Internalizing disorders that were assessed for this analysis were: Social Phobia, Separation Anxiety, Panic Disorder, Generalized Anxiety Disorder, PTSD, Major Depressive Disorder, and Dysthymia. Adolescent participants were judged to meet DSM-IV symptom criteria for a disorder if they met diagnostic criteria for the number and duration of symptoms based on either adolescent or caretaker report. We did not require participants to meet criteria for impairment in order to increase statistical power to test the primary research questions. As noted by Spitzer and Wakefield (1999), the use of symptom criteria alone results in higher estimates of the prevalence of disorders (compared to the added requirement of clinical significance), but may reduce problems of false negatives that arise when the judgment of clinical significance is added. Adolescent participants were considered to meet DSM-IV symptom criteria for an internalizing disorder if they met symptom criteria for one or more of the seven specific anxiety and depressive disorders assessed in the study.

Social support from friends—Social support from friends was measured using questions based on the work of Thoit (1995) that examined both adult and peer social support (Bird, Canino, et al., 2006; Bird, Davies, et al., 2006). For this analysis, three items from the interview were summed together for a social support from friends subscale. Higher scores indicate 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. For this analysis, responses to the open-ended question were coded using a four-point scale (0, 1, 2, 3 or more friends) so that it was on a metric similar to the other social support from friends questions. The resulting friend social support subscale had adequate internal consistency (Cronbach's alpha of .68).

Peer deviance—Deviant peer behavior in the past 12 months was assessed using items based on the work of Loeber, Farrington, Stouthamer-Loeber, and Van Kammen (1998). Items for the current study were divided into two subscales: substance use and violence. Peer substance use was measured through four questions that asked about friends' use of

alcohol, marijuana, and crack, cocaine, speed, heroin, or LSD, as well as selling drugs. Peer violence was measured by four questions about friends getting into physical fights, using a weapon, stealing things/robbing someone, and belonging to a gang. Response choices for these items were all “yes or no.” A sum of endorsed items was used to create a measure of each subscale. Higher scores indicate higher levels of violence and substance use by friends. Cronbach’s alpha for the substance use subscale in this sample was .63. Cronbach’s alpha for the violence subscale in this sample was .77.

Results

Descriptive Statistics

Descriptive statistics were calculated for hurricane exposure, peer social support, peer deviance, and prevalence of internalizing disorders (based on symptom criteria only) over the previous year. Table 1 presents data on those meeting DSM-IV symptom criteria for each individual disorder included in the overall internalizing disorder variable. A total of 122 (13.5%) participants met DSM-IV symptom criteria for one or more internalizing disorder. Of the measured anxiety and depressive disorders, symptom criteria were met most frequently for Separation Anxiety Disorder (6.1%), and symptom criteria were met least often for PTSD (1.1%). When examining hurricane exposure in this sample, 62% of youth (or their caretaker) endorsed at least one item indicating hurricane exposure, with the mean of 2.44 ($SD = 3.04$) hurricane exposure items endorsed. For peer deviance, 43% of the adolescents responded “yes” to at least one item about having friends who used drugs or alcohol ($M = .78$, $SD = 1.15$) and 37% responded “yes” to at least one item about having friends who engaged in violence ($M = .54$, $SD = .89$).

Independent samples t-tests and chi-square analyses were conducted to compare males and females on hurricane exposure, age, and the three peer variables (Table 2). Independent samples t-tests indicated that girls reported more peer social support than boys, $t(903) = 5.46$, $p < .0001$ (two-tailed). There were no gender differences in age, hurricane exposure, peer substance use, or peer violence. A chi-square test for independence assessing gender differences on meeting DSM-IV symptom criteria for an internalizing disorder showed that girls met criteria more often than boys, $\chi^2(1, n = 905) = 6.59$, $p < .01$.

Bivariate Correlations of Study Variables

Bivariate correlations were then calculated to examine the relations between the study variables (Table 3). Results showed that higher age was significantly related to more social support, more peer violence, and more substance use. More hurricane exposure was significantly related to having lower levels of social support. Social support was significantly and positively related to peer substance use.

Relation between Hurricane Exposure, Peer Variables and Meeting Symptom Criteria for an Internalizing Disorder

A hierarchical logistic regression was run to predict whether adolescents met DSM-IV symptom criteria for an internalizing disorder from the three peer variables and hurricane exposure, while including age and gender (0 = girls, 1 = boys) in the analysis. Hurricane

exposure, age, and the three peer variables were mean centered for this regression. Tests for multicollinearity indicated that none of these variables were highly correlated and thus could be included within the same regression model. Single imputation was used to handle missing data because less than 5% of the data were missing for the study variables.

We entered age and gender as control variables in step one and found that gender was a significant predictor of meeting DSM-IV symptom criteria for an internalizing disorder (Table 4). On step two, we examined the additive effects of hurricane exposure, social support from friends, and peer deviance in meeting DSM-IV symptom criteria for an internalizing disorder. Peer violence, peer substance use, and hurricane exposure all significantly predicted meeting DSM-IV symptom criteria for an internalizing disorder. Step three examined possible exposure by peer variable interaction effects (Table 4). A significant interaction was seen between hurricane exposure and peer violence ($B = .89, p = .02$). To further understand these findings, the interaction was probed following methods outlined by Aiken and West (1991). Since peer violence was a continuous variable in this model, the 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, hurricane exposure was not related to the probability of meeting DSM-IV symptom criteria for an internalizing disorder ($B = -.008, p = .86$). However, for those who reported low levels of peer violence, hurricane exposure was significantly related to the probability of meeting DSM-IV symptom criteria for an internalizing disorder ($B = .15, p = .001$). This suggests that hurricane exposure plays a role in the prediction of meeting DSM-IV symptom criteria for an internalizing disorder among adolescents who do not report associating with violent peers. In contrast, those adolescents who do report peer violence are more likely to meet DSM-IV symptom criteria for an internalizing disorder regardless of hurricane exposure.

Discussion

This study examined the effects of hurricane exposure, social support from friends, and peer deviance on the development of symptoms of internalizing disorders in adolescents following Hurricane Georges. Approximately 14% of the sample met self-report or parent-report symptom criteria for having one or more of the seven internalizing disorders assessed in this study. Interestingly, 6% met symptom criteria for separation anxiety and 4% met symptom criteria for major depression, while only 1.1% met symptom criteria for PTSD. One reason why the rate of meeting PTSD symptoms is relatively low may relate to the use of the DISC, which skips the entire section on PTSD symptoms if the participant does not endorse enough of the ten gate questions regarding exposure to traumatic events and the individual's level of distress during exposure. This method for assessing PTSD is stricter than many disaster studies, which have not used diagnostic interviewing in their methodology and often evaluate symptoms of posttraumatic stress in all participants regardless of level of exposure to a traumatic event (e.g., La Greca et al., 1996). In addition, high rates of depressive and other anxiety symptoms have been reported in other disaster-related studies (for a review see Bonanno et al., 2010), suggesting that assessing for a range of symptomatology may provide assistance in providing targeted interventions.

Results indicated that exposure to Hurricane Georges was associated with meeting DSM-IV symptom criteria for an internalizing disorder. In addition, adolescents who reported having friends who used substances, and those who reported having friends who engaged in violence, were more likely to report meeting DSM-IV symptom criteria for an internalizing disorder, even when controlling for age and gender. Finally, an interaction was found between hurricane exposure and peer violence in predicting the presence of meeting DSM-IV symptom criteria for an internalizing disorder, such that those associating with deviant peers were more likely to meet DSM-IV symptom criteria for an internalizing disorder regardless of their level of hurricane exposure, while those with no peer deviance were more likely to report meeting DSM-IV symptom criteria for an internalizing disorder as their exposure to the hurricane increased.

The Influence of Peer Relationships and Hurricane Exposure on Internalizing Disorder

Exposure to the hurricane appeared to be related to some of the peer relationships in these adolescents. For instance, increased hurricane exposure was correlated with lower reports of social support from friends. This finding was similar to other studies of post-disaster recovery in youth (e.g., Vernberg et al., 1996). Disasters may lead to separation between youth and their friends, leading to a reduction in social support from this group of peers (Silverman & La Greca, 2002). In adolescence, this loss of support from friends may be challenging as they enter a phase of life when they wish to be more autonomous from their parents and rely on friends for more support.

Contrary to expectation, social support from friends was not related to meeting DSM-IV symptom criteria for an internalizing disorder, nor did it interact with hurricane exposure to predict meeting DSM-IV symptom criteria for an internalizing disorder in the regression analysis. This was surprising given prior research on social support and PTSD following disasters (Vernberg et al., 1996; Moore & Varela, 2010; Pina et al., 2008). However, because our current focus was on peer influences on post-disaster mental health, we did not include items on youth-perceived family or adult support, which have both been found to negatively relate to the development of PTSD symptoms (Pina et al., 2008; Vernberg et al., 1996). More exploration into these relationships and how they affect mental health symptoms may help inform areas of focus for interventions aimed at supporting adolescents following a disaster. For instance, studies have found that adolescents may co-ruminate with their friends, which is related to internalizing symptoms (Rose, 2002). It may be that adolescents recovering from hurricane exposure who do experience social support from friends are not receiving healthy social support as they process the experiences. Researchers may wish to investigate interventions that promote the development of healthy social support from friends in the aftermath of disaster exposure.

Participants who endorsed either measured type of peer deviance were more likely to report meeting DSM-IV symptom criteria for an internalizing disorder. Other post-hurricane studies have found youth who exhibit deviant behaviors tend to report symptoms of internalizing disorders (Rowe et al., 2010). This study furthers this literature by examining a community sample and by examining the role of peers' deviant behaviors in meeting DSM-IV symptom criteria for an internalizing disorder rather than one's own deviant behavior. In

addition, an interaction was found between peer violence and hurricane exposure in predicting the presence of meeting DSM-IV symptom criteria for an internalizing disorder. Results indicated that for participants reporting low levels of violent peer behavior, hurricane exposure increased the risk for meeting DSM-IV symptom criteria for an internalizing disorder. However, for those youth reporting high levels of violent peer behaviors, hurricane exposure did not increase risk of meeting DSM-IV symptom criteria for an internalizing disorder; it may be that those youth were already experiencing distress associated with having deviant peers. Since involvement with deviant peers appears to increase the risk for meeting DSM-IV symptom criteria for an internalizing disorder, those developing interventions for adolescents affected by disasters may want to re-establish prosocial outlets for youth in disaster-affected communities so as to limit involvement with deviant peers. This may include increasing access to clubs and after-school groups that will allow adolescents to get involved with a positive peer group.

Limitations

Several factors should be considered in the interpretation of these results. First, we did not ask about involvement with deviant peers prior to the hurricane. Given the unpredictable nature of disasters, establishing pre-disaster functioning can be challenging. Nonetheless, previous research has shown a relation between deviant behavior and disaster exposure even when controlling for predisaster deviant behaviors (Khoury et al., 1997; Rohrbach et al., 2009). In addition, although the measures used to assess peer deviance and social support were validated measures used in studies of similar populations, they were limited in length, which may influence the depth of understanding that was found from these variables. Future research may wish to use measures that explore these constructs in greater depth in order to better understand the influence of peers on adolescents exposed to disasters. Finally, given the relatively small number of participants who met DSM-IV symptom criteria for any of the depressive or anxiety disorder, issues of statistical power limited our ability to compare these connections separately for each disorder. Symptoms of anxiety and depression in child and adolescent samples frequently co-occur, and there is evidence to predict a similar interplay between individual differences in vulnerability, such as environmental adversity (including stressful life event and peer relationships) across a spectrum of internalizing disorders (e.g., Hicks, DiRago, Iaconi, & McGue, 2009). However, it is possible that the interplay found here between peer relationships, hurricane exposure, and meeting DSM-IV symptom criteria for an internalizing disorder may not apply equally for all individual anxiety and depressive disorders.

Conclusions

Future research should continue to examine the differences between deviant peer behaviors and how these may influence mental health development in 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. In addition, future research could explore changes in mechanisms of social support from friends since the data from this study was collected prior

to the wide-spread use of social media outlets. More exploration is also warranted into the relationship of youth perceived family or adult social support and how this may affect the development of symptoms of internalizing disorders, as this may help inform areas of focus for intervention.

In conclusion, few studies have explored the role of peer deviance in adolescents' adjustment following exposure to a hurricane. This study attempts to provide information to begin understanding the relationships between peer deviance and hurricane exposure in the psychosocial development of adolescents. Continuing to increase our understanding for these relationships may provide clinicians, parents, and schools with areas to focus on when helping adolescents to cope with hurricane exposure.

Acknowledgments

Funding for this study was provided by 1 R03 MH085276-01A1 by the National Institute of Mental Health.

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Table 1

Frequency of Specific Internalizing Disorders

Disorder	N (%)
Social Phobia	29 (3.2)
Separation Anxiety	55 (6.1)
Panic Disorder	10 (1.1)
Generalized Anxiety Disorder	17 (1.9)
PTSD	10 (1.1)
Major Depression	37 (4.1)
Dysthymic Disorder	10 (1.1)
Any Internalizing Disorder	122 (13.5)

Note. PTSD = Posttraumatic Stress Disorder

Table 2

Means and Standard Deviations of Variables

Variable	Girls (N = 429)	Boys (N = 476)
	Mean (SD)	Mean (SD)
Age	14.10 (1.98)	14.24 (1.96)
Hurricane Exposure	2.39 (2.96)	2.48 (3.10)
Social Support*	5.59 (2.32)	4.71 (2.52)
Peer Violence	.49 (.86)	.59 (.92)
Peer Substance Use	.75 (1.14)	.81 (1.17)
	N(%)	N(%)
Any Internalizing Disorder**	71 (17)	51 (11)

Note.

* $p < .0001$ for independent-sample t-test comparison.

** $p = .01$ for chi-square test of independence

Table 3

Bivariate Correlations

	1	2	3	4	5
1. Age	—	-.05	.08*	.15**	.43**
2. Hurricane Exposure		—	-.10**	.01	-.05
3. Social Support			—	.002	.10**
4. Peer Violence				—	.48**
5. Peer Substance Use					—

Note.

*
 $p < .05$.

**
 $p < .01$

Table 4
 Relationship between Hurricane Exposure, Peer Variables, and Symptoms of Internalizing Disorders

Predictors	β	SE	Wald	P	OR	95% CI
Step 1: Demographic Variables						
Gender	.510	.197	6.69	.01	1.67	1.13–2.45
Age	0.52	.05	1.08	.30	1.05	.96 – 1.16
Step 2: Main Effects						
Social Support from Friends	-.016	.042	.148	.701	.984	.91 – 1.07
Peer Violence	.305	.109	7.78	.005	1.36	1.10 – 1.68
Peer Substance Use	.222	.10	5.07	.024	1.25	1.03 – 1.52
Hurricane Exposure	.068	.031	4.73	.03	1.07	1.01 – 1.14
Step 3: Test of Moderation						
Hurricane Exposure × Social Support from Friends	-.002	.012	.031	.860	.99	.97 – 1.02
Hurricane Exposure × Peer Violence	-.087	.038	5.228	.022	.92	.85 – .99
Hurricane Exposure × Peer Substance Use	.041	.031	1.75	.185	1.04	.98 – 1.11

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