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## Risks Factors and Resiliency in Secondary School Students after the BP Deepwater Horizon Oil Spill

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Risks Factors and Resiliency in Secondary School  
Students after the BP Deepwater Horizon Oil Spill

A Dissertation

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Doctor of Philosophy  
in  
Counselor Education

by

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## Abstract

The purpose of this study was to explore the impact of the BP Deepwater Horizon oil spill on students of two coastal Louisiana secondary schools. Bronfenbrenner's (1979) ecological systems theory was used as a framework to understand how exposure, gender, socioeconomic status, and resilience interact to influence the impact of the spill on students. Cross-sectional questionnaires were administered to 155 high school students in May 2012 and 225 middle school students in January 2013 out of 1247 possible for a return rate of about 30%.

Results showed that exposure groups differed significantly on students' Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) scores. Students with high exposure to the oil spill had significantly higher IES scores than those with no exposure and low exposure. Logistic regression results indicated that exposure was a significant predictor of higher IES scores and as exposure increased by 1, students were 1.46 times more likely to experience higher impact. Males were found to have significantly higher IES scores than females, with a low effect size. Students did not differ significantly across resilience levels. In the entire sample, lower-SES students did not score significantly different on IES scores than higher-SES students. However, in the high school significant differences were found between SES groups and SES was a significant predictor of higher IES scores. Implications are provided for counselor educators interested in disaster mental health. Conclusions include suggestions for counselors servicing areas affected by the oil spill and how individual and environmental characteristics of students can influence risk factors.

Keywords: Disaster mental health, crisis intervention counseling, ecological systems theory, BP Deepwater Horizon oil spill, secondary school students, resilience, risk factors

## Chapter I

### Introduction

Late in the evening of April 20, 2010, a technological malfunction on the BP Deepwater Horizon oil rig off the coast of Louisiana caused an explosion (Burdeau, 2011). Eleven oil rig workers were killed and several more were injured. Deep on the gulf floor, the oil well began to leak oil, setting in motion the largest oil spill on U.S. territory and the greatest environmental disaster in U.S. history. Previous spills that have touched U.S. soil, like the Exxon Valdez catastrophe off the coast of Alaska, were linked to not only prolonged environmental destruction, but also to decreased mental health functioning for residents many years after the catastrophe (Arata, Picou, Johnson, & McNally, 2000).

Following the BP Deepwater Horizon oil spill unprecedented environmental contamination has occurred in the Gulf of Mexico and has impacted the coastal habitats of Louisiana (Button, 2010). Previous research on similar human-caused disasters found that the effects of oil contamination are severe not only on exposed wildlife, but also on the physical and psychological health of surrounding human populations (Dass-Brailsford, 2010; Palinkas, Petterson, Russell, & Downs, 2004). Conditions caused from the human-caused disasters are the ensuing community corrosion and loss of trust in authority and the continued legislative battles to affix the amount of blame (Picou, Marshall, & Gill, 2004). In the aftermath of technological disasters, a *secondary disaster* is characterized by the erosion of social relationships and loss of community cohesion (Dyer, Gill, & Picou, 1992; Erikson, 1976).

Unfortunately, along the Gulf Coast, the BP Deepwater Horizon oil spill is causing many of the typical endemic effects of toxic contamination outlined by Freudenburg (1997). Early journalists reported that many Gulf Coast residents could no longer shrimp and fish and residents

continue to suffer economic, emotional, and familial consequences as a result of the oil spill (Elliott & Peñaloza, 2010). Hobfoll (2001) suggested that stress from such man-made disasters can be measured by the amount of resources lost by individuals, or the potential loss of future resources. In the Louisiana Gulf Coast area after the BP oil spill disaster, residents stand to lose an entire way of life. As a constant reminder, legal and government inquiries into the entities responsible for the spill will continue for some time (Brady, 2010).

Fishermen, subsistence cultural groups, and the poor fare much worse after oil spills (Abramson et al., 2010; Arata et al., 2000; Dyer, Gill, & Picou, 1992). After the Exxon Valdez oil spill (1989), the plight and losses of the Native Alaskan subsistence groups were well-recorded indicating that some of their major struggles were related to the breakdown of traditional cultural practices and confusion about the possible consequences of oil contamination caused by the impact of the Exxon Valdez oil spill (Dyer, Gill, & Picou, 1992; Palinkas et al., 2004). According to Button (2010), coastal Louisiana residents are on the same difficult path as Alaskan survivors of the Exxon Valdez spill, living in continual uncertainty and fighting legislative battles with the international oil companies for scientific knowledge of the actual threat that oil may cause to residents and their environment. Researchers have begun to investigate the short and long-term health impacts of the Deepwater Horizon oil spill on Louisiana residents and their environment over the next few decades (Sandler, n.d.).

## **Background**

In recent years, much has been learned about the impact of natural and man-made disasters on different groups of people (James, 2008; Norris et al., 2002). Both personal and environmental factors have been shown to be related to individuals' stress reactions to disasters. Stress responses of individuals have been related to cultural factors like reliance on natural

resources (Dyer, Gill, & Picou, 1992; Picou & Gill, 1996), amount of exposure to a disaster (Palinkas et al., 2004), gender differences (Dell’Osso et al., 2011), socioeconomic resources (Norris et al., 2002), and individual psychological resources (Benight, Swift, Sanger, Smith, & Zeppelin, 1999). Moreover, studies have focused on the impact of disasters on children and adolescents and have noted reactions specific to youth (Gaffney, 2006; Green et al., 1991; Khoury et al., 1997; March, Amaya-Jackson, Terry, & Costanzo, 1997; Norris et al., 2002; Vila et al., 2001).

Researchers have found that psychosocial risk factors are linked to the amount of exposure to technological disasters (Bevc, Marshall, & Picou, 2007; Dass-Brailsford, 2010; Palinkas et al., 2004). Exposure can include damage to individuals’ environments, or physical exposure to toxic chemicals, or amount of resources lost during disasters (Bevc et al., 2007; Hobfoll, 2001; Palinkas et al. 2004; Palinkas, Russell, Downs, & Petterson, 1992). Individuals may be exposed to oil in several ways; through eating contaminated foods from spill areas, working near toxic materials in clean-up areas, or having to make changes in normal activities because of pollution, such as modifying recreational activities or altering customary work patterns. Additionally, risk factors for negative emotional effects from disasters are related to economic resources of individuals (Abramson et al., 2010; Dyer, Gill, & Picou, 1992; Norris et al., 2002; Palinkas et al., 2004; Palinkas et al., 1992). People with greater economic resources recover more quickly from disasters; however, females report significantly more stress symptoms after disasters than males (Anderson & Manuel, 1994; Dell’Osso, 2011; Khoury et al. 1997; March et al., 1997).

In the aftermath of regional and national disasters, children and adolescents have been identified as vulnerable populations (Norris et al., 2002; Pfefferbaum et al., 2010) and children’s

reactions to crisis events are thought to vary depending on their developmental level (Lepore, 2009). Murray (2011) indicated that biological and social factors may place children and adolescents at greater risks for contamination during oil spills. For example, younger children have a higher rate of respiration and may be more likely to inhale dangerous fumes. Adolescents may be more active exploring their environments and more likely to come into contact with oil that was spilled. However, Murray (2011) identified a lack of published research on the possible impact of technological disasters on children and adolescents.

Factors have been identified that place both children and adults at greater risks for continued psychological distress following disasters. Risk factors include amount of disaster exposure, gender, cultural background, social corrosion, and lower-SES status (Dyer, Gill, & Picou, 1992; Green et al., 1991; March et al., 1997; Norris et al., 2002; Picou, Marshall, & Gill, 2004). However, studies of individuals exposed to oil spills, namely the Exxon Valdez oil spill, have focused only on adults and have not focused specifically on the reactions of adolescents (Arata et al., 2000; Palinkas et al., 2004; Palinkas et al., 1992).

Protective factors for children and adolescents like social support and resiliency in response to disasters are beginning to be better understood (Baum, Rotter, Reidler & Brom, 2009; Conner, 2008; Garmezy, 1994). Resilience is a growing research concept of the factors that either mitigate the risks from disaster exposure or contribute to the speedy recovery of survivors (Baum et al., 2009; Conner, 2008; Garmezy, 1994). Individual psychological resources such as coping self-efficacy, mastery, self-esteem, optimism, and hope have been linked to lesser impact of disasters (Benight et al., 1999). Resiliency has been linked to individuals' abilities to bounce back and recover from difficult life events (Werner, 1986; Windle, Bennet, & Noyes, 2011). Masten and Osofsky (2010) contended that disaster research

has contributed to progress in the field of resilience studies. Nevertheless, the authors identified the need to determine which adolescents are most at risk and how disasters may impact adolescent development.

### **Importance of the Study and Key Constructs**

The growing importance of disaster mental health and crisis intervention counseling to the field of counselor education is reflected in the newest standards of the Council for Accreditation of Counseling and Related Programs (CACREP, 2009). As stated in the clinical mental health counseling standards, counselors should understand the impact of disasters on different groups of individuals (CACREP, 2009, Section III.A.9), such as individuals impacted by an oil spill disaster. Additionally, counselors should gain working knowledge of models of crisis intervention and disaster response (Section II.G.1.c; Section III.A.10; Section IV.I.4), such as information related to counselors working with individuals after technological disasters.

Disaster mental health focuses on coping with the destruction, loss of loved ones, loss of irreplaceable belongings, and the aftermath from disasters (Jordin, n.d.). Disasters often overwhelm the normal coping abilities of survivors and can cause physiological, emotional, and cognitive stressors. Historical gains in the field of disaster mental health parallel significant domestic and international disasters and the lessons learned from responding to disasters (Dass-Brailsford, 2010; Norris et al., 2002). Progressions in the field span 100 years, from the response to the 1906 San Francisco Earthquake to the vast impact in 2005 of Hurricane Katrina. Lessons learned from previous disasters include an enhanced understanding of the role of disaster responders, the many layers of communication necessary for effective recovery responses, and the importance of building protections from disasters into community infrastructures (James, 2008).

Differences have been noted in survivors' responses to natural disasters in comparison to survivors of man-made or technological disasters (James, 2008; Norris et al., 2002). The American Counseling Association (ACA; 2011b) defines natural disasters as the losses caused by a naturally occurring hazard like an earthquake, hurricane, wildfire or flood. ACA differentiates human generated disasters by the losses incurred through human causes, which can be intentional like war or terrorism, or unintentional/ technological. Technological disasters include environmental destructions (i.e., oil spills, pollution, and toxic waste), industrial accidents or fires, and all types of transportation accidents. ACA also defines a crisis as an emotionally stressful event or a traumatic change in a person's life. The main purpose of crisis counseling is to assist individuals in regaining a sense of control and mastery after a crisis or disaster (ACA, 2011a).

Crisis intervention theories have progressed from basic concepts of survivors' reactions to crisis events (Lindeman, 1944) to more complex or expanded theories (James, 2008). Expanded theories of crisis intervention take into consideration personal, social, environmental, and situational factors that make an event a crisis to a person (James, 2008). In the disaster mental health literature, several personal and environmental factors have been linked to individuals' stress reactions to disasters. Norris et al. (2002) elaborated on the importance of the following factors: (a) individual exposure and community-wide exposure, (b) gender, (c) socioeconomic status (SES) and (d) individual psychological resources or resilience.

Bronfenbrenner's (1979) ecological systems theory (EST) provides descriptors of the many interacting factors that may influence people's reactions to disasters (Collins & Collins, 2005; Kilmer & Gil-Rivas, 2010; James, 2008; Myer & Moore, 2006). At the time he proposed his theory, it was a revolutionary approach for the field of psychology (Bronfenbrenner Life

Course Center, n.d.). His theory integrates ideas from several disciplines and considers many competing elements and environments that impact people. EST is similar to other systems theories in that it involves the study of the interactional processes among the parts of the whole system. Bronfenbrenner (1979) uses the terms *microsystem*, *mesosystem*, *exosystem*, and *macrosystem* to describe the different environments, or systems, that can influence development. The microsystem represents the characteristics of the original setting of human development, that is, the home and the family. As children grow, the microsystem expands to include more contexts. The mesosystem symbolizes the relationships, communications, or connections between two or more settings in which developing children interact. The exosystem includes settings that individuals do not directly interact in, but that still influence development. The broadest context of EST is the macrosystem, which are the influences and customs of the culture as a whole.

EST centralizes the importance of the interactions between settings: people and the environment, people's immediate environment and systems outside of that environment, and people and society as a whole. More than anything, understanding the context (i.e., individual, family, culture) in which disasters strike is paramount; fittingly, EST is rooted in multiple contextual interactions (Kilmer & Gil-Rivas, 2010). EST has had a broad appeal in the social sciences and has contributed greatly as a model to approach the multilevel impacts that crises and disasters can have on individuals and the systems in which they interact. EST has served as a framework for understanding the systemic impact of disasters and the subsequent, layered recovery response (James, 2008; Kilmer & Gil-Rivas, 2010). Furthermore, it has been adapted into an approach to determine the severity of a crisis on an individual (Collins & Collins, 2005;



Myer & Moore, 2006). Part of the appeal is EST's holistic approach and structure, which accounts for the varying levels of influences that can shape human behavior and development.

EST allows for the influence of child characteristics, like resiliency or gender, on psychosocial reactions to disasters. Its ecosystemic perspective entails characteristics of the individual, the environmental context of individual development, and the interactional process between individuals and the environment (Bronfenbrenner, 1979). Correspondingly, the ecosystemic perspective has been identified as one of the greatest contributing theories in explaining the development of resiliency in children (Luthar, Cicchetti, & Becker, 2000). Schools were identified as an important environmental context to promote resiliency in children and adolescents (Henderson & Milstein, 2003). EST is based in the cultural and contextual understanding of the individual and incorporates the school as a key context of recovery.

### **Purpose of the Study**

The purpose of this study is to explore the impact of the BP Deepwater Horizon oil spill on students of a coastal Louisiana high school and determine what factors influence students' reactions to the spill. This study utilizes Bronfenbrenner's ecological systems theory as a framework to better understand how the factors of exposure, gender, socioeconomic status, and resilience interact to influence the impact of the oil spill on students.

### **Research Questions**

The following five research questions were investigated in the present study.

1. Is there a statistically significant mean difference in risk factors for students with low levels of oil exposure in comparison to students with high levels of oil exposure?
2. Do mean differences for risk from exposure vary significantly across gender, socioeconomic status, and level of resilience?

3. Are there statistically significant mean differences in student risk factors across gender and socioeconomic status?
4. Are there statistically significant mean differences in student risk factors across levels of student resilience (i.e., high resilience, medium resilience, low resilience), gender and socioeconomic status?
5. How well do level of oil exposure, gender, socioeconomic status, and resilience predict student risk factors?

### **Limitations of the Study**

Anticipated limitations included the cross-sectional and self-report design of the survey and the assessment of only stress reactions of students. The cross-sectional design of the study did not allow for the measurement of pre-existing student characteristics. Studies have shown pre-disaster functioning to be one of the greatest predictors of post-disaster functioning (La Greca, Silverman, & Wasserstein, 1998). This study measured student characteristics at only one period of time two years after the original occurrence of the event. Additionally, students may not have self-reported accurately because of the lack of self-understanding or social pressures to respond in a certain way. Because of the scope of the study, only the risk factors of students were measured. Students may have been impacted in other ways that were not tested, including academically, socially, or behaviorally.

Additionally, resilience was measured in this study as an individual personality construct (see the Resilience Scale by Wagnild & Young, 1993). However, resilience can include both characteristics of the individual as well as environmental characteristics like social supports and economic resources (Garmezy, 1994). Social supports were not measured because of the scope of the study.

## **Assumptions of the Study**

Assumptions made in the present study included the measurement of student SES, the connection that coastal residents have with the environment, and the representativeness of the population. Based on the work of previous authors (Ensminger et al., 2000; Malecki & Demaray, 2006), using student free or reduced lunch status is assumed to be a valid measure of SES. A second assumption of the study was that residents of coastal Louisiana have a deep connection to the local environment and have been affected by the damages caused by the BP Deepwater Horizon oil spill. The population to be surveyed was assumed to be representative of students along the coast who were exposed to the oil spill.

Additional assumptions were made about the validity of instruments used. The Exposure Index has been used and tested only with adults (Palinkas et al., 2004; Palinkas et al., 1992), but the measure was assumed to be valid for use with adolescents. The Impact of Event Scale (Horowitz, Wilner, & Alvarez, 1979) was assumed to be a valid measure of students' stress reactions despite weaknesses of the scale, such as lack of guards against faking. The Resilience Scale was formulated and tested through interviews with an older female population (Wagnild & Young, 1990, 1993; Windle et al., 2011). The scale has been used in numerous published studies with adolescents (Ahern, Kiehl, Sole, & Byers, 2006). An assumption of this study was that the Resilience Scale is a valid measure of adolescent resilience.

## **Definition of Terms**

**Crisis.** An emotionally stressful event or a traumatic change in a person's life (ACA, 2011b).

**Crisis intervention counseling.** Counseling assistance that allows an individual to regain a sense of control and mastery after a crisis or disaster event. Intervention steps that include techniques to establish rapport, allow survivors to tell their stories, identify major problems,

assess for safety issues, assist with feelings, explore alternatives, develop an action plan, and make necessary referrals for ongoing services (ACA, 2011a).

**Disaster exposure.** The amount of resources lost during a disaster including social relationships or material property, changes in normal activities due to the disaster, or damage to one's environment from the disaster. Exposure can also include physically coming into contact with the elements in natural disasters or being exposed to the toxic chemicals/harmful agents of technological disasters (Bevc et al., 2007; Hobfoll, 2001; La Greca, Silverman, & Wasserstein, 1998; Palinkas et al., 2004).

**Disaster mental health.** Coping with the destruction, loss of loved ones, and loss of irreplaceable belongings during and after disasters (Jordin, n.d.).

**Ecological systems theory.** A psychological theory of human development in which the environment influences the developing person, and subsequently, the developing person influences the environment. Contexts of development include the microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979).

**Exosystem.** A context of EST in which children do not directly participate, but that is influential in development (Bronfenbrenner, 1979).

**Human generated disaster.** A disaster that can be intentional like war or terrorism, or unintentional technological accidents (ACA, 2011b).

**Macrosystem.** The broadest context of EST that represents the expectations and customs of the culture as a whole (Bronfenbrenner, 1979).

**Microsystem.** The most fundamental context of EST and the original settings in which human development occurs. It is described as "a pattern of activities, roles, and interpersonal relations

experienced by the developing person in a given setting with particular physical and material characteristics” (Bronfenbrenner, 1979, p. 22).

**Mesosystem.** The context of EST that symbolizes the relationships, communications, or connections between two or more settings that a developing child interacts in (Bronfenbrenner, 1979).

**Natural disaster.** A naturally occurring hazard like an earthquake, hurricane, wildfire or flood (ACA, 2011b).

**Protective factors.** The factors that mitigate the risks from stress or disaster exposure, which can include personal factors like physical health or resilience and environmental factors such as family income or social supports (Garmezy, 1994).

**Resilience.** “Resilience is the process of negotiating, managing and adapting to significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and ‘bouncing back’ in the face of adversity” (Windle, 2010, p. 2; as cited in Windle, Bennet, & Noyes, 2011).

**Technological disaster.** A disaster that is an unintentional human-caused incident, which can be environmentally destructive like oil spills, pollution, or toxic waste; industrial accidents or fires; or any type of transportation accidents (ACA, 2011b).

## **Chapter II**

### **Literature Review**

In this chapter, the literature related to disaster mental health is discussed across two broad sections. First, the historical development of crisis intervention theory and the important lessons learned from responding to disasters are provided. Several 2009 CACREP standards are outlined to reflect the growing importance of the field of crisis and disaster mental health. The development of crisis intervention theories and the progression of more expanded approaches are discussed in relation to early disasters. The second area discussed is the use of ecological systems theory (EST) to better understand how disasters can impact children and adolescents. The background and basic concepts of EST are discussed including studies on how individuals and the environment interact to influence the impact of disasters. Also, descriptions of resilience and the protective factors that can mitigate the negative effects of disasters on children and adolescents are provided. Finally, cultural and group influences on survivors' reactions to disaster events are examined.

#### **Disaster Mental Health: Lessons Learned from Previous Disasters**

The newest CACREP 2009 clinical mental health standards reflect the growing importance of counselor preparation for crisis intervention and disaster response. According to the CACREP standards (2009; Section III.A.9), counselors should understand the human impact of crises, disasters, and other trauma-causing events. Furthermore, counselors should have knowledge about emergency response systems and their role in clinical mental health agencies and in communities during a crisis or a disaster (Section II.G.1.c; Section III.A.10). This knowledge is expanded to include crisis intervention models, leadership roles in particular, and strategies for responding to community, national, and international crises and disasters (Section

IV.I.4). According to the standards, counselors should have a solid comprehension of the principles of crisis intervention during crises, disasters, and other trauma-causing events (Section III.C.6). Additionally, counselors should be able to demonstrate the use of procedures for assessing and managing suicide risk (Section III.D.6). Finally, it is essential that counselors understand the appropriate use of diagnosis during crises and disasters and differentiate between diagnoses and developmentally appropriate reactions to crises (Section III.K.5; Section III.L.3).

The above CACREP 2009 Standards are representative of theoretical and clinical progressions in the field of disaster mental health. Disasters devastate the defenses of not only individuals, but of entire communities (James, 2008). The result is often severe losses. According to Jordin (n.d.), trauma occurs when natural or human-caused disasters overwhelm the normal coping abilities of survivors. Trauma can impact a person's sense of security, thoughts, feelings, and beliefs about the world. Grief and reactions of trauma are essential symptoms to address in the treatment of disaster survivors (Gaffney, 2006).

### **Crisis Intervention Counseling and Theories**

Disaster mental health, which has recently emerged as a subspecialty in counseling, has a distinct history of theoretical development (James, 2008). Disaster mental health services are provided through the use of crisis intervention counseling. The central purpose of crisis counseling is to assist survivors in regaining their sense of control and mastery after a crisis event (ACA, 2011a). The basics of crisis intervention counseling are to: establish rapport, allow survivors to tell their stories, identify major problems, assess for safety issues, deal with feelings, explore alternatives, develop action plans, and make the necessary referrals for ongoing services (Jordin, n.d.). These benchmarks are similar to the steps of providing psychological first aid (James, 2008).

The crisis intervention field has expanded, providing knowledge through the analysis of the impact of crisis events on survivors and the progression of survivors on the road towards recovery. At the turn of the 20<sup>th</sup> century, professional crisis and disaster mental health services had not been developed yet (Dass-Brailsford, 2010). However, in 1902, the first suicide hotline was established in San Francisco. Shortly after, in 1906, the National Save a Life League, a suicide prevention program, was created in New York. Developments in the field of disaster mental health and crisis intervention led to a better understanding of how to prevent future crises and disasters and how best to respond to crises and disasters when they occur.

Many of the gains in knowledge related to crisis and disaster response have been in the form of lessons learned from previous disasters. Dass-Brailsford (2010) pointed to the response after the Great San Francisco Earthquake of 1906 in which building standards and codes were developed to prevent future loss from earthquakes. Dass-Brailsford also stated that the Tri-State Tornado of 1925, in which 695 people died, demonstrated the vast need for improved warning systems. Ganzel (2003) further noted that the 1930 dust storms, better known as the “Dust Bowl,” were caused from severe drought, made worse by over-use of soil by farmers and the economic depression. The dust storm disaster led to an understanding of the importance of taking care of the land and an eventual preventive response for soil conservation legislation. Countless lessons have been learned from previous disasters of old, like the San Francisco Earthquake, in addition to more recent disasters (Dass-Brailsford, 2010). The most recent disasters, like the September 11 Terrorist Attacks (2001) in New York, showed us the increased need for security and the many layers of impact that can be felt directly, indirectly, as well as nationally and internationally. Hurricane Katrina (2005) also taught us the severe implications of



the breakdown of social structures and communications post-disaster, especially for at-risk populations.

Still, the response to one disaster in particular, the Cocoanut Grove Fire, has been singled out as the origin of crisis intervention counseling. A nightclub fire in 1942 at the Cocoanut Grove in Boston killed over 400 people trapped inside. Lindeman (1944) treated many of the survivors and their families. He categorized their responses and found that many survivors experienced feelings of guilt and anger. Survivors also had a fixation on the dead and many showed strong identification with those who had perished in the blaze. Somatic ailments and complaints were frequently observed in the survivors and their families. Like such crisis theories formulated by Lindeman (1944), crisis theories that were developed started with basic conceptualizations of reactions to crisis events (James, 2008). The basic theories were based on psychoanalytic perspectives, such as a person's unconscious thoughts and past emotional experiences. Basic crisis theories expanded into theories of crisis response, like the adaptational theory and the interpersonal theory, which took into consideration social, environmental, and situational factors that make an event a crisis to a person (James, 2008). Moreover, expanded theories of crisis intervention further developed into crisis intervention approaches that offer a more encompassing framework for understanding crisis intervention strategies.

### **Crisis Intervention Approaches**

Several authors have demonstrated how the principles of EST can be applied to crisis intervention situations. These expanded approaches of crisis intervention have taken into consideration personal, social, environmental, and situational factors that make an event a personal crisis (James, 2008). Four examples of the principles of EST applied to crisis intervention and disaster mental health are the developmental-ecological approach (Collins &

Collins, 2005), the ecological model, which includes crisis in context theory (Myer & Moore, 2006), the ecological systems approach (Kilmer & Gil-Rivas, 2010), and the ecological, contextual crisis intervention approach (James, 2008).

Collins and Collins (2005) labeled their developmental-ecological approach to responding to a crisis and trauma as the ABCDE model. The ABCDE acronym is intended to remind interventionists of the five main categories included in crisis assessment and counseling: affect, behavior, cognition, development, and ecosystem. Affect is the client's expressed and unexpressed feelings to the crisis event. Behavior is indicated by what a client is doing or not doing in response to a crisis and can include the possibility of self-harm. Cognition is reflected in the meaning that a client ascribes to a traumatic event and is linked to thoughts and beliefs about a crisis. Development includes a client's characteristics such as psychosocial maturation, learned coping behaviors, and cognitive development. Finally, ecosystem is the client's cultural background and the access to different types of resources.

The second crisis intervention approach is the ecological model, which includes crisis in context theory (Myer & Moore, 2006). Myer and Moore (2006) proposed the determination of the unique impact of a crisis event on an individual. The authors used a specific formula to postulate the impact of a crisis event which included the following four factors: (a) the person's proximity to a crisis event, (b) the person's specific reaction to the event, (c) the determination of how the crisis changed a person's relationships with others and with systemic entities, and (d) the moderating impact of time on all other factors of the event. Although the ecological model has not been used in practical application, its potential for understanding the complex and layered nature of crisis reactions has been cited in research (James, 2008).

The third approach that includes principles of EST is the ecological systems approach for crisis intervention (Kilmer & Gil-Rivas, 2010). Kilmer and Gil-Rivas (2010) recommended the model as a useful framework for understanding the impact that disasters can have on children and families. The authors contended that their ecological model is useful in developing interventions for various systemic levels; such as the individual, the family, or the community. Their approach incorporates factors that previously have been shown to impact children's post-disaster functioning, like the strength of the child-parent bond. Kilmer and Gil-Rivas described how child characteristics might interact with environmental factors (i.e., school, community, and government responses) to influence child functioning and well-being after a disaster.

The fourth approach is James' (2008) ecological, contextual crisis intervention model for understanding disaster response across multiple systemic levels. James posited that effective communication is essential to adequately respond to a crisis and that the ecological systems perspective is adept at taking into consideration the multiple layers of communication and response, from local government to international aid organizations, that are often required to meet survivors' needs. James explored the impact of time on a person's healthy versus unhealthy reactions to a crisis event in his pathological chronosystem. In addition to James, several other authors have demonstrated how the principles of EST can be applied to crisis intervention situations (Collins & Collins, 2005; Kilmer & Gil-Rivas, 2010; Myer & Moore, 2006). Utilizing an ecological systems perspective has allowed researchers to better understand the contextual and systemic factors that can impact a person's reactions to a crisis event. Likewise, research has shown that the context of a disaster — it being of natural or man-made causes — can impact the subsequent reactions of survivors (Norris et al., 2002).

**Natural and man-made disasters.** Although natural disasters are often more physically destructive and initially more overwhelming, authors have argued that technological disasters cause more insidious psychological harm to survivors (Freudenburg, 1997). Part of the stress caused by technological disasters appears to stem from the lack of finality of the event. In a natural disaster like a hurricane, the storm passes through causing visible destruction, but leaves a measurable mess of damage to clean up. Freudenburg postulated that the problem with technological disasters like environmental pollutants is that the threat of toxicity is sometimes imperceptible to the natural senses. He noted that the clean-up of toxic contamination may also be very complex. For example, ground water contamination can change with water levels and can one day be within safe levels and the next day toxic.

The debate in disaster research has been over the efficacy of classifying disasters according to type (Picou, Marshall, & Gill, 2004). For example, there have been commonalities underlined in how individuals respond to all disasters. Still, natural disasters have been termed “Acts of God” by researchers, which may imply that the damage incurred could not have been prevented (Barkun, 1974). On the other hand, technological disasters have been considered “Acts of Man” and are human-caused. One of the first researchers to observe differences between technological and natural disasters was Erikson (1976). Erikson conducted anthropological research with survivors of the Buffalo Creek Disaster of 1972, a flood resulting from a poorly secured coal company impoundment dam in West Virginia. The coal company deflected responsibility for the flood by claiming it was an act of God. Erikson found that survivors were more distressed than would have been expected from a natural disaster.

Norris et al. (2002) also noted specific differences in the psychological reactions of survivors in response to man-made disasters when compared to natural disasters. Norris et al.

conducted a meta-analysis of over 160 samples of disaster survivors to determine the magnitude of the psychological impact from different types of disasters. The authors utilized samples of survivors from both developed and developing countries that had experienced natural disasters, technological disasters, and disasters involving mass violence. Results indicated that survivors of disasters of mass violence presented with the most severe impairment, defined as psychopathology in greater than 50% of the sample population. Furthermore, survivors of technological disasters reported a higher frequency of severe psychological impairment in comparison to survivors of natural disasters. The results obtained by Norris et al. lend strength to the argument put forth by previous disaster researchers (Erikson, 1976; Freudenburg, 1997; Picou, Marshall, & Gill, 2004): technological disasters have involved psychological harm over and above the impacts of natural disasters.

Researchers have explained that the persistent stress of not knowing levels of toxicity can bring fears and further stress, causing social problems (Freudenburg, 1997; Picou, Marshall, & Gill, 2004). Authors have noted the breakdown of social structures following technological disasters, a phenomenon referred to as the “corrosive community” (Erikson, 1976; Picou, Marshall, & Gill, 2004). Some of the community breakdown has been related to the sense of blame attributed to others — usually authority figures or the perpetrator — for the environmental and destructive damage suffered by survivors. Freudenburg (1997) outlined how survivors can become mistrustful of agencies and government entities that were supposed to protect them from harm. Furthermore, the legal process is ultimately designed to provide justice, but being involved with legal proceedings related to technological disasters has been found to contribute to long-lasting mental health consequences for survivors (Freudenburg, 1997; Picou, Marshall, & Gill, 2004). Research has supported that the legal battle over attributing blame is linked to re-

experiencing the traumatic event, or re-victimization. Authors have demonstrated that toxic technological disasters, due to their insidious nature, offer more opportunities for secondary and tertiary social disasters (Erikson, 1976; Picou, Marshall, & Gill, 2004).

**Impact of the Exxon Valdez oil spill.** Although the people of the Gulf Coast have experienced disasters before in the form of hurricanes and the resulting environmental contamination (Picou, 2009b), no place in the U.S. has faced a toxic technological disaster the magnitude of the BP Deepwater Horizon oil spill (Burdeau, 2011). The most similar technological catastrophe that the U.S. suffered was on March 24<sup>th</sup>, 1989, when the supertanker Exxon Valdez struck a reef off the coast of Prince William Sound, Alaska, and spilled an estimated 11 million gallons of oil in the local waters (Skinner & Reilly, 1989). The lessons learned from the Exxon Valdez oil spill (EVOS) provide a framework for how a community may be impacted by an oil spill (Picou, 2009a). Although studies of the impact of the EVOS have not focused on children or adolescents in particular, the knowledge garnered from the four studies outlined below is important because it represents how individuals, families, and social relationships are impacted by oil spills (Arata et al., 2000; Palinkas et al., 2004; Palinkas et al., 1992; Picou & Gill, 1996). Furthermore, cultural similarities between coastal Alaska and coastal Louisiana can be inferred through commonalities in subsistence and fishing-based economic activities (Dyer, 1993; Dyer, Gill, & Picou, 1992). Comparable to coastal Louisiana, Alaska has an economy largely based on petroleum production and fishing (Picou & Gill, 1996). The Alaskan spill was responsible for the death of approximately 500,000 fish, marine animals, and birds (Dass-Brailsford, 2010). In addition to the destruction of wildlife, the spill negatively impacted surrounding communities (Dyer, 1993; Dyer, Gill, & Picou, 1992). The inhabitants of Prince William Sound, and especially the Native American inhabitants, have largely lived off the

marine species of the local environment. The spill not only destroyed wildlife and habitat in the environment, but also threatened the mental health of Alaskan Natives and their entire way of life (Palinkas et al., 2004; Palinkas et al., 1992). Researchers investigated the immediate social and psychological reactions to the EVOS and the longer-term community impacts up to six years after the spill (Arata et al., 2000; Picou & Gill, 1996).

In the first study, Palinkas et al. (1992) surveyed a random sample of 559 households from 13 communities in Alaska (i.e., 177 Alaskan Natives and 371 Euro-Americans). Eleven of the communities were affected, impacted directly by the EVOS, and two communities were used as control communities, not directly impacted. Study variables were exposure to the spill, changes in income, variations in social support, and symptoms of depression. Exposure scores for both Alaskan Natives and Euro-Americans were significantly related to depression scores with Alaskan Natives more severely impacted and having higher mean depression scores than Euro-Americans, although both groups lived similar distances from the coast. Alaskan Natives had higher exposure levels specifically because of working more in clean-up activities, contact with oil, damage to traditional fishing areas, and worse effects of the spill on hunting, fishing, and gathering activities of family members. Additionally, the decline in social relations was an important predictor of depressive symptoms in both Alaskan Natives and Euro-Americans. However, family supports seemed to buffer the effects of the spill for Euro-Americans, but not Natives. Palinkas et al. suggested that differences in how social supports operate could be due to the societal structure of the Native cultures and that Alaskan Native cultures were based on seasonal harvests and sharing of subsistence resources to strengthen family bonds. Because subsistence activities were threatened by the EVOS, the authors concluded that the maintenance of family bonds was more difficult for Alaskan Natives.

As a follow-up study with the same sample, Palinkas et al. (2004) explored ethnic differences of PTSD between Alaskan Natives and Euro-Americans across exposure, subsistence behavior, and social support. Results indicated declines in subsistence activities were related to PTSD in both Alaskan Natives and Euro-Americans. However, in comparing the two groups, decline in subsistence activities was a stronger predictor of PTSD in Natives. Decreases in social support had a similar relationship to PTSD for the two ethnicities, but decline in social support was a stronger predictor of PTSD in Alaskan Natives. In Natives, low family support was significantly related to PTSD and female gender was a strong predictor of PTSD. When considering exposure type and symptoms of PTSD, only one type of exposure was significant for Euro-Americans: effects on hunting, fishing, and gathering. On the other hand, for Alaskan Natives PTSD was significantly related to participation in clean-up activities, loss of property, effects on fishing activities, and damage to commercial fishing areas. Overall, Palinkas et al. pointed out that the EVOS seriously impacted social supports for both ethnicities and that declines in social supports were related to the presence of PTSD symptoms. Moreover, exposure and decline in subsistence activities seemed to particularly impact Alaskan Natives.

Picou and Gill (1996) examined some of the longer-term stress effects of the EVOS two (1991) and three years (1992) after the spill from three Alaskan communities with distinct economic infrastructures that were exposed differentially. The town of Cordova, Alaska was selected as a community with an economy based largely on fishing, and hence a renewable resource community, that had its waters directly impacted by the spill (i.e., 228 respondents in 1991 and 89 respondents in 1992). Petersburg, Alaska, the control community, was selected also as a renewable resource community, but Petersburg did not have its waters directly impacted by the spill (i.e., 102 respondents in 1991 and 59 respondents in 1992). Valdez, Alaska, was



selected as a community with an economy based on non-renewable resources like the petroleum industry and tourism, but not much fishing, which was impacted by its proximity to the disaster (i.e., 119 respondents in 1991 and 63 respondents in 1992). Picou and Gill (1996) found that the fishing-based residents of Cordova and residents of Valdez with greater exposure to the spill were more impacted and had significantly higher intrusive scores than Petersburg residents, the control community. In the 1991 study, the results indicated that the fishing based community of Cordova had significantly higher intrusive stress levels than residents of the non-fishing based community of Valdez. Although results were similar in 1992, differences only approached significance. However, the authors found that stress levels were still high two and three years after the spill in fishing-based communities. Others have found that the endemic affects of oil spills can last much longer (Arata et al., 2000).

Six years after the spill, Arata, Picou, Johnson, and McNally (2000) explored the impact of the EVOS on the mental health, social, and economic resources of commercial fishermen. The authors surveyed 125 commercial fishermen in Cordova and asked about ways participants had attempted to cope with stressors from the oil spill. Their results indicated that anxiety and depression were persistent problems with 23% of males and 13% of females reporting clinically significant levels of anxiety and 39% of males and 20% of females reporting clinically significant levels of depression. PTSD symptoms were reported high for both males (34%) and females (40%). Additionally, certain types of resource losses, like having to sell possessions to have income, were significantly correlated with levels of anxiety, depression, and PTSD. For participants in the 2000 study, both decline in the quality of family relationships and reported level of physical health were significantly related to all measures of participants' mental health. Declines observed in the social and economic resources of participants may have triggered

mental health problems, which were not short-lived in the aftermath of the spill, but persisted for at least six years post-spill. The authors' study, like the other three studies outlined above (i.e. Palinkas et al., 2004; Palinkas et al., 1992; Picou & Gill, 1996), focused on the impact of the EVOS on adults; no studies have been conducted on the children and adolescents impacted by the EVOS, one of the most vulnerable populations that can be impacted by disasters (Norris et al., 2002; Pfefferbaum et al., 2010). Studies of survivors of the EVOS have shown that both individual and environmental factors can impact a person's stress reactions to a spill (Palinkas et al., 2004; Palinkas et al., 1992; Picou & Gill, 1996), with symptoms that can be endemic and persist many years after a disaster (Arata et al., 2000).

### **Ecological Systems Theory**

Ecological systems theory (EST) has been recommended as a useful framework for understanding the individual and environmental factors that can impact the functioning of individuals, children, and families after disasters (James, 2008; Kilmer & Gil-Rivas, 2010). EST has a rich history and is conceptually similar to other systems theories. EST includes the influences of individual and environmental characteristics that contribute to child development (Bronfenbrenner, 1979). In the face of disasters, youth are viewed as a vulnerable population (Lepore, 2009; Murray, 2011; Norris et al., 2002; Pfefferbaum et al., 2010). EST incorporates the influences of child factors (e.g., gender and psychological resources) as well as environmental factors (e.g., exposure, SES, and culture) on children's reactions to disaster events.

Uri Bronfenbrenner, a leading theorist of EST, was born in Russia in 1917 and immigrated to the U.S. with his family when he was 6 years old (Bronfenbrenner Life Course Center, n.d.). Bronfenbrenner's (1979) multicultural background facilitated his extensive

research in Russia where he furthered a conceptualization of the societal and cultural impacts on behavior. The international scope of his work allowed for the exposition of how environmental factors can influence human development, and vice versa, from the microsystem family influences to the macrosystem (i.e., political ideology). Bronfenbrenner is considered a developmental psychologist, and accordingly, has cited numerous developmental scholars, including Jean Piaget, as being influential in the development of his ecological systems theory. He elaborated on how important the writings of social psychologist Kurt Lewin were on his own theory. In fact, Lewin's (1951) field theory proposed the centrality of context as is represented in his equation:  $B = f(P \times E)$ , behavior is a function of the person and the environment. Bronfenbrenner has been credited with integrating ideas from many disciplines, crossing previously held academic boundaries, and forming a multidisciplinary approach that takes a novel look at human behavior (Bronfenbrenner Life Course Center, n.d.).

EST can be conceptualized in relation to other systems theories. Prochaska and Norcross (2007) explained how systems theories, when they emerged in the mid-20<sup>th</sup> century, represented a new perspective in understanding communication pathways and organizational processes. Instead of focusing on the end product as was common in traditional scientific methods, systems theories focused on studying the interactional processes within organisms and organizations. Two of the original systems theories influential in the development of subsequent models were general systems theory and cybernetics. General systems theory explained how biological processes work together to maintain balance. Prochaska and Norcross provided an example of the mechanics of how different parts of the human cell interact in the transfer of information during cell division. The authors added that cybernetics, the study of the similarities in ways computers and living organisms operate, represents how communication in one part of the

system causes reaction in other parts of the system. They purported that in counseling, systemic therapy can refer to either the treatment type or the objective of therapy. A counselor might work in a one-on-one format with a client in individual therapy, or meet with the entire family, which would be considered a systemic modality. Approaching from a systemic perspective, the objective of therapy would be the improvement of the functioning of the family system.

Prochaska and Norcross described how each member of the family can influence other family members, and in turn, impact the workings of the whole family system as much positively as negatively. Bronfenbrenner (1979) maintained that in EST, the environment or system influences the developing person, and subsequently, the developing person influences the environment.

The continuous exchanges between the system's entities, or the parts of the whole, have been described as the processes of interest to systems theorists (Prochaska & Norcross, 2007). Likewise, Bronfenbrenner (1979) identified social interactions as the building blocks of development. He referred to these building block interactions as molar activities, which are behaviors, or interactions, that have meaning to those involved and occur continuously over time. Later, Bronfenbrenner and Morris (1998) incorporated more genetic, or biological, factors into the proximal processes of development and posited that "human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment" (p. 996).

**Basic concepts of EST.** Bronfenbrenner (1979) portrayed the microsystem as the core of human development and is described as "a pattern of activities, roles, and interpersonal relations experienced by the developing person in a given setting with particular physical and material

characteristics” (p. 22). He explained that the original setting in which a person develops is usually the home and the original interactions that stimulate development are normally with the family. As children grow, the microsystem expands to include additional contexts like the school. This process of entering into a new setting is referred to by Bronfenbrenner (1979) as an ecological transition.

Bronfenbrenner (1979) represented the mesosystem as the relationships, or communications, between two or more contexts in which developing children interact. He provided an example of children transitioning from a setting like the home into a school environment. The mesosystem represents the connections that result from children moving between these two ecologies. Teachers might send notes or call home periodically to report on the progress of children, parents may decide to join parent teacher organizations, or children may begin to see the school counselor. Through these communications and interactions, the environment influences the development of children. Simultaneously, the characteristics of the children and the family would equally influence the school and other environments. These social interactions are the building blocks of development and can lead to important protective factors for children (Bernard & Slade, 2009; Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998).

Bronfenbrenner (1979) proposed that the setting that children do not directly participate in, but still in fact influences and impacts development, is the exosystem. An example of the exosystem is the parents’ place of work. Although children would not normally participate in the parents’ work settings, the conditions and the responsibilities of the job still could influence the parents’ mood, parenting style, and subsequently, the way the parents interact with children. The impact of time on children is seen as the chronosystem. Bronfenbrenner (1986) considered the chronosystem as either the amount of time that has passed since an event or when an event

occurs in children's sequential development. He distinguished between normative life transitions like entering a certain level of school, which tend to be positive, and non-normative transitions, like the death of a family member, or by extension the experiences of a disaster. The timing of a non-normative life transition in children's development can have long-lasting effects.

Bronfenbrenner explained that beyond the influences of the microsystem of the home, school and work lay the broader influences of the culture as a whole. He termed the culture context the macrosystem, which includes general consistencies or cultural communalities in the ways microsystems, mesosystems, and exosystems function. He provided an example of how schools in one nation, France, would likely be guided by similar laws and would have much in common in comparison to schools in a different nation like the United States. Similarly, members of particular sub-cultures, like rural Appalachian residents affected by the Buffalo Creek flood of 1972 (Erikson, 1976), would have a more collective belief system in comparison to the nation as a whole. The macrosystem, and the cultural mores, are thought to influence the workings of more interior systems like the home and the school.

Southern Louisiana residents are distinct and possess values and customs different from mainstream America (Davis, 2010; Tidwell, 2003). The smaller communities representative of coastal Louisiana have a sharp power differential in comparison to the large oil corporation responsible for the spill (Button, 2010). The Louisiana coastal communities are under-matched in political and economic power. Residents can be viewed as a peripheral group struggling to maintain its identity in relation to the expectations and corporate interests of mainstream America (Helms, 1995; Helms & Carter, 1991). Coastal Louisiana has a rich cultural history, but one that is being threatened by susceptibility to man-made and natural disasters (Barry, 1997; Davis, 2010; Tidwell, 2003). Coastal residents have had a history of exposure to natural

disasters like Hurricanes Camille and Betsey and most recently Hurricane Katrina (Dass-Brailsford, 2010). Residents have also been victimized by man-made disasters at the hands of larger power holders. Examples include the levee breakage after Katrina (Dass-Brailsford, 2010), the Mississippi River levee being intentionally exploded south of New Orleans during the great flood of 1927 (Barry, 1997), and the improper containment of oil before Hurricane Katrina in 2005 causing toxic seepage in St. Bernard Parish (Button, 2010). Disasters, along with the persistence of coastal erosion and now the BP oil spill have threatened to completely wash away Louisiana coastal communities (Button, 2010; Davis, 2010; Tidwell, 2003).

Louisiana coastal communities have been described as culturally and economically tied to the seafood industry (Tidwell, 2003), which was been hit hard by the impact of the BP Deepwater Horizon oil spill. As a result of the oil spill,; fishing, shrimping, and oyster fishing have all been in decline and fishermen are facing uncertain futures (Anderson, 2011; Elliott & Peñaloza, 2010). Recent and previous researchers have found that fishermen, subsistence cultural groups, and communities intrinsically tied to the natural ecosystem fare much worse in oil spills (Abramson et al., 2010; Arata et al., 2000; Dyer, Gill, & Picou, 1992; Palinkas et al., 2004). Affected coastal populations in Louisiana have largely self-reported as either Cajun/Creole/French or White (Lee & Blanchard, 2010). Tidwell (2003) conducted an anthropological study along the bayous of southern Louisiana, interviewing fishermen and studying the unique coastal culture. Tidwell explained that the Cajun people of southern Louisiana are a diverse mix of cultures. They are characterized as incredibly strong and resourceful people that have endured a long history of discrimination and oppression from mainstream America. Primarily, the Cajuns were kicked out of Nova Scotia and later had the

French language outlawed in public schools. Tidwell argued that this history of oppression has led to a tendency of coastal residents to be suspicious of outsiders.

Fishing, shrimping, and trapping have been a way of life for some coastal residents for a number of generations (Tidwell, 2003). Wetland habitats such as in the Louisiana coastal area have been described as one of the most biologically productive areas on earth. Davis (2010) argued that there are not many communities left in the U.S. that can still sustain themselves through subsistence activities like fishing and hunting. However, coastal erosion has been posing a serious threat to coastal communities. Estimates are that a football field of land is lost from coastal Louisiana every 20 minutes, 25 square miles per year, destroying vital habitat for fish, crabs, shrimp, birds, and other wild life, which are the lifelines for traditional Cajun communities (Tidwell, 2003).

Coastal erosion has been caused by both man-made environmental engineering and the practices of the petroleum industry (Tidwell, 2003). Over the years, the gulf coast has been built up from the periodic flooding of the Mississippi River and the depositing of sediments (Barry, 1997). To prevent flooding, the river is now channeled out to sea through a complex levee system constructed by the U. S. Army Corps of Engineers. However, erosion has been made worse from the lack of natural over-flow of sediments from the Mississippi River. The practices of shipping and the petroleum industry, which serves the high demands of oil by the entire U.S. population, have also enhanced coastal deterioration. “More than ten thousand miles of pipe lie underwater, constructed by the cutting of canals” (Tidwell, 2003, p. 35). Canals have been made to facilitate shipping of oil and other products, but allow wave action erosion from boats and storms causing further erosion to the delicate marsh grass and land, which is mud-based. Much of Louisiana’s coastal marshes and wetlands are being destroyed. Coastal residents have come



to find their unique way of life threatened by several sources, but none as immediate as the BP Deepwater Horizon oil spill (Button, 2010; Davis, 2010).

### **Child Characteristics and the Environment**

Children and environmental characteristics have been identified that interact to influence the impact of disasters on youth (Norris et al., 2002). Bronfenbrenner and Morris (1998) built on the growing body of research of the ecological influences on development and argued that genetic characteristics of children could profoundly impact interactional processes, which in turn could influence child development. Genetic factors that have been linked to the developmental outcome of interactional processes are physical characteristics and gender of children (Bronfenbrenner & Morris, 1998; Maccoby, 1995). Bronfenbrenner and Morris provided an example of how children of low birth-weight elicit different responses from their respective environments in comparison to children of normal birth-weight. Genetic and personality characteristics of children have been postulated to greatly influence children's interactions with others in the environment (Bronfenbrenner & Morris, 1998). Bronfenbrenner and Morris explained that not only the individual physical characteristics of children, but also their personality traits can influence subsequent interactional processes. They noted that positive personal characteristics of the interacting individuals, like pro-social tendencies and curiosity, influence the environment and stimulate additional interactions.

According to Bronfenbrenner (1986), a child's age at the onset of a traumatic or stressful event is important to subsequent functioning. Older children have had the time to develop more coping resources than younger children and are expected to fare better. By extension, adults are expected to exhibit more coping resources than children. Children of all ages have been found to be vulnerable in the face of crises and disasters (Norris et al., 2002; Pfefferbaum et al., 2010).

Norris et al. (2002) found that children were more likely to experience very severe psychological impairment after a disaster in comparison to adults. More specifically, 29.6% of youth analyzed experienced severe psychological impairment in comparison to 18.3% of adults analyzed.

Research noted that younger children deal less effectively with non-normative transitions as they have not developed the coping resources to counteract environmental stressors (Lepore, 2009; Vila et al., 2001). Nevertheless, others have reported that older children experience more psychological stress after a disaster than younger children (Green et al., 1991).

**Stress reactions.** Level of exposure, impact on family, and child characteristics have been linked to stress responses of children after disasters (Green et al., 1991; La Greca, Silverman, & Wasserstein, 1998; March et al., 1997). Child interactions with the environment have been tied to ability to recover from stress and other traumatic events (Garmezy, 1994). Preexisting child characteristics, like the level of anxiety, have been shown to place students at risk for stronger stress reactions when exposed to natural disasters (La Greca, Silverman, & Wasserstein, 1998). Other research indicated stress reactions (i.e., intrusive thoughts, denial, and arousal responses) from 118 families and their children to the Buffalo Creek flood of 1972 two years after the event (Green et al., 1991). Green et al. noted the most common stress response of survivors of intrusive thoughts was related to the flood. Green et al. found that younger children (i.e. under the age of 8) were less impacted than older children (i.e., between ages of 8 and 15). Females reported significantly more stress symptoms overall than males. Also, the authors found that child and environmental characteristics were significant predictors of stress responses in children. Severity of exposure, female gender, parental impact, and home atmosphere were significant predictors of stress. More specifically, severity of exposure included contact with the flood waters and subsequent separation from family. Higher stress responses of parents were

found to be predictors of distress in children. Additionally, home environment after a disaster was noted as being a significant predictor of subsequent stress response symptoms of children. Home environments described as irritable and depressive were the most predictive of stress.

**Exposure to disasters.** Hamblen and Barnett (n.d.) outlined three factors that most impact children's reactions to a crisis: proximity, parental reactions, and severity of the traumatic event. Amount of exposure has been considered one of the greatest contributors to ongoing psychological distress for children after disasters (March, Amaya-Jackson, Terry, & Costanzo, 1997; La Greca, Silverman, & Wasserstein, 1998). Exposure to disasters has been characterized as threat to life, loss of loved ones, family separation, significant life changes due to the disaster, and media exposure (March et al., 1997; Khoury et al., 1997; La Greca, Silverman, & Wasserstein, 1998; Pfefferbaum et al., 2000). Exposure to oil spills has included amount of resources lost, damage to the environment, or physical exposure to toxic chemicals (Bevc et al., 2007; Hobfoll, 2001; Palinkas et al., 2004; Palinkas et al., 1992).

Norris et al. (2002) found that children who were exposed to a disaster presented with clinginess, dependence, refusal to sleep alone, temper tantrums, aggressive behavior, incontinence, hyperactivity, and separation anxiety. After disaster exposure, children were observed as being very aware of the potential for new disasters (Gaffney, 2006). Vila et al. (2001) found that children more directly exposed to a technological disaster had higher distress and more behavioral symptoms than children indirectly exposed. Similarly, Khoury et al. (1997) observed that adolescents experiencing greater problems from Hurricane Andrew reported higher stress symptoms, and subsequently, more deviant behavior. La Greca, Silverman, and Wasserstein (1998) noted that exposure to hurricane conditions in which participants thought that they might die was associated with the most risk.

March, Amaya-Jackson, Terry, and Costanzo (1997) examined reactions of children and adolescents impacted by a man-made disaster, the 1991 Imperial Foods Fire in a North Carolina food-processing plant that killed 25 and injured 56 people. Although no children were physically injured by the fire, the community was shaken by the suddenness of the tragedy and youth were directly and indirectly impacted. Direct exposure was considered going to the site of the fire the next morning and seeing the aftermath. Indirect exposure was considered having a friend or relative injured or killed in the fire. Nine months after the accident, between 9.7% and 11.9% of 1,019 youth from the ages of 10 to 16 years old had diagnosable symptoms of PTSD and higher levels of exposure predicted higher post-traumatic symptoms (March, et al., 1997). Moreover, 30.4% of youth who experienced both direct and indirect exposure met criteria for PTSD. At this highest exposure level, female gender was found to be a significant risk factor for symptoms of distress. Although direct and more life-threatening exposure was shown to be the greatest predictor of stress symptoms (Green et al., 1991; La Greca, Silverman, & Wasserstein, 1998), authors have found that indirect exposure can be significant in highly publicized and wide-spread disasters (Pfefferbaum et al., 2000). Pfefferbaum et al. (2000) examined the posttraumatic stress reactions of children two years after the Oklahoma City Bombing and found that even indirect interpersonal exposure to the bombing, along with media exposure, significantly predicted symptoms.

**Gender differences.** Gender has been linked to how individuals respond to stress (Anderson & Manuel, 1994; Dell’Osso et al., 2011; Garmezy, 1994). Dell’Osso et al. (2011) examined gender differences and symptoms of PTSD reactions of 512 high school students (232 females and 280 males) 10 months after an earthquake in Italy. Results indicated that double the percentage of female respondents (51.7%) self-reported with full-blown symptoms of PTSD,

compared to male respondents (25.7%). Furthermore, there were significant mean differences in total impact scores as well as intrusion and avoidance subscale scores for male and female adolescents. Additionally, Norris et al. (2002) analyzed 49 studies with gender as the independent variable of the impact of disasters and found that for 94% of the studies (46 of 49) females were more greatly impacted by disasters than males, which held true for female adults as well as female children and adolescents.

Several studies examining gender differences reported that females experience greater distress post-disaster (Anderson & Manuel, 1994; Dell'Osso, 2011; Khoury et al. 1997; March et al., 1997). Nevertheless, other studies revealed different results (Sundin & Horowitz, 2003; Vila et al., 2001; Werner, 1986). Sundin and Horowitz (2003) discovered no gender differences in responses to stressful events and Werner (1986) found that female children showed more resilience to growing up in the environment of an alcoholic home. Additionally, Vila et al. (2001) noted no gender differences in children exposed to a technological disaster in France.

Masten and Osofsky (2010) outlined several studies that found females reported more symptoms post-disaster than males. However, the authors postulated that these findings may represent actual differences in how females experience disasters, or may represent only gender differences in the disclosure of symptoms. Males may feel less comfortable disclosing symptoms. Maccoby (1995) argued that as males and females develop, they are socialized in different ways by their environments, are influenced by differing societal expectations, and participate in separate activities that may involve distinct social supports. Melecki and Demaray (2002) found that adolescent females reported greater levels of perceived social support than males. Garnezy (1994) found that gender impacts how individuals respond to stress. He surmised that both interpersonal stressors and support systems are more significant for girls.

Additionally, differences have been observed in how males and females experience stress (Anderson & Manuel, 1994; Dell'Osso et al., 2011) and in how males and females utilize social support (Melecki & Demaray, 2002, 2003; Rueger, Malecki, & Demaray, 2010).

**Socioeconomic status.** Socioeconomic status can be representative of the available resources in the microsystem of children (Bronfenbrenner, 1979). Economic resources have been viewed as a protective factor for children facing adversity (Garmezy, 1994). The ability to rebound psychosocially after a toxic disaster is often associated with the amount of resources available to individuals (Picou, 2009a). Norris et al. (2002) found that in 13 of 14 (93%) studies analyzed, participant SES was significantly associated with level of impact. Other disaster mental health studies have neglected to analyze SES of youth, but have linked minority ethnic status to greater distress following disasters (La Greca, Silverman, & Wasserstein, 1998; Vila et al., 2001). Vila et al. (2001) conceded that these findings may have more to do with underlying social and economic constraints than participant ethnic category. Hobfoll (2001) pointed out that stress following trauma is related to the amount of resources lost and the ability to recuperate losses. Individuals with fewer accumulated resources struggle more in recuperating resources.

Lower-SES individuals, or those who have fewer resources available to them, can be considered peripheral group members (Helms, 1995). According to Helms (1995), what has made groups different in the U.S. are their experiences of different degrees of either being dominant or being oppressed: the former concept representing the advantages of being a member of the in-group, while the latter represents the perils of out-group membership. Although the concept of central versus peripheral group membership originated as a conceptualization of differential racial identity development, group membership can be applied to how lower-SES individuals may respond to a disaster event.

When coping resources of a community are overwrought by a disaster, help usually comes from outside of the local community (James, 2008). However, peripheral group members may be mistrustful of outsiders (Erikson, 1976; Tidwell, 2003). This mistrust may complicate intergroup relationships; Nickerson, Helms and Terrell (1994) found that high levels of cultural mistrust were related to negative attitudes about seeking help from mental health agencies staffed by members of the dominant or central group culture. Central group members may be less likely, though at times unconsciously, to offer help to peripheral group members in times of distress (Carter, Helms, & Juby, 2004; Helms, 1995).

**Resilience and protective factors.** Researchers have argued that the personal characteristic of resilience is related to children's ability to bounce back from stressful or possibly traumatic events (Baum, Rotter, Reidler & Brom, 2009; Conner, 2008; Garmezy, 1994). The development of resilience has been related to people's interactions with the environment and the presence of other protective factors. Garmezy (1994) also found that gender influences resilience. Resilience and protective factors are two complimentary terms that have been put forth in the literature. Researchers have stressed that resilience and protective factors mitigate the risks from disaster exposure and contribute to the speedy recovery of survivors (Baum, Rotter, Reidler, & Brom, 2009; Conner, 2008). Resilience has been described as an individual personality characteristic and has been related to social or economic environmental supports (Garmezy, 1994). Garmezy (1994) posited the following:

protective factors are generally classified into two groups: 1) personal factors, some with a strong biological component, like physical health status and temperament; others closely linked to experiences with the social environment, such as self-esteem and

mastery beliefs; and 2) environmental resources, such as family income or ties to a community of supportive social relationships (p. 34).

Windle (2010) defined the concept of resilience as follows: “Resilience is the process of negotiating, managing and adapting to significant sources of stress or trauma. Assets and resources within the individual, his or her life and environment facilitate this capacity for adaptation and ‘bouncing back’ in the face of adversity” (p. 2; as cited in Windle, Bennet, & Noyes, 2011). The definition of resilience satisfies the tenets of an ecosystemic perspective because it entails the characteristics of individuals, the aspects of the environmental context of development, and the process of the interaction between individuals and the environment in the development of resilience (Bronfenbrenner, 1979). Studies with adults have shown that psychological resources; such as coping, self-efficacy, mastery, self-esteem, optimism, and hope are linked to lesser impacts from disasters (Benight, Swift, Sanger, Smith, & Zeppelin, 1999). The authors surveyed 67 adult survivors of Hurricane Opal in Florida and determined that survivor characteristics that were the strongest predictors of distress were coping and self-efficacy, with higher levels of coping and self-efficacy predicting lower levels of distress.

Many studies of resilience in children have been longitudinal in nature and have examined the characteristics of children who attain success despite difficult environmental conditions (Bernard & Slade, 2009; Rutter, Champion, Quinton, Maughan, & Pickles, 1995; Werner, 1986). According to the findings of Rutter et al. (1995), children who displayed emotional or behavioral problems at a young age are much more likely to experience similar problems later in life. However, individuals who tended to plan life events and choices as children had significantly less severe problems later. The concept of planning for the future is similar to the two dimensions measured in the Resilience Scale, perseverance and self-reliance



(Wagnild & Young, 1990, 1993). Perseverance is defined as the persistence and continued self-discipline in the face of adversity, whereas self-reliance is defined as individuals' confidence in personal abilities and a clear outlook on what individuals are capable of achieving individually.

Starting in 1955, Werner (1986), a leading researcher in the field of resilience (Bernard & Slade, 2009; Henderson & Milstein, 2003; Wagnild & Young, 1993), followed a cohort of 698 children from birth in Kauai, Hawaii. Using a sub-sample of 49 children from the original cohort, Werner found that more of the children of alcoholic parents, when compared to the rest of the cohort, were from poor families (76%) and received low levels of emotional support (78%) from their families. Children of alcoholic parents had higher rates of learning problems, mental health needs, and serious legal problems by age 18. Nevertheless, 59% of the at-risk sample did not develop the above-mentioned problems and were classified as resilient. Both child and environmental characteristics were related to a lack of problems, or resilience. Werner pointed out the importance of child influences on the environment and the importance of environmental influences on children in the development of resilience. Resilient children were more likely to be female and more likely to be rated by parents as cuddly or affectionate during the first year of life. Resilient children of alcoholics had higher IQs and higher aptitude scores in comparison to children with more psychosocial problems. In particular, they had higher verbal intelligence and verbal aptitude scores. Resilient children tended to possess the following psychological characteristics: greater sense of well-being, psychological health, higher socialization and caring, self-control and tolerance of individual differences, higher internal locus of control and self-esteem.

Characteristics of the environment were also found to be important distinctions between resilient and non-resilient children (Werner, 1986). Resilient children were less likely to have

another sibling born close in age (i.e., within 20 months), which was thought to be related to increased parental attention. Less home conflict, maternal employment, and two-parent homes were environmental characteristics of resilience. Children from alcoholic mothers in comparison to fathers were found to be particularly at-risk and to have more developmental problems. Although significant SES differences were not found, it was thought that most of the children came from impoverished homes and there was not a great range of SES levels.

Bernard and Slade (2009) outlined the basics of how resilience develops, or resilience theory: environmental protective factors, or resiliency assets, help in the attainment of resiliency characteristics in developing children. Individual resiliency characteristics have included personal self-efficacy and a positive outlook on life (Wagnild & Young, 1990, 1993). Bronfenbrenner and Morris (1998) proposed that stimulating environments with toys and objects that can be touched and manipulated by children facilitate intellectual development. Subsequently, the authors argued that personal characteristics of growing children can interact with the environment and contribute to differential developmental outcomes. Bronfenbrenner's (1979) microsystem includes the settings in which individuals participate in on a daily basis. The mesosystem acts as the connections between two or more contexts in which developing children interact. Through children's communications, the environment influences child development, while the characteristics of children influence the environment. Researchers have noted that these social interactions help to build resilience in children (Bernard & Slade, 2009; Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998).

A protective factor, or resiliency asset, identified in the development of resiliency is the availability of social supports in children's environments (Bernard & Slade, 2009; Garnezy, 1994). Social support has been found to be a protective factor in mitigating many development

risks (Hyman, Gold, & Cott, 2003; Rueger, Malecki, & Demaray, 2010; Uchino, 2006). Family support has been linked to less student problems post-disaster (Khoury et al., 1997). Researchers have described how social supports for adolescents can come from parents, teachers, classmates, close friends, and school (Malecki, Demaray, Elliott, & Nolten, 1999; Malecki, Demaray, & Elliott, 2000). Different types of social supports have been recognized in the literature. Malecki and Demaray (2002) outlined four types based on Tardy's (1985) model of social support: instrumental, emotional, informational, and appraisal support.

Prinstein, La Grega, Vernberg, and Silverman (1996) reported that one of the most commonly described forms of assistance provided to children in the aftermath of Hurricane Andrew (1992) was the reinstatement of familiar daily roles and routines. Prinstein et al. found that parents and friends were important social outlets and support for children after the hurricane. Schools play an essential function in helping children and families to re-establish normal schedules after a disaster (Lepore, 2009). Henderson and Milstein (2003) and Werner (1986) suggested that the home and the school are two settings that have been linked to the development of resilience and protective factors in children. Additionally, teachers were labeled as critical post-disaster players because of their frequent contact with students and their ability to provide coping-related school activities. Increasing social support and helping to build resiliency were recommended as interventions for children and adolescents in the face of disasters (Baum, Rotter, Reidler, & Brom, 2009; Conner, 2008; Norris & Kaniasty, 1996). Baum, Rotter, Reidler, and Brom (2009) demonstrated how schools can help to build resiliency through structured guidance lessons that teach coping skills. Henderson and Milstein (2003) proposed ways to incorporate resiliency building into school settings with a six step model (Resiliency Wheel), which includes: increasing pro-social bonding, setting clear and consistent boundaries, teaching

life skills, providing caring and support, setting and communicating high expectations, and providing opportunities for meaningful participation.

## **Summary**

Progressions in the field of disaster mental health have paralleled responses to early disasters. Crisis intervention theories started with basic concepts of how survivors respond to disasters and developed into more expanded theories like EST that take into consideration social, environmental, and situational factors of crisis events (James, 2008). The principles of EST have been incorporated into several models that offer a more encompassing framework for understanding how crises can impact individuals and systems. However, these approaches, like the ecological model of Myers and Moore (2006), have been utilized as conceptualizations and have not been used greatly in practical application (James, 2008).

Basic concepts of EST include the microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1979). EST incorporates the influences of child factors (i.e., gender and resilience) in addition to environmental factors (i.e., exposure and SES) on children's stress reactions to disasters. Research has indicated that stress reactions of children post-disaster are related to exposure, impact on the family, and child characteristics (Green et al., 1991; La Greca, Silverman, & Wasserstein, 1998; March et al., 1997). Female gender (Dell'Osso et al., 2011) and lower-SES (Hobfoll, 2001; Norris et al., 2002) have been identified as risk factors for greater reported distress after disasters, whereas individuals with higher levels of resilience have been found to report lesser reactions (Benight et al., 1999). Despite knowledge gained from previous disaster research, questions still abound about which factors most impact adolescent functioning post-disaster and how factors interact to influence stress reactions.

Researchers have noted differences in how survivors respond to natural and man-made disasters. Although natural disasters are often initially more physically destructive and overwhelming, technological disasters can cause more insidious psychological harm (Freudenburg, 1997; Norris et al., 2002). In the U.S., the man-made disaster most similar to the BP Deepwater Horizon oil spill has been the Exxon Valdez oil spill. Investigators have found that fishing-based and subsistence populations were greatly impacted by the spill (Palinkas et al., 2004) and that negative effects lasted for up to six years after the spill (Arata et al., 2000). The intermediate and longer-term effects of the BP Deepwater Horizon oil spill are yet to be known. Research with survivors of the Exxon Valdez oil spill has largely focused on adults (Palinkas et al., 2004; Palinkas et al., 1992; Picou & Gill, 1996), leaving a gap in the research in regards to the impact of oil spills on children and adolescents. Moreover, children and adolescents have been identified as vulnerable populations during and after all types of disasters (Norris et al., 2002; Pfefferbaum et al., 2010).

## **Chapter III**

### **Methodology**

#### **Introduction**

In this chapter, the purpose of the study and the research questions are reviewed and the variables (i.e., independent and dependent) are identified. The psychometric properties of the following selected instruments are discussed: Impact of Event Scale (Horowitz, Wilner & Alvarez, 1979), Exposure Index (Palinkas et al., 2004; Palinkas et al., 1992), and Resilience Scale (Wagnild & Young, 1990, 1993). Also, the data collection and analysis methods are delineated.

#### **Purpose of the Study**

The purpose of this study was to explore the impact of the BP Deepwater Horizon oil spill on students enrolled in coastal Louisiana schools and determine how student factors influence psychosocial risks. A review of the literature demonstrated that much has been learned in recent years about the impact of natural and man-made disasters on different groups of people (James, 2008; Norris et al., 2002) and that the ecological systems theory offers a useful framework for understanding the complex interactions that may influence people's reactions to a crisis event (Bronfenbrenner, 1979). Several personal and environmental factors have been linked to individuals' stress reactions to disasters. Norris et al. (2002) enumerated the importance of the following factors: (a) severity of exposure including intensity and duration of individual exposure and severity of community-wide destruction, (b) gender, (c) socioeconomic status (SES), and (d) individual psychological resources.

## **Research Questions**

The following research questions were investigated in the present study:

1. Is there a statistically significant mean difference in risk factors for students with low levels of oil exposure in comparison to students with high levels of oil exposure?
2. Do mean differences for risk from exposure vary significantly across gender, socioeconomic status and level of resilience?
3. Are there statistically significant mean differences in student risk factors across gender and socioeconomic status?
4. Are there statistically significant mean differences in student risk factors across levels of student resilience (i.e., high resilience, medium resilience, low resilience) and gender and socioeconomic status?
5. How well do level of oil exposure, gender, socioeconomic status, and resilience predict student risk factors?

## **Variables**

This study contained one dependent variable, risk. The Impact of Event Scale (IES; Horowitz, Wilner, & Alvarez, 1979) was used to determine student risk. The IES has been used frequently in disaster mental health research and is a measure of a person's subjective reactions to a stressful event (Joseph, 2000; Sundin & Horowitz, 2003).

The independent variables for this study included exposure, gender, SES, and resilience. The Exposure Index (EI) was used to measure the first independent variable, student exposure to the BP oil spill (Palinkas et al., 2004; Palinkas et al., 1992). Researchers noted that psychosocial risk factors are related to amount of exposure to technological disasters (Bevc, Marshall, & Picou, 2007; Palinkas et al., 2004; Palinkas et al., 1992). Exposure has included contamination

like eating foods from contaminated areas, working in the clean-up of toxic materials, or having to change normal activities because of pollution. However, Bevc et al. (2007) argued that at times it is hard to measure exposure to toxic contamination. The authors proposed that physical proximity to the site or source of exposure is often used as a variable. However, proximity to the source may be deceptive due to variability in geophysical forces, like wind direction and water currents. Exposure in the EI assesses physical contact with oil, property lost from pollution, and changes in normal activities like fishing, hunting, or recreation due to contamination.

The second independent variable that has been found to relate to differences in a person's responses to disasters is gender. Researchers have found that females score higher on risk factors than males following natural disasters (Anderson & Manuel, 1994; Dell'Osso et al., 2011). Differences also have been observed in how males and females experience stress (Anderson & Manuel, 1994; Dell'Osso et al., 2011) and in how they utilize social support (Melecki & Demaray, 2002; 2003; Rueger, Malecki, & Demaray, 2010). Studies have found that women reported significantly more symptoms than men of PTSD, or experiences of stress, following natural disasters (Anderson & Manuel, 1994; Dell'Osso et al., 2011). Similarly, researchers comparing at-risk adolescents have observed that females tend to have more severe depressive symptoms than males (Tandon & Solomon, 2009). However, other studies have failed to find gender differences in responses to stressful events (Sundin & Horowitz, 2003).

The third independent variable, SES, has been found to relate to negative emotional effects from disasters (Norris et al., 2002; Palinkas et al., 2004; Palinkas et al., 1992). A person with greater economic resources has been found to recover more quickly from disasters. Although authors have found that risk factors for negative emotional effects from disasters are related to a person's or family's economic resources (Abramson et al., 2010; Norris et al., 2002;



Palinkas et al., 2004; Palinkas et al., 1992), researchers have noted problems in determining a person's socioeconomic status (SES). A contributing factor that makes it difficult to ascertain SES is that many participants do not respond when asked about family income (Entwisle & Astone, 1994) or some measures of SES are unreliable or not valid. Assessment of SES has included factors like amount of family income, parental education, number of members in a family, or a combination of several variables (Entwisle & Astone, 1994; Hauser, 1994). Both Hauser (1994) and Entwisle and Astone (1994) argued that one stand-alone measure, like subsidized school meal status should not be used to assess SES, but that a combination of caretaker and family characteristics should be utilized. Other studies have utilized the availability of the independent measure of student free or reduced school lunch status to categorize students across socioeconomic levels (Malecki & Demaray, 2006). These researchers pointed to the work of Ensminger et al. (2000) in analyzing measurements of adolescent SES. Ensminger et al. found that subsidized lunch status correlated strongly with other assessments of SES, like family income. Furthermore, the authors suggested that using school lunch status as an indicator of SES was more appropriate for local or regional studies than for national studies. Therefore, for the present study student SES was determined by assessing student meal status through school records. Students receiving free lunch were considered lower-SES and students paying for lunch were considered higher-SES.

The fourth independent variable in this study was resilience. Resilience and social support have been linked to protection of an individual from psychological harm following stressful events (Baum, Rotter, Reidler, & Brom, 2009; Garmezy, 1994; Norris & Kaniasty, 1996). Aspects of resilience that have been studied include factors that mitigate risks from disaster exposure and contribute to the speedy recovery of survivors (Baum, Rotter, Reidler, &

Brom, 2009; Benight, Swift, Sanger, Smith, & Zeppelin, 1999; Conner, 2008). Resilience includes the process of adapting to significant sources of stress and can include assets and resources within the individual and the environment that facilitate one's capacity for bouncing back from adversity (Windle, 2010; as cited in Windle, Bennet, & Noyes, 2011). Resilience as defined satisfies the tenets of an ecosystemic perspective because it entails individual characteristics, the environmental context, and the interactions between individuals and the environment (Bronfenbrenner, 1979). Likewise, social support, a factor in a child's environment, has been related to the development of resiliency (see resiliency theory; Bernard & Slade, 2009). Social support is an important environmental characteristic because it acts as a protective factor in mitigating many development risks (Hyman, Gold, & Cott, 2003; Rueger, Malecki, & Demaray, 2010; Uchino, 2006). In the face of disasters, increasing social support and helping children and adolescents to build resiliency are recommended interventions (Baum, Rotter, Reidler, & Brom, 2009; Conner, 2008; Norris & Kaniasty, 1996).

## **Instruments**

**Impact of event scale.** The Impact of Event Scale (IES) is a self-report evaluation of a person's subjective reaction to a stressful event (Horowitz, Wilner, & Alvarez, 1979; see Appendix A). The IES was first normed on a population of psychotherapy patients with stress response syndromes and non-clinical volunteers who had experienced possible traumatic life events. The theoretical framework of the IES is based on how people overcome difficult life events (Sundin & Horowitz, 2003). The scale assesses respondents' intrusive or avoidant thoughts (within the past week) about a designated stressful event. The IES contains 15 items with two subscales (Horowitz et al., 1979). Seven of the items measure intrusive thoughts and represent the intrusion subscale. A sample of a question from the intrusion subscale reads: "I

had waves of strong feelings about it.” Eight of the items measure avoidant thoughts and represent the avoidance subscale. A sample from the avoidance subscale is: “I tried not to talk about it.” Respondents indicate the specific life event and answer each of the 15 questions regarding the personal impact of the event with one of the following four Likert-type responses: *not at all* = 0, *rarely* = 1, *sometimes* = 3, or *often* = 5 (Horowitz et al., 1979; Joseph, 2000). Total scores range from 0 to 75. Horowitz (2003) proscribed IES scores below 8.5 as low, between 8.5 and 19 as medium, and 19 and above as high. The IES can be adjusted so that respondents’ responses are about one particular event, such as the BP Deepwater Horizon oil spill.

The IES (Horowitz et al., 1979) was designed before the formal diagnosis of posttraumatic stress disorder (PTSD) as a classified syndrome (Joseph, 2000). The scale has similar concepts used in describing PTSD like intrusive and avoidant thoughts. However, Joseph (2000) argued that the IES should not be used as a formal diagnostic tool for PTSD because of the lack of specifics of the criteria. Still, the scale has been used extensively in disaster research and has shown respectable psychometric properties (Joseph, 2000; Sundin & Horowitz, 2003). Horowitz et al. (1979) contended that the IES is a valid measure of subjective stress because of its sensitivity to changes in a person’s experiences of stressful events over time. For example, scores have been shown to increase after the introduction of a stressful life event. Furthermore, scores have been shown to decrease with the passage of time and the introduction of therapy aimed to reduce stress levels. The authors reported strong internal reliability with a split-half reliability of  $r = .86$ ,  $r = .78$  for the intrusion subscale, and  $r = .82$  for the avoidance subscale. Test-retest reliability was noted as  $.87$  for the entire scale. Horowitz et al. argued that the IES has empirical validity because the items are based on clinical observations. Distinct clusters of

questions emerged during testing around the two subscales of the measures; intrusion and avoidance, indicating further support for the validity of the subscales. Subsequent examinations of the IES have shown that cluster loading may be representative of more than two subscales (Joseph, 2000). However, other studies have supported the two-factor structure in a non-clinical sample of college students with a mean age of 19 years (Thatcher & Krikorian, 2005).

Joseph (2000), in other critiques about the validity of the IES, argued that whereas some items on the IES have strong face validity, other items do not at first glance appear to be related to subjective distress and may be perceived as neutral by a respondent. For example, item 6 reads: "I had dreams about it" (Horowitz et al., 1979). Additionally, Joseph noted that the scale does not distinguish the nature of intrusive thoughts and that these thoughts could hypothetically be either negative or positive. Lastly, the IES does not contain guards against faking. Joseph indicated that a respondent could manipulate his or her answers to make symptoms seem worse.

Despite these concerns about validity, Joseph (2000) contended that overall the IES has been shown to be a reliable measure that is useful in determining the subjective stress of an individual in relation to an event. Also, the IES has been well researched since 1979 and has been applied in a variety of settings and with diverse respondents (Sundin & Horowitz, 2003). The IES has been applied in studies with adolescents (Joseph, Mynard, & Mayall, 2000; Maeda, Kato, & Maruoka, 2009; McNally, 1991) and has been used in previous investigations of the psychosocial impact of oil spills (Palinkas et al., 2004; Picou & Gill, 1996). Such studies have led to a great deal of knowledge about responding to technological disasters. Likewise, the Prince William Sound Regional Citizens' Advisory Council (2004), instrumental in the recovery from the Exxon Valdez spill, recommended the IES as an essential tool for conducting

community research after a spill. Permission to use the IES was obtained through the author's webpage (<http://mardihorowitz.com/permissions>; see Appendix B).

**Exposure index.** The Exposure Index (EI) is a self-report measure that had been utilized in previous studies to explore exposure of European Americans and Native Alaskans to the Exxon Valdez oil spill in Alaska (Palinkas et al., 2004; Palinkas et al., 1992; see Appendix C). Respondents answer *Yes* or *No* to the following six items of the EI: 1) "Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill?"; 2) "Did you work on any of the shoreline or water clean-up activities of the oil spill?"; 3) "Are there any other ways that you came into contact with the oil spill or clean-up activities, such as during recreation, hunting, fishing, or gathering activities?"; 4) "Did you have any property that was lost or damaged because of the oil spill or clean-up?"; 5) "Did the oil spill cause any damage to the areas you or other household members fish commercially?"; and 6) "Has the oil spill directly affected the hunting, fishing or gathering activities of any members of this household?" Responses of *No* are coded as 0 and *Yes* responses are recorded as 1 (Palinkas et al., 2004; Palinkas et al., 1992). Scores range from 0 to 6. In this study, items about gathering activities were deleted from the EI as they are not relevant to the local culture of Louisiana. Question 4 was slightly modified by adding "or your parents" to make it more relevant to the population being surveyed.

Using the EI, Palinkas et al. (2004) analyzed participants across three levels of exposure. The psychometric properties on the EI were found to be acceptable. Palinkas et al. (1992) conducted a factor analysis on all six items and found that the index measured a single concept, which according to the authors would strengthen the content validity of the index. Internal

reliability for the measure was  $r = .74$  for Native Alaskans and  $r = .73$  for European Americans. Permission to use the EI was gained through contacting the author (see Appendix D).

**Resilience scale.** The Resilience Scale (RS) is a self-report measure used to assess a person's resiliency characteristics (Wagnild & Young, 1993; Windle et al., 2011; see Appendix E). Response items for the RS are drawn word for word from qualitative interview responses (Wagnild & Young, 1990, 1993). Items are classified into five dimensions of resilience; Equanimity, Perseverance, Self-reliance, Meaningfulness, and Existential Aloneness. Equanimity is a balanced perspective on life and life experiences with few extreme reactions. Perseverance is persistence and continued self-discipline in the face of adversity. Self-reliance is confidence in personal abilities and a clear outlook on the capability to achieve individually. Meaningfulness is the belief that life has purpose and that contributions are significant to something. Finally, Existential Aloneness is the acceptance that every person's life course is unique and that, although some experiences are shared with others, many experiences must be faced alone.

The RS is a 25-item Likert-type measure that asks respondents to indicate their level of agreement from 1 = *disagree* to 7 = *agree* (Wagnild & Young, 1993). The scale assesses a person's resiliency characteristics (Wagnild & Young, 1993; Windle et al., 2011). Individual characteristics include items about personal self-efficacy and a positive outlook on life. Sample questions include "I can get through difficult times because I've experienced difficulty before" and "I do not dwell on things that I can't do anything about." Scores range from 25 to 175 with smaller scores indicating less resilience and higher scores indicating more resilience. According to Wagnild (2009), scores greater than 145 indicate higher resilience, scores between 125 and 145 indicate moderate resilience, and scores below 125 indicate lower resilience.

The authors stated that the RS contains strong content validity because of the scale's five dimensions, which are based on previous resilience literature and are formulated from original qualitative responses of resilient individuals (Wagnild & Young, 1990, 1993; Windle, Bennet, & Noyes, 2011). Internal consistency was reported as  $r = .91$  ( $p \leq .001$ ) for scores from a randomly selected sample of community-dwelling older adults ( $n = 810$ ). Wagnild and Young (1993) supported the construct validity of the measure by comparing RS scores from a sample ( $N = 810$ ) with scores from other measures given simultaneously that were thought to be related to resilience. Several outcomes thought to be representative of adaptive behaviors were significantly correlated with RS scores including physical health ( $r = .26$ ), morale ( $r = .28$ ), and life satisfaction ( $r = .30$ ). Depression scores were negatively correlated with resilience scores for the sample ( $r = -.37$ ).

According to a review by Windle, Bennet, and Noyes (2011); no current "gold standard" exists for resiliency measures because available measures of resilience were not able to establish consistent criterion validity. However, Windle et al. (2011) contended that certain measurement scales like the RS by Wagnild and Young (1993) offer superior psychometric properties in comparison to other measurements of resilience. The authors concluded that the RS has been one of the most widely used measures of resiliency. Windle et al. indicated that some of the strengths of the RS are its content validity, internal consistency, and construct validity. The scale was developed through qualitative interviews with older women who had adjusted well to a recent loss and had scored high on a measure of morale, which are characteristics thought to be related to resilience (Wagnild & Young, 1990). The conceptualization of the RS was based on existentialism and dimensions of the scale were supported by popular concepts in the existing resilience literature.

A few weaknesses of the RS have been described. First, although the authors theorized a five-dimensional model would be the best fit for the scale items, factor loadings supported a two-factor model composed of Personal Competence and Acceptance of Self and Life (Wagnild & Young, 1993). Second, Windle et al. (2011) pointed out that the scale was formulated through interviews with an older female population and may not be useful for other populations. Also, the psychometric properties established in 1993 by Wagnild and Young were based on a sample of older, predominantly White adults. Nevertheless, the RS has subsequently been used in numerous published studies with adolescents (see review by Ahern, Kiehl, Sole, & Byers, 2006). Based on the RS's psychometric properties and wide application in studies of adolescent resilience, the scale has been regarded as appropriate for adolescent studies concerning resilience. In fact, Ahern et al. (2006) rated the scale highest in a comparison to five other adolescent measures of resilience. Permission to use the RS was obtained through the authors' webpage and acceptance of terms of use ([www.resiliencescale.com](http://www.resiliencescale.com); see Appendix F).

### **Data Collection**

Approval was gained prior to data collection from the UNO Institutional Review Board (IRB) on April 17, 2012 (see Appendix G). Minimal risks were thought to be involved in participation in the present study. However, respondents may have experienced unpleasant thoughts and memories in answering questions about the oil spill. Students were directed to the counseling department of the schools selected for the study to address on-going concerns and risks related to the oil spill. Data was collected from two schools, a high school and a middle school, at two different points in time (May 2012 and January 2013). Data collection procedures in the two schools varied slightly based on the school schedules and student availability.



For the high school, preliminary approval to ask students to participate during school time was sought from the school and the school board (see Appendices H and I) and gained through the school principal (see Appendix J). Homeroom teachers were utilized to distribute the informed consents and questionnaires during homeroom. The assistance of teachers and school counselors was recruited through an informational letter (see Appendix K). A lead counselor was designated from the school staff to coordinate with all teachers, counselors and homeroom teachers in distributing and collecting of consent forms and questionnaires. Each homeroom teacher distributed the informational letters including consent forms to sophomore and junior students to take home to parents one week prior to conducting the study. Parents were informed of the upcoming study and asked to sign consent forms if they would like to have their minor child participate in the study (see Appendix L). Informed consent was gained directly from adult students 18 or older prior to conducting the study (see Appendix M). Student assent to participate in the study was gained from minor students prior to conducting the study (see Appendix N). As noted in the consent forms, the voluntary basis of the study was emphasized and students were informed that they could decline to participate, or not answer certain questions, if they did not feel comfortable.

Each homeroom teacher collected the appropriate consent forms and returned them to the lead counselor. A list of students for whom consent to participate was gained was compiled from each homeroom. Each homeroom teacher was provided a list of the students in his or her homeroom who agreed to participate in the study. One week after collection of informed consents, homeroom teachers were asked to distribute questionnaires and student assent forms corresponding to the number of students on their lists, collect completed forms and questionnaires, and return forms to the lead counselor.

For the middle school, approval to ask students to participate during school time was sought from the school and the school board (see Appendices O and P) and gained through the school board (see Appendix Q). Science teachers distributed the informed consents and questionnaires during class time (see Appendix R). A lead counselor helped to coordinate the study with science teachers and the school. Science teachers distributed the informational letters including consent forms to middle school students to take home to parents one week prior to conducting the study. Parents were informed of the upcoming study and asked to sign consent forms if they would like to have their minor child participate in the study (see Appendix S). Student assent to participate in the study was gained from minor students prior to conducting the study (see Appendix N).

Each science teacher was provided with a list of the students in his or her homeroom who agreed to participate in the study through informed consent. One week after collection of informed consents, science teachers were asked to distribute questionnaires and student assent forms corresponding to the number of students on their lists during class, collect completed forms and questionnaires, and return forms to the lead counselor.

A purposive sample of students was utilized for this current cross-sectional survey. A coastal Louisiana high school and a middle school were selected because of their locations in proximity to the affected BP Deepwater Horizon oil spill area. The high school had a fairly large student population of about 1,200 students. At the time of sampling in spring, 2012, senior students had finished final exams, leaving a target population of 757 sophomore and junior students. A sample of 155 completed responses was obtained for a return rate of 20%. The middle school had a population of 490 students in sixth through eighth grades, of whom 225

participated in the study for a return rate of about 46%. The overall return rate for the study was 380 participants out of 1247 possible, or a return rate of about 30%.

### **Methods of Analysis**

To analyze the five research questions, several techniques were utilized including descriptive statistics, analysis of variance (ANOVA), and logistic regression. Once raw data were collected, variables were coded and entered into IBM SPSS Statistics version 19.0 for further analysis. Data were scanned for missing information and outlier cases. One case had an entire missing dependent variable section (IES), two cases had missing EI sections, and two cases had missing RS sections. The cases with missing sections were eliminated from analyses including that variable, therefore, *n*'s varied based on type of analysis. The IES contained 48 missing values (i.e., less than 1% of all IES values), the EI contained 19 missing values (i.e., less than 1%), and the RS contained 149 missing values (i.e., 1.57% of all RS items). To get the total scores for the IES, the EI, and the RS, missing values were handled by inputting the sample mean (series mean) for that item. A stem and leaf plot indicated five extreme scores of 50 or higher on the dependent variable, the IES. One case was removed from mean analyses (ANOVAs) because it was more than four standard deviations above the mean. For all of the data analysis, an alpha level of .05 was used to minimize the potential for a Type I error.

ANOVAs were tested to determine that the three main assumptions were met. Prior to each ANOVA, a Levene's test of homogeneity of variance was performed for all variables. The Levene's test for equality of variances was significant for the three exposure groups on IES scores,  $F(2,373) = 24.19, p < .001$ . All two-way ANOVAs (i.e., except for the Resilience and SES) had significant Levene's tests, indicating a violation of the assumption of homogeneity of variance for these comparisons. However, analysis of variance is robust to violations of the

homogeneity of variance assumption (Harris, 1998; as cited in Mertler & Vannatta, 2005). All tests were run first with the entire sample and then separately with students from each school to compare differences.

**Research question 1.** Is there a statistically significant mean difference in risk factors (IES scores) for students with low levels of oil exposure in comparison to students with high levels of oil exposure (EI)?

**Data analysis.** An ANOVA was used to analyze mean differences of IES scores on the EI (Palinkas et al., 2004; Palinkas et al., 1992). Students were categorized into three exposure groups based on the mean EI scores. Students with EI scores of 0 were categorized as No exposure, those with EI scores of 1 or 2 (around the mean) were categorized as Low exposure, and those with scores above the mean (3 or higher) were categorized as High exposure.

**Research question 2.** Do mean differences for risk (IES scores) from exposure (EI) vary significantly across gender, SES, and level of resilience (RS)?

**Data analysis.** Three separate ANOVAs (two-way) were utilized to analyze mean differences of IES scores across: 1) level of exposure and gender, 2) exposure and SES, and 3) exposure and resilience. To obtain SES levels, students were grouped according to their indicated school-lunch status. Students reporting free lunch status were considered lower-SES and compared to those paying for lunch (reduced price and full-pay), the higher-SES group. Wagnild (2009) proscribed three levels or resilience scores for the RS; high, moderate, and low. Low level scores (< 125) were combined with moderate level scores (125 to 145) to facilitate group comparisons. Respondents were compared on resilience levels across two groups; those scoring in the low to moderate resilience range (145 and <) to those scoring in the high resilience range (> 145).

**Research question 3.** Are there statistically significant mean differences in student risk factors (IES scores) across gender and socioeconomic status?

**Data analysis.** A two-way ANOVA was used to analyze mean differences of IES scores across SES and gender. Students with free school lunch were classified as lower-SES and students paying full or reduced price for lunch were classified as higher-SES.

**Research question 4.** Are there statistically significant mean differences in student risk factors (IES scores) across levels of student resilience (RS; high resilience vs. low to moderate resilience) and gender and SES?

**Data analysis.** Two separate ANOVAs (two-way) were utilized to analyze mean differences of IES scores across: 1) levels of student resilience and gender and 2) levels of student resilience and SES.

**Research question 5.** How well do level of exposure (EI), gender, socioeconomic status, and resilience (RS) predict student risk factors (IES scores)?

**Data analysis.** A logistic regression was utilized to determine how well the independent variables of resilience (RS), level of oil exposure (EI), SES, and gender predicted higher IES scores. A preliminary multiple regression was run on all of the predictor variables to test for multicollinearity. All tolerance statistics were greater than .1, which indicated that multicollinearity was not a problem (Mertler & Vannatta, 2005). Binary logistic regression was used. Respondents' IES scores were dichotomized into higher IES scores and average to low IES scores. According to Horowitz (2003), IES scores of 19 or above are considered high, which was used as the cut off for higher IES scores in the present study.

## Chapter IV

### Results

The purpose of this study was to explore the impact of the BP Deepwater Horizon oil spill on students of two coastal Louisiana secondary schools and determine how student factors influence psychosocial risks. In this chapter, characteristics of the sample are outlined and descriptive statistics are delineated using the IES, EI, and RS. Additionally, the research questions are explored and results of advanced statistical analyses discussed.

Of the 380 students, ages ranged from 11 to 19 (see Table 1). The average age was approximately 14 years old ( $M = 14.21$ ,  $SD = 2.3$ , see Table 2). The highest percentage of students indicated an age of 13 ( $n = 79$ , 20.8%) and the second highest percentage of students indicated an age of 17 ( $n = 56$ , 14.7%). An age of 12 was reported by 55 students (14.5%), 11 was reported by 49 students (12.9%), 14 was reported by 33 students (8.7%), 15 was reported by 23 students (6.1%), 16 was reported by 46 students (12.1%), 18 was reported by 29 students (7.6%), and 19 was reported by 3 students (0.8%). There were 7 students (1.8%) with missing data for age.

Table 1

*Frequencies of Student Ages (N = 380)*

Age	<i>f</i>	%
11	49	12.9
12	55	14.5
13	79	20.8
14	33	8.7
15	23	6.1
16	46	12.1
17	56	14.7
18	29	7.6
19	3	.8
Missing, no response	7	1.8

In high school, ( $n = 155$ ) students' average age was between 16 and 17 years old ( $M = 16.67$ ,  $SD = .991$ , see Table 2). In middle school, students' average ages were between 12 and 13 ( $M = 12.48$ ,  $SD = 1.04$ ,  $n = 225$ ).

Table 2

*Descriptive Statistics for Student Ages by School (N = 380)*

School	<i>M</i>	<i>SD</i>	<i>n</i>
High School	16.67	.991	155
Middle School	12.48	1.04	225
Total Population	14.21	2.3	380

In the high school, ages ranged from 15 to 19 years old (see Table 3). The most frequent response was 17 years old ( $n = 56, 36.1\%$ ), followed by 16 years old ( $n = 46, 29.7\%$ ), 18 years old ( $n = 29, 18.7\%$ ), 15 years old ( $n = 20, 12.9\%$ ), 19 years old ( $n = 3, 1.9\%$ ), and no response ( $n = 1, 0.6\%$ ). For the middle school, ages ranged from 11 to 15. The most frequent response was 13 years old ( $n = 79, 35.1\%$ ), followed by 12 years old ( $n = 55, 24.4\%$ ), 11 years old ( $n = 49, 21.8\%$ ), 14 years old ( $n = 33, 14.7\%$ ), 15 years old ( $n = 3, 1.3\%$ ), and no response ( $n = 6, 2.7\%$ ).

Table 3

*Frequencies of Student Ages in High School ( $n = 155$ ) and Middle School ( $n = 225$ )*

High School			Middle School		
Age	<i>f</i>	%	Age	<i>f</i>	%
15	20	12.9	11	49	21.8
16	46	29.7	12	55	24.4
17	56	36.1	13	79	35.1
18	29	18.7	14	33	14.7
19	3	1.9	15	3	1.3
No response	1	0.6	No response	6	2.7

The highest frequency (25.0%) of students came from the eleventh grade ( $n = 95$ , see Table 4). The next highest frequency (23.7%) of students reported being in the eighth grade ( $n = 90$ ), then the sixth grade (21.3%,  $n = 81$ ), followed by the seventh grade (13.9%,  $n = 53$ ) and the tenth grade (13.4%,  $n = 51$ ). Twelve grade was reported by six students (1.6%) and grade level data were missing four students (1.1%).



Table 4

*Frequencies of Student Grade Classifications (N = 380)*

Grade	<i>f</i>	%
6	81	21.3
7	53	13.9
8	90	23.7
10	51	13.4
11	95	25.0
12	6	1.6
Missing, no response	4	1.1

A total of 242 students, or 63.7% of the sample, were female (see Table 5). In comparison, 125 students (32.9%) were male. Thirteen (3.4%) students did not respond to the gender item.

Table 5

*Frequencies of Student Gender (N = 380)*

Gender	<i>f</i>	%
Male	125	32.9
Female	242	63.7
Missing, no response	13	3.4

The most prevalent ethnicity reported was White ( $n = 271$ , 71.3%, see Table 6). The second most common ethnicity was Black ( $n = 36$ , 9.5%), followed by Hispanic ( $n = 18$ , 4.7%), more than one ethnicity ( $n = 17$ , 4.5%), Native American ( $n = 17$ , 4.5%), and Asian/Pacific

Islander ( $n = 9, 2.4\%$ ). Nine students ( $2.4\%$ ) reported their ethnicity as Other. Ethnicity data were missing for 3 ( $.8\%$ ) students.

Table 6

*Frequencies of Student Ethnicities (N = 380)*

Ethnicity	<i>f</i>	%
White	271	71.3
Black	36	9.5
Hispanic	18	4.7
Native American	17	4.5
Asian/Pacific Islander	9	2.4
More than one ethnicity	17	4.5
Other	9	2.4
Missing, no response	3	0.8

In addition to ethnicity, students indicated local cultural affiliations. Cajun was noted by 210 ( $55.3\%$ ) students, followed by 17 ( $4.5\%$ ) students who reported Indian (Houmas, Chitimacha or Choctaw) and 17 ( $4.5\%$ ) indicated more than one culture, which included combinations of Cajun, Creole, French and Indian (see Table 7). Creole was noted by 13 ( $3.4\%$ ) students, 15 noted French ( $3.9\%$ ), and seven ( $1.8\%$ ) Vietnamese. For none, 56 students ( $14.7\%$ ) reported their local culture with descriptors such as Irish, English, German, Italian, Latino/Hispanic, Spanish, Mexican, Puerto Rican, Isleños, Southern, Virgin Islands, Muslim, and Catholic. Five ( $1.3\%$ ) students indicated that they did not know their culture and 40 ( $10.5\%$ ) students gave no response to culture.

Table 7

*Frequencies of Student Culture (N = 380)*

Local culture	<i>f</i>	%
Cajun	210	55.3
Creole	13	3.4
French	15	3.9
Indian (Houmas, Chitimacha or Choctaw)	17	4.5
Vietnamese	7	1.8
More than one culture	17	4.5
None of the above	56	14.7
Not Know	5	1.3
Missing, no response	40	10.5

Free lunch at school was reported by 158 (41.6%) students, 42 (11.1%) students indicated paying reduced price for school lunch, and 155 (40.8%) reported paying full price for lunch (see Table 8). Data were missing for 25 (6.6%) students. Students reporting receiving free lunch were classified as lower-SES, whereas students reporting paying for lunch (full price or reduced) were classified as higher-SES.

Table 8

*Frequencies of Student School Lunch Status (N = 380)*

Lunch Status	<i>f</i>	%
Free Lunch	158	41.6
Reduced Price	42	11.1
Full-pay Lunch	155	40.8
Missing, no response	25	6.6

Students from the middle school reported a higher frequency of full-pay and reduced price lunch status, or higher-SES, in comparison to the high school (see Table 9). From the middle school, 48.4% ( $n = 109$ ) of students indicated full-pay lunch status, 11.6% ( $n = 26$ ) indicated reduced price status, and 30.2% ( $n = 68$ ) of students noted free lunch status, or lower-SES. Conversely, in the high school 29.7% ( $n = 46$ ) of students reported full-pay status, 10.3% ( $n = 16$ ) reported reduced price status, and 58.1% ( $n = 90$ ) of students indicated free lunch status. Three (1.9%) cases were missing data in the high school, whereas 22 (9.8%) cases were missing data in the middle school.

Table 9

*Frequencies of SES by School - High School (n = 155) and Middle School (n = 225)*

Lunch Status	High School		Middle School	
	<i>n</i>	%	<i>n</i>	%
Free Lunch	90	58.1	68	30.2
Reduced Price	16	10.3	26	11.6
Full-pay Lunch	46	29.7	109	48.4
Missing, no response	3	1.9	22	9.8

Students were asked about their parents' current place of work and type of work before the BP Deepwater Horizon oil spill (i.e., 2 year span). The most common job type for students' mothers and fathers was in the service industry (see Table 10). For father's job before the oil spill, students reported the following: petroleum industry ( $n = 50$ , 13.2%), service ( $n = 204$ , 53.7%), professional ( $n = 15$ , 3.9%), seafood and fishing ( $n = 26$ , 6.8%), deceased ( $n = 4$ , 1.1%), did not know ( $n = 20$ , 5.3%), unemployed ( $n = 15$ , 3.9%), disabled ( $n = 2$ , 0.5%), and no response ( $n = 44$ , 11.6%). For father's current job, students reported the following: petroleum industry ( $n = 48$ , 12.6%), service ( $n = 207$ , 54.5%), professional ( $n = 17$ , 4.5%), fishing and seafood ( $n = 24$ , 6.3%), deceased ( $n = 7$ , 1.8%), did not know ( $n = 15$ , 3.9%), unemployed ( $n = 24$ , 6.3%), disabled ( $n = 4$ , 1.1%), and no response ( $n = 34$ , 8.9%). For mother's job before the oil spill, students reported the following: petroleum industry ( $n = 4$ , 1.1%), service ( $n = 143$ , 37.6%), professional ( $n = 70$ , 18.4%), seafood and fishing ( $n = 4$ , 1.1%), deceased ( $n = 3$ , 0.8%), did not know ( $n = 10$ , 2.6%), unemployed ( $n = 111$ , 29.2%), disabled ( $n = 0$ , 0.0%), and no response ( $n = 35$ , 9.2%). For mother's current job, students reported the following: petroleum industry ( $n = 5$ , 1.3%), service ( $n = 150$ , 39.5%), professional ( $n = 72$ , 18.9%), fishing and seafood ( $n = 4$ , 1.1%), deceased ( $n = 3$ , 0.8%), did not know ( $n = 5$ , 1.3%), unemployed ( $n = 116$ , 30.5%), disabled ( $n = 1$ , 0.3%), and no response ( $n = 24$ , 6.3%).

Table 10

*Frequencies of Parents' Current Job Types and Job Types Before BP Oil Spill (N = 380)*

Job Type	Father's Current Job		Before Spill		Mother's Current Job		Before Spill	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Petroleum Industry	48	12.6	50	13.2	5	1.3	4	1.1
Service	207	54.5	204	53.7	150	39.5	143	37.6
Professional	17	4.5	15	3.9	72	18.9	70	18.4
Fishing & Seafood	24	6.3	26	6.8	4	1.1	4	1.1
Deceased	7	1.8	4	1.1	3	0.8	3	0.8
Not Know	15	3.9	20	5.3	5	1.3	10	2.6
Unemployed	24	6.3	15	3.9	116	30.5	111	29.2
Disabled	4	1.1	2	0.5	1	0.3	0	0.0
No Response	34	8.9	44	11.6	24	6.3	35	9.2

Most students ( $n = 291$ , 76.6%) revealed no change in their parents' type of work from before to after the BP Deepwater Horizon oil spill (see Table 11). The next highest category was change in mother's type of work ( $n = 48$ , 12.6%), followed by change in father's type of work ( $n = 25$ , 6.6%), change in mother and father's type of work ( $n = 11$ , 2.9%), and no response ( $n = 5$ , 1.3%).

Table 11

*Frequencies of Changes in Parents' Type of Work Before/After BP Oil Spill (N = 380)*

Work Change	<i>f</i>	%
No Change Father or Mother	291	76.6
Change in Father	25	6.6
Change in Mother	48	12.6
Change in Mother and Father	11	2.9
No Response	5	1.3

### Scales of Measurement

**Impact event scale (IES) descriptive statistics.** IES scores ranged from 0 to 75 ( $N = 379$ ). One case was omitted because of an entire missing IES section. Average scores for students were between 12 and 13 ( $M = 12.57$ ,  $SD = 13.95$ ) and in the moderate range (Horowitz, 2003). Scores below 9 and in the low range included 191 (50.4%) students (see Table 12). In the moderate range, between 9 and 18, were 79 (20.8%) students; 109 (28.7%) students had high scores of 19 or above.

Table 12

*Frequencies of IES Scores by IES Ranges (N = 379)*

IES Total	<i>f</i>	%
Low Scores 0-8.5		
0	108	28.5
1-3	41	10.8
4-8	42	11.1
Moderate Scores 9-18		
9-13	51	13.5
14-18	28	7.3
High Scores 19-75		
19-25	41	10.8
26-35	37	9.8
36-45	18	4.7
46-75	13	3.4

*Note:* One case omitted due to missing IES scale

The IES contains eight avoidance subscale items and seven intrusion subscale items, with the five most frequently reported items from the subscale avoidance. The item with the highest positive rating was #3, “I tried to remove it from memory” with responses of rarely ( $n = 47$ , 12.4%), sometimes ( $n = 53$ , 13.9%), and often ( $n = 49$ , 12.9%, see Table 13). The item with the second highest positive rating was #13, “I tried not to think about it” with responses of rarely ( $n = 51$ , 13.4%), sometimes ( $n = 49$ , 12.9%), and often ( $n = 47$ , 12.4%), followed by #9, “I tried not to talk about it” with responses of rarely ( $n = 44$ , 11.6%), sometimes ( $n = 51$ , 13.4%), and often ( $n = 41$ , 10.8%). Item #2, “I avoided letting myself get upset when I thought about it or was reminded of it,” contained responses of rarely ( $n = 55$ , 14.5%), sometimes ( $n = 42$ , 11.1%), and



often ( $n = 39, 10.3\%$ ), and #8, “I felt as if it hadn’t happened or it wasn’t real,” contained responses of rarely ( $n = 62, 16.3\%$ ), sometimes ( $n = 51, 13.4\%$ ), and often ( $n = 32, 8.4\%$ ).

Table 13

*Frequency and Percentage for 5 Most Indicated IES Items (N = 379)*

Item	Rarely		Sometimes		Often	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
#2. I avoided letting myself get upset when I thought about it or was reminded of it. (A)	55	14.5	42	11.1	39	10.3
#3. I tried to remove it from memory. (A)	47	12.4	53	13.9	49	12.9
#8. I felt as if it hadn't happened or it wasn't real. (A)	62	16.3	51	13.4	32	8.4
#9. I tried not to talk about it. (A)	44	11.6	51	13.4	41	10.8
#13. I tried not to think about it. (A)	51	13.4	49	12.9	47	12.4

The Impact of Event Scale (Horowitz, Wilner & Alvarez, 1979)

Note: A= Avoidance subscale

For the total population, students’ IES scores ranged from 0 to 75 ( $M = 12.47, SD = 13.95$ ). Students’ IES scores for middle school ( $M = 15.46, SD = 14.11$ ) were higher on average in comparison to high school students’ scores ( $M = 8.34, SD = 12.60$ , see Table 14). In the middle school, scores ranged from 0 to 55 and the high school ranged from 0 to 75.

Table 14

*Descriptive Statistics for IES Scores by School (N = 379)*

School	<i>M</i>	<i>SD</i>	<i>n</i>
High School	8.34	12.60	154
Middle School	15.46	14.11	225
Total Population	12.57	13.95	379

**Exposure index (EI) descriptive statistics.** For the total sample, EI scores ranged from 0 to 6 ( $N = 378$ ,  $M = 1.80$ ,  $SD = 1.70$ ). For high school, EI scores ranged from 0 to 6 ( $M = 1.47$ ,  $SD = 1.75$ ). For middle school, EI scores ranged 0 to 6 ( $M = 2.02$ ,  $SD = 1.63$ ; see Table 15).

Table 15

*Descriptive Statistics for EI Scores by School (N = 378)*

School	<i>M</i>	<i>SD</i>	<i>n</i>
High School	1.47	1.75	155
Middle School	2.02	1.63	223
Total Population	1.80	1.70	378

Overall, 121 (31.8%) students indicated no exposure to the BP Deepwater Horizon oil spill as measured by the EI (see Table 16). EI scores of 1 and 2 were reported by 76 (20%) and 48 (12.7%) students, respectively. Additionally, students reported the following EI scores: 3 ( $n = 65$ , 17.1%), 4 ( $n = 40$ , 10.6%), 5 ( $n = 18$ , 4.7%), and 6 ( $n = 10$ , 2.6%).

Table 16

*Frequencies of EI Scores (N = 378)*

EI Score	<i>f</i>	%
0	121	31.8
1	76	20.0
2	48	12.7
3	65	17.1
4	40	10.6
5	18	4.7
6	10	2.6

*Note:* Two cases omitted due to missing EI sections

Responses were categorized across three EI levels (see Table 17). The No Exposure group ( $n = 121, 32\%$ ) contained EI responses of 0. The Low Exposure group was based on scores around the mean and consisted of EI scores of 1 or 2 ( $n = 124, 32.8\%$ ). The High Exposure group consisted of EI scores from 3 to 6 ( $n = 133, 35.2\%$ ).

Table 17

*Frequencies of EI Levels (N = 378)*

EI Level	<i>f</i>	%
No Exposure (EI score of 0)	121	32.0
Low Exposure (EI score of 1 or 2)	124	32.8
High Exposure (EI score of 3 or higher)	133	35.2

The most frequently indicated EI item was #6 ( $n = 159, 42.1\%$ ), “Has the oil spill directly affected the hunting or fishing activities of any member of your household?” (see Table 18). The second most frequently noted item was #3 ( $n = 157, 41.5\%$ ), which referred to coming into contact with the oil spill in other ways like hunting, fishing, or recreation, followed by 39.4% on #1 ( $n = 149$ ), “Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill?” and #5 ( $n = 130, 34.4\%$ ), “Did the oil spill cause any damage to the areas you or other household members fish commercially?” Noted less frequently were #2 ( $n = 34, 9.0\%$ ) and #4 ( $n = 48, 12.7\%$ ).

Table 18

*Frequency of Six EI Items (N=378)*

Item	Yes		No	
	<i>n</i>	%	<i>n</i>	%
1. Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill?	149*	39.4	227	60.1
2. Did you work on any of the shoreline or water clean-up activities of the oil spill?	34	9.0	344	91.0
3. Are there any other ways that you came into contact with the oil spill or clean-up activities, such as during recreation, hunting, or fishing activities?	157*	41.5	219	57.9
4. Did you or your parents have any property that was lost or damaged because of the oil spill or clean-up?	48**	12.7	327	86.5
5. Did the oil spill cause any damage to the areas you or other household members fish commercially?	130	34.4	248	65.6
6. Has the oil spill directly affected the hunting or fishing activities of any members of your household?	159	42.1	219	57.9

The Exposure Index (Palinkas, Russell, Downs & Petterson, 1992)

Note: \*Four missing values and \*\*Five missing values

**Resilience scale (RS) descriptive statistics.** RS scores ranged from 35 to 175 ( $M = 138.23$ ,  $SD = 20.21$ ). Average RS scores from the high school ranged from 35 to 173 ( $M = 139.05$ ,  $SD = 21.91$ ) and scores from the middle school ranged from 56 to 175 ( $M = 137.67$ ,  $SD = 18.99$ ). The highest frequency of RS scores ( $n = 156$ , 41.3%) were in the High Resilience category (see Table 19). The second highest frequency of scores fell in the Moderate Resilience category ( $n = 144$ , 38.1%), followed by Low Resilience ( $n = 78$ , 20.6%).

Table 19

*Frequencies of RS Levels (N = 378)*

RS Level	<i>f</i>	%
Low Resilience (score < 125)	78	20.6
Moderate Resilience (score between 125-145)	144	38.1
High Resilience (score > 145)	156	41.3

The RS item most indicated by students was #6 ( $M = 6.35$ ,  $SD = 1.22$ ), “I feel proud that I have accomplished things in life,” followed by #16 ( $M = 6.13$ ,  $SD = 1.34$ ), “I can usually find something to laugh about” (see Table 20). Items #21 ( $M = 6.11$ ,  $SD = 1.56$ ) and #25 ( $M = 6.04$ ,  $SD = 1.61$ ) had high mean scores as well. The RS items least indicated were #22 ( $M = 4.62$ ,  $SD = 1.81$ ), “I do not dwell on things that I can’t do anything about,” and #11 ( $M = 4.66$ ,  $SD = 1.81$ ), “I seldom wonder what the point of it all is.” Items #7 ( $M = 4.94$ ,  $SD = 1.48$ ) and #12 ( $M = 4.95$ ,  $SD = 1.73$ ) also had low mean scores.

Table 20

*Top Four Most and Least Indicated Items of RS Mean Scores (N = 378)*

Item	<i>M</i>	<i>SD</i>
6. I feel proud that I have accomplished things in life	6.35	1.22
16. I can usually find something to laugh about	6.13	1.34
21. My life has meaning	6.11	1.56
25. It's okay if there are people who don't like me	6.04	1.61
22. I do not dwell on things that I can't do anything about	4.62	1.81
11: I seldom wonder what the point of it all is	4.66	1.81
7: I usually take things in stride	4.94	1.48
12: I take things one day at a time	4.95	1.73

*Note:* Scores ranged from 1 to 7

## Results of Research Questions

**Research question 1.** Is there a statistically significant mean difference in risk factors (IES scores) for students with low levels of oil exposure in comparison to students with high levels of oil exposure (EI)? Using an ANOVA, results indicated that mean differences on IES scores across the three exposure levels were significant,  $F(2,373) = 28.97, p < .000, \eta^2 = .134$ , with a moderate effect size (see Table 21).

Table 21

*ANOVA Results for EI Levels on IES Scores (N = 376)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Exposure Group	2	4641.16	28.97	.000	.134	1.0
Error	373	160.19				

*Note: p < .05*

Because the Levene statistic showed unequal group variances, a Tamhane post hoc test was utilized to determine which exposure group means were significantly different (see Table 22). Results indicated that the No Exposure group (EI of 0) had significantly different IES scores ( $M = 6.26, SD = 9.59$ ) from the Low Exposure group (EI of 1 or 2,  $M = 11.87, SD = 12.29$ ) and the High Exposure group (EI of 3 or greater,  $M = 18.38, SD = 15.28$ ). The High Exposure group was significantly different ( $M = 18.38, SD = 15.28$ ) from the Low Exposure group ( $M = 11.87, SD = 12.29$ ).

Table 22

*Tamhane Post Hoc Test for EI Group Differences on IES scores (N = 376)*

Exposure Index Level	<i>M</i>	<i>SD</i>	<i>n</i>	<i>p</i>
No Exposure (score of 0)	6.26	9.49	121	.000*
Low Exposure (score of 1 or 2)	11.87	12.29	124	.001*
High Exposure (score of 3 or higher)	18.38	15.28	131	.000*

Note: \* $p < .05$

**Research question 2.** Do mean differences for risk (IES) from exposure (EI) vary significantly across gender, SES, and level of resilience (RS)? Three separate two-way ANOVAs were conducted. For the first two-way ANOVA (Exposure x Gender), the interaction between exposure and gender on IES scores was not significant,  $F(2,357) = 2.56, p = .079$  (see Table 23). The main effect for gender was not significant,  $F(1,357) = .877, p = .350$ , but the main effect for exposure was significant,  $F(2,357) = 25.68, p < .000, \eta^2 = .126$ .

Table 23

*ANOVA Results for Exposure x Gender (N = 363)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	Power
Exposure Group	2	4114.49	25.68	.000*	.126	1.0
Gender	1	140.46	.877	.350	.002	.877
Exposure x Gender	2	410.34	2.56	.079	.014	.510
Error	357	160.22				

Note: \* $p < .05$

Although the interaction between exposure and gender was not significant, results did indicate some interaction between exposure and gender on the IES scores (see Graph 1). In the High Exposure group, males had a higher IES mean ( $M = 21.33, SD = 17.20$ ) in comparison to females ( $M = 16.65, SD = 13.95$ , see Table 24). In the No Exposure group, males also a higher

mean ( $M = 7.70$ ,  $SD = 9.53$ ) than females ( $M = 5.59$ ,  $SD = 9.49$ ). However, in the Low Exposure group, females ( $M = 12.92$ ,  $SD = 12.00$ ) had a higher mean than males ( $M = 10.11$ ,  $SD = 12.76$ ).

Graph 1

Exposure Group x Gender on IES Mean Scores ( $N = 363$ )

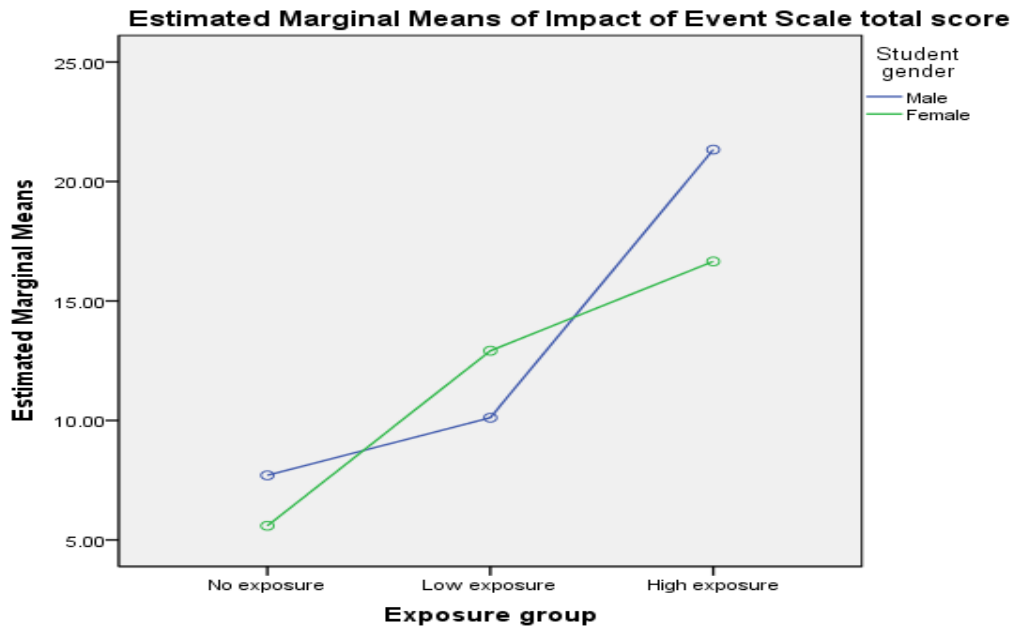


Table 24

Descriptive Statistics for ANOVA Results for Exposure x Gender ( $N = 363$ )

Exposure Level	Male			Female		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
No Exposure	32	7.70	9.53	82	5.59	9.49
Low Exposure	43	10.11	12.76	78	12.92	12.00
High Exposure	47	21.33	17.20	81	16.65	13.95

For the second two-way ANOVA (Exposure x SES) for research question 2, descriptive statistics indicated that the interaction between SES and exposure on IES scores was not significant,  $F(2,345) = .762$ ,  $p = .467$  (see Table 25). Also, the main effect for SES was not significant,  $F(1,345) = .524$ ,  $p = .470$ , but the main effect for exposure was significant,  $F(2,345)$



= 25.28,  $p < .001$ ,  $\eta^2 = .128$ . Students with free school lunch were classified as lower-SES and students paying full or reduced price for lunch were classified as higher-SES.

Table 25

*ANOVA Results for Exposure x SES (N = 351)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Exposure Group	2	4197.14	25.28	.000*	.128	1.00
SES Group	1	86.94	.524	.470	.002	.111
Exposure x SES	2	126.52	.762	.467	.004	.179
Error	345	166.03				

Note: \* $p < .05$

The highest mean IES was in the High Exposure by Higher SES group ( $M = 18.76$ ,  $SD = 14.97$ ; see Table 26). The mean for the High Exposure by Lower SES group was also high ( $M = 18.15$ ,  $SD = 16.48$ ). The lowest mean was in the Low Exposure by Higher SES group ( $M = 6.35$ ,  $SD = 9.56$ ), followed by the No Exposure by Lower SES group ( $M = 6.58$ ,  $SD = 9.79$ ). The mean for the Low Exposure by Lower SES group ( $M = 14.16$ ,  $SD = 13.42$ ) was higher than scores in the Low Exposure by Higher SES group ( $M = 10.76$ ,  $SD = 11.69$ ).

Table 26

*Descriptive Statistics for ANOVA Results for Exposure x SES (N = 351)*

	<i>n</i>	Lower SES <i>M</i>	<i>SD</i>	<i>n</i>	Higher SES <i>M</i>	<i>SD</i>
No exposure	59	6.58	9.79	56	6.35	9.56
Low exposure	48	14.16	13.42	64	10.76	11.69
High exposure	49	18.15	16.48	75	18.76	14.97

In the high school only, the main effect for SES on IES scores was significant,  $F(1,144) = 11.27$ ,  $p = .001$ ,  $\eta^2 = .073$  (see Table 27). The main effect was significant for exposure,  $F(2,144)$

= 6.54,  $p = .002$ ,  $\eta^2 = .083$ , but the interaction was not significant,  $F(2,144) = 2.21$ ,  $p = .114$ ,  $\eta^2 = .030$ .

Table 27

*High School ANOVA Results for Exposure x SES (n = 150)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Exposure Group	2	747.07	6.54	.002*	.083	.903
SES Group	1	1288.66	11.27	.001*	.073	.915
Exposure x SES	2	252.19	2.21	.114	.030	.445
Error	144	114.30				

Note: \* $p < .05$

In the high school, mean differences were high across levels of SES, which indicated that across No Exposure, Lower SES students scored higher on the IES ( $M = 5.20$ ,  $SD = 9.19$ ) than Higher SES students ( $M = 4.07$ ,  $SD = 7.05$ ), across Low Exposure, Lower SES students scored higher on the IES ( $M = 12.04$ ,  $SD = 13.30$ ) than Higher SES students ( $M = 3.31$ ,  $SD = 4.35$ ), and across High Exposure, Lower SES students scored higher on the IES ( $M = 16.68$ ,  $SD = 16.26$ ) than Higher SES students ( $M = 8.16$ ,  $SD = 9.30$ , see Table 28).

Table 28

*Descriptive Statistics for High School on Exposure x SES (n = 150)*

	Lower SES			Higher SES		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
No Exposure	39	5.20	9.19	28	4.07	7.05
Low Exposure	27	12.04	13.30	16	3.31	4.35
High Exposure	22	16.68	16.26	18	8.16	9.30

For the third two-way ANOVA (Exposure x Resilience) for research question 2, results revealed the interaction was not significant for exposure by resilience on IES scores,  $F(2,368) =$

.170,  $p = .844$  (see Table 29). The main effect was not significant for the Resilience group,  $F(1,368) = .292$ ,  $p = .589$ . However, the main effect was significant for Exposure,  $F(2,368) = 28.6$ ,  $p < .001$ ,  $\eta^2 = .135$ .

Table 29

*ANOVA Results for Exposure x Resilience (N = 374)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Exposure Group	2	4606.58	28.6	.000*	.135	1.00
Resilience Group	1	46.99	.292	.589	.001	.084
Exposure x Resilience	2	27.41	.170	.844	.001	.076
Error	368	161.06				

*Note: \*p < .05*

Students were grouped into two groups based on RS scores: Low to Moderate Resilience (145 and <) and High Resilience (>145). Descriptive statistics indicated that mean IES scores were highest in the High Exposure, Low to Moderate Resilience group ( $M = 18.44$ ,  $SD = 14.43$ ) and in the High Exposure, High Resilience group ( $M = 18.65$ ,  $SD = 16.64$ , see Table 30).

Although, IES scores in the No Exposure, Low to Moderate Resilience group were slightly higher ( $M = 7.02$ ,  $SD = 10.33$ ) than scores in the No Exposure, High Resilience group ( $M = 5.32$ ,  $SD = 8.22$ ), groups did not vary much across level of resilience. Scores in the Low Exposure, Low to Moderate Resilience group ( $M = 12.18$ ,  $SD = 12.34$ ) were similar to scores in the Low Exposure, High Resilience group ( $M = 11.51$ ,  $SD = 12.34$ ).

Table 30

*Descriptive Statistics for ANOVA Results for Exposure x Resilience (N = 374)*

	Low to Moderate Resilience			High Resilience		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
No Exposure	70	7.02	10.33	50	5.32	8.22
Low Exposure	67	12.18	12.34	57	11.51	12.34
High Exposure	80	18.44	14.43	50	18.65	16.64

**Research question 3.** Are there statistically significant mean differences in student risk factors (IES scores) across gender and SES? Students with free school lunch were classified as lower-SES and students paying full or reduced price for lunch were classified as higher-SES. The two-way ANOVA indicated that the interaction between gender and SES on IES scores was not significant,  $F(1,339) = 2.75, p = .098$  (see Table 31). The main effect was significant for gender,  $F(1,339) = 4.19, p = .042, \eta^2 = .012$ , but with a low effect size (Huck, 2008). The main effect was not significant for SES group,  $F(1,339) = .153, p = .696$ .

Table 31

*ANOVA Results for Gender x SES (N = 343)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Gender	1	793.56	4.19	.042*	.012	.532
SES	1	29.02	.153	.696	.000	.068
Gender x SES	1	522.17	2.75	.098	.008	.380
Error	339	189.61				

Note: \* $p < .05$

Males in the Lower SES group had the highest average IES scores ( $M = 16.63, SD = 16.03$ ) and males in the Higher SES group had the next highest IES scores ( $M = 13.33, SD = 15.00$ , see Table 32). Females in the Lower SES group indicated the lowest average scores ( $M =$

10.66,  $SD = 13.07$ ) and females in the Higher SES group indicated the next to lowest average scores ( $M = 12.71$ ,  $SD = 12.68$ ).

Table 32

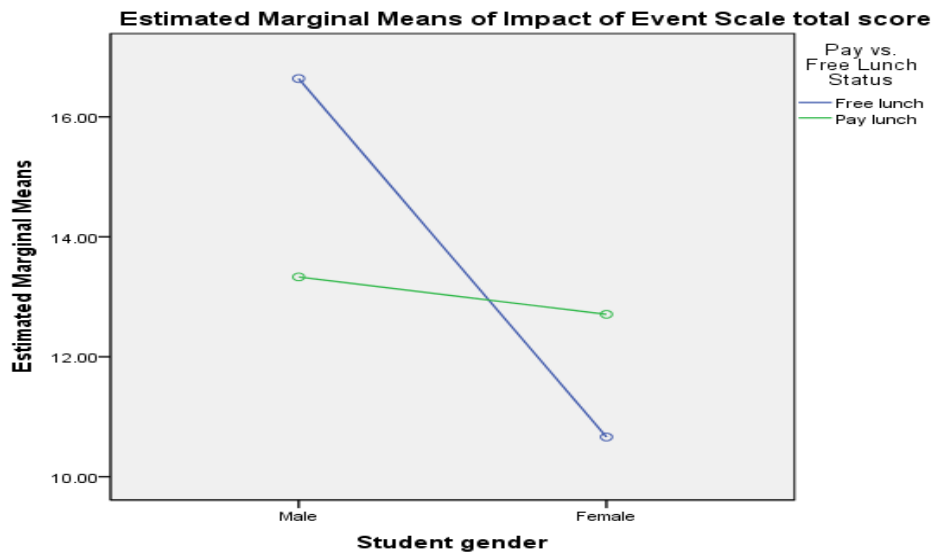
*Descriptive Statistics for ANOVA Results for Gender x SES (N = 343)*

	Lower SES			Higher SES		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Male	42	16.63	16.03	75	13.33	15.00
Female	108	10.66	13.07	118	12.71	12.68

Although not significant, some interaction between gender and SES on IES scores was indicated (see Graph 2). In the Lower SES group, a mean difference occurred of about six between males ( $M = 16.63$ ,  $SD = 16.03$ ) and females ( $M = 10.66$ ,  $SD = 13.07$ ) on IES scores, whereas in the Higher SES group, a mean difference occurred of less than one between males ( $M = 13.33$ ,  $SD = 15.00$ ) and females ( $M = 12.71$ ,  $SD = 12.68$ ) on IES scores.

Graph 2

*Mean IES Scores Across Gender x SES (N = 343)*



**Research question 4.** Are there statistically significant mean differences in student risk factors (IES scores) across levels of student resilience (RS; high resilience vs. low to moderate resilience) and gender and SES? Students were categorized by level of resilience as determined by their RS scores. Students with RS scores above 145 were categorized as High Resilience and scores of 145 or below were categorized as Low to Moderate Resilience. Results of the first two-way ANOVA indicated that the interaction between resilience and gender was not significant,  $F(1,360) = .921, p = .338$  (see Table 33). Additionally, the main effect was not significant for resilience,  $F(1,360) = .364, p = .547$ , and did not reach significance for gender,  $F(1,360) = 2.98, p = .085$ .

Table 33

*ANOVA Results for Resilience x Gender (N = 364)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Resilience Group	1	67.54	.364	.547	.001	.092
Gender	1	552.49	2.98	.085	.008	.406
Resilience x Gender	1	170.72	.921	.338	.003	.160
Error	360	185.4				

Note: \* $p < .05$

In comparing descriptive statistics of resilience by gender groups, males in the High Resilience group had the highest mean IES scores ( $M = 14.45, SD = 15.83$ , see Table 34). Males in the Low to Moderate Resilience group had the second highest average scores ( $M = 13.90, SD = 14.81$ ). Females in the High Resilience group had the lowest IES scores ( $M = 10.31, SD = 12.75$ ) and females in the Low to Moderate Resilience group had the next to lowest IES scores ( $M = 12.72, SD = 12.73$ ).

Table 34

*Descriptive Statistics for ANOVA for Resilience x Gender (N = 364)*

	<i>n</i>	Male <i>M</i>	<i>SD</i>	<i>n</i>	Female <i>M</i>	<i>SD</i>
Low to Moderate	76	13.90	14.81	137	12.72	12.73
High Resilience	47	14.45	15.83	104	10.31	12.75

Only the middle school results showed a significant interaction between gender and resilience on IES scores  $F(1,210) = 4.101, p = .044, \eta^2 = .019$  (see Table 35).

Table 35

*Middle School ANOVA Results for Resilience x Gender (n = 214)*

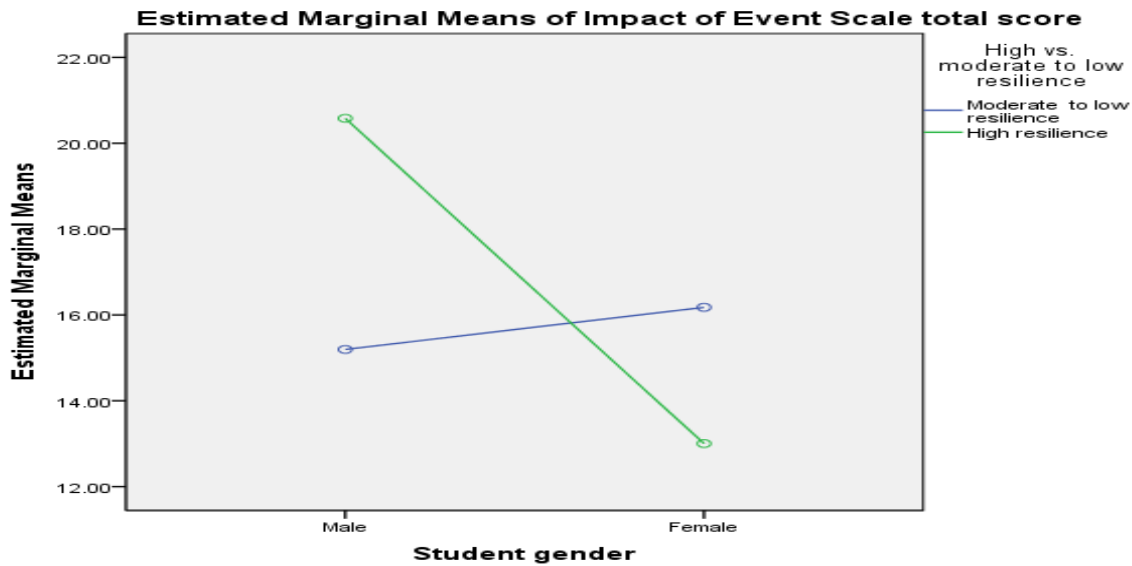
Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Resilience Group	1	54.62	.274	.601	.001	.082
Gender	1	486.13	2.44	.120	.011	.343
Resilience x Gender	1	818.14	4.10	.044*	.019	.522
Error	210	199.49				

Note: \* $p < .05$

In the middle school, males had higher IES scores in the High Resilience group ( $M = 20.58, SD = 16.67$ ) and females had higher IES scores in the Low to Moderate Resilience group ( $M = 16.18, SD = 12.54$ ; see Graph 3). Males had lower IES scores in the Low to Moderate Resilience group ( $M = 15.20, SD = 15.31$ ) and females had lower IES scores in the High Resilience group ( $M = 13.00, SD = 13.96$ ).

Graph 3

*Middle School Mean IES Scores Across Gender by Resilience (n = 214)*



The second two-way ANOVA for research question 4 indicated no significant interactions between resilience and SES on IES scores,  $F(1,348) = .302, p = .583$  (see Table 36). The main effect for resilience was not significant,  $F(1,348) = .620, p = .432$ , nor was the main effect for SES,  $F(1,348) = .009, p = .926$ .

Table 36

*ANOVA Results for Resilience x SES (N = 352)*

Source	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>	$\eta^2$	<i>Power</i>
Resilience Group	1	118.54	.620	.432	.002	.123
SES	1	1.64	.009	.926	.000	.051
Resilience x SES	1	57.72	.302	.583	.001	.085
Error	348	191.20				

Note: \* $p < .05$

Descriptive statistics indicated that mean differences were not large. The highest mean difference was between the Low to Moderate Resilience by Lower SES group ( $M = 13.54, SD =$



14.40) and the High Resilience by Lower SES group ( $M = 11.53$ ,  $SD = 13.77$ , (see Table 37). Scores between the Low to Moderate Resilience by Higher SES group ( $M = 12.85$ ,  $SD = 13.18$ ) and the High Resilience by Higher SES group ( $M = 12.49$ ,  $SD = 14.20$ ) were similar.

Table 37

*Descriptive Statistics for ANOVA Results for Resilience x SES (N = 352)*

	Lower SES			Higher SES		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Low to Moderate	85	13.54	14.40	119	12.85	13.18
High Resilience	70	11.53	13.77	78	12.49	14.20

**Research question 5.** How well do level of exposure (EI), gender, SES, and resilience (RS) predict student risk factors (IES scores)? A binary logistic regression was utilized using the Enter method to determine how well resilience scores (RS), exposure scores (EI), SES, and gender predicted higher IES scores. Two variables were compared across categories; SES compared Lower SES to Higher SES and gender. Students' IES scores were dichotomized into higher IES scores (19 or higher) and average to low IES scores (below 19). IES scores of 19 were used as the cut off for higher IES scores based on guidelines of Horowitz (2003).

Results of the logistic regression indicated that the model of four independent variables was reliable in predicting higher IES scores ( $-2 \text{ Log Likelihood} = 381.36$ ;  $X^2(4) = 30.19$ ,  $p < .001$ ). The model correctly classified 71.1% of the cases and explained about 12% of the variance (Nagelkerke  $R^2 = .121$ ) in IES scores (see Table 38). Based on *Wald* statistics, only one of the four predictors, exposure, was found to significantly predict higher IES scores. Odds Ratios ( $e^B = 1.46$ ) showed that as exposure index scores increased by 1, students are 1.46 times more likely to be classified as higher IES.

Table 38

*Regression Coefficients for Logistic Regression (N = 342)*

Source	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Odds Ratio
Gender (Male)	.193	.262	.542	1	.462	1.21
SES (Lower)	.063	.254	.061	1	.805	1.07
Exposure	.380	.073	26.81	1	.000*	1.46
Resilience	-.001	.006	.010	1	.918	.999
Constant	-1.67	.928	3.24	1	.072	.188

Note: \* $p < .05$

In the high school, results of the logistic regression indicated that the model of four independent variables was reliable in predicting higher IES scores ( $-2 \text{ Log Likelihood} = 112.04$ ;  $X^2(4) = 19.52$ ,  $p = .001$ ). The model correctly classified 83.9% of the cases and explained about 20% of the variance (Nagelkerke  $R^2 = .209$ ) in IES scores (see Table 39). Based on *Wald* statistics, two of the four predictors were found to significantly predict higher IES scores: SES and exposure. Odds Ratios ( $e^B = 4.79$ ) indicated that high school students in the Lower SES group were nearly 5 times as likely to report higher IES symptoms than those in the Higher SES group. Furthermore, Odds Ratios showed that as exposure index scores increased by 1, students are 1.51 times more likely to be classified as higher IES.

Table 39

*Regression Coefficients for High School Logistic Regression (n = 149)*

Source	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Odds Ratio
Gender (Male)	.332	.512	.420	1	.517	1.39
SES (Lower)	1.57	.603	6.75	1	.009*	4.79
Exposure	.411	.129	10.21	1	.001*	1.51
Resilience	.002	.011	.042	1	.838	1.00
Constant	-3.95	1.62	5.90	1	.015	.019

Note: \* $p < .05$

In the middle school, results of the logistic regression indicated that the model of four independent variables was reliable in predicting higher IES scores (-2 Log Likelihood = 243.83;  $X^2(4) = 14.06, p = .007$ ). However, the model correctly classified only 61.1% of the cases and explained 9.5% of the variance (Nagelkerke  $R^2 = .095$ ) in IES scores (see Table 40). Based on *Wald* statistics, only one of the four predictors, exposure, was found to significantly predict higher IES scores. Odds Ratios ( $e^B = 1.40$ ) showed that as exposure index scores increased by 1, students are 1.40 times more likely to be classified as higher IES.

Table 40

*Regression Coefficients for Middle School Logistic Regression (n = 193)*

Source	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	Odds Ratio
Gender (Male)	.165	.321	.265	1	.607	1.18
SES (Lower)	-.087	.330	.070	1	.792	.916
Exposure	.335	.096	12.22	1	.000*	1.40
Resilience	-.003	.009	.149	1	.699	.997
Constant	-1.67	.928	3.24	1	.072	.188

Note: \* $p < .05$

## Summary of the Findings

Descriptive statistics indicated that the most frequent responses to the IES were on the avoidance subscale with students trying to remove the spill from their memories, or avoiding thinking about the spill, or trying to not talk about the spill. Average student IES scores were in the moderate range and scores in the middle school were higher than scores in the high school. Additionally, results indicated that 35.2% of the students reported high exposure to the oil spill, 32.8% noted low exposure, and no exposure to the oil spill was reported by 32% of students. Average exposure scores were higher for middle school students than the high school students. Exposure to the oil spill was reported by 39.4% of the students with their coastal areas being affected, 42.1% reported the spill affected the hunting or fishing activities in their household, 34.4% reported having commercial fishing areas used by family damaged, and 41.5% reported coming into contact with the oil spill in other ways. A high proportion of students, 41.3%, had scores in the high resilience range and 38.1% of the students scored in the moderate range. Only 20.6% of the students scored in the low resilience range. Average resiliency scores did not differ significantly between the high school students and the middle school students. However, impact of the oil spill on students was found to significantly differ across levels of exposure. Students who reported high exposure were found to have significantly higher impact than students who reported no exposure or low exposure. Additionally, students who reported low levels of exposure had significantly higher impact than students who reported no exposure.

**Gender, SES, resilience, and exposure on impact.** No significant interaction was found between gender and exposure from the impact of the oil spill on students; however, males in the higher exposure group scored higher than females and males in the lower exposure group. Also, males and females did not have significantly different IES scores when compared across

levels of exposure. Significant mean differences were found only across exposure level. Results were similar in the high school and middle school with significant differences only between the exposure groups and effect sizes in the moderate range.

No significant interaction was found between SES and exposure from the impact of the spill on students. The main effect for SES was also not significant, but the main effect for exposure was significant. In the high school alone, lower-SES students, or those reporting receiving free lunch, were found to have significantly higher impact from the oil spill in comparison to higher-SES students, or those reporting paying for lunch. Effect sizes for SES were in the moderate range.

No significant interaction was found between resilience and exposure from the impact of the spill on students. Students with low to moderate resilience did not report significantly different experiences of impact from the spill in comparison to students with high resilience. Exposure groups were found to differ significantly from the impact of the spill when compared across resilience levels.

**Gender and SES on impact.** No significant interaction was found between gender and SES from the impact of the spill on students. SES did not have a significant main effect. The main effect for gender from the impact of the spill was found to be significant with males scoring higher. Nevertheless, the effect size for gender was small. In the high school alone, significant differences in impact were found across levels of SES and lower-SES students, or those receiving free school lunch, reported higher impact from the spill.

**Resilience and gender on impact.** No significant interactions were found between levels of resilience and gender from impact of the spill on students. Males reported higher impact than females, but the difference did not reach significance. Also, student resilience

groups were not significantly different from impact of the spill. However, in the middle school a significant interaction was found between gender and resilience, with low effect size. Males who indicated higher resilience had higher impact from the spill than males who indicated low to moderate resilience, whereas females who indicated higher resilience had lower impact from the spill than females who indicated low to moderate resilience. No significant interactions were found between levels of resilience and SES from the impact of the spill. The main effect for resilience and SES were both non-significant.

**Exposure, gender, SES, and resilience on impact.** Results of the logistic regression which included exposure, gender, SES, and resilience was a good fit in predicting higher impact of the oil spill on students, classifying 71.1% of cases correctly. For all students, exposure was found to be the only significant predictor of higher impact from the spill. Odds ratios indicated that as exposure increased by 1, students were 1.46 times more likely to be classified as experiencing higher impact from the spill.

In the high school, the results of the regression which included the four variables were also significant and classified 83.9% of the cases correctly. Two independent variables were found to be significant predictors of higher impact from the spill; SES and exposure. More specifically, lower-SES students, or those reporting receiving free lunch, were nearly 5 times as likely to report higher impact from the spill. As exposure increased by 1, students were 1.51 times more likely to have experienced higher impact from the spill. In the middle school, the regression model with the four independent variables was significant, but classified only 61.1% of the cases correctly. Exposure was the only significant predictor of higher impact from the spill. Odds ratios indicated that as exposure increased by 1, students were 1.40 times more likely to be classified as experiencing higher impact.

## **Chapter V**

### **Discussion**

In recent years, much has been learned about the impact of natural and man-made disasters on different groups of people (James, 2008; Norris et al., 2002). Both personal and environmental factors have been shown to be related to individuals' stress reactions to a disaster. The present study utilized Bronfenbrenner's (1979) ecological systems theory as a framework to understand how the factors of exposure, gender, SES, and resilience interact to influence the impact of the BP Deepwater Horizon oil spill on coastal secondary school students. Exposure and socioeconomic status were considered environmental factors, whereas gender and resilience were considered individual (or personal) factors. Bronfenbrenner maintained that in his ecological systems theory, the environment influences the developing person, and subsequently, the developing person influences the environment.

In this chapter, results of the five research questions for the present study are summarized and discussed. Additionally, implications for counselors and counselor educators as well as implications for future research are presented. Furthermore, limitations of the study are outlined and conclusions about the presenting problem are drawn.

#### **Discussion of Research Findings**

**Impact from the spill.** In the present study, risk to secondary school students of the BP Deepwater Horizon oil spill was studied. Overall, approximately 29% of students reported they were highly impacted by the oil spill, about 21% were moderately impacted, and about 50% had low impact. Also, as the oil spill in Louisiana occurred approximately two years previous to the present study, results were consistent with previous findings, which indicated that individuals exposed to oil spills can be impacted years after the event (Arata et al., 2000). Previous research

has shown that coastal Louisiana populations are deeply connected to the local environment and subsistence activities (Tidwell, 2003). Recent and earlier researchers have found that fishermen, subsistence cultural groups, and communities intrinsically tied to the natural ecosystem fare much worse in oil spills (Abramson et al., 2010; Arata et al., 2000; Dyer, Gill, & Picou, 1992; Palinkas et al., 2004). The finding that half of students sampled reported moderate to high distress symptoms from the oil spill may indicate the presence of a vulnerable population. Furthermore, the moderate to high distress symptoms reported by students were consistent with previous research findings that children of all ages are vulnerable in the face of crises and disasters (Norris et al., 2002; Pfefferbaum et al., 2010).

Previous research has noted post-disaster symptoms specific to youth like clinginess, dependence, and refusal to sleep alone (Gaffney, 2006; Norris et al., 2002). Results of the present study indicated specific distressing and avoidant thoughts that student responses indicated to the oil spill. For example, students in the present study reported the highest impact from the spill when they “tried to remove it from [their] memory,” and the second highest when they “tried not to think about it,” followed by students who “tried not to talk about it.” Also, students frequently reported that they avoided getting upset about the spill or “it wasn’t real” to them. Overall, high school students reported experiences of lower impact from the spill than middle school students, which is consistent with previous findings that younger children may be more severely impacted by disasters (Lepore, 2009; Vila et al., 2001).

**Exposure to the spill.** Results of the present study indicated that approximately 35% of the students reported high exposure to the oil spill, whereas about 33% noted low exposure, and 32% indicated no direct exposure. Additionally, roughly 40% of students who were exposed to the spill reflected that the spill affected their coastal areas and hunting or fishing activities in



their household, and that they came in contact with the oil in other ways. Approximately 34% of students indicated that the oil spill caused damage to the areas that their family fished commercially. Overall, students from the middle school reported they had higher exposure than students in high school.

In the present study, students reporting high exposure levels were found to have significantly higher reported distress from the oil spill than students reporting no exposure and low exposure, which is consistent with previous findings in the existing disaster mental health literature (March et al., 1997; Vila et al., 2001). Vila et al. (2001) found that children more directly exposed to a technological disaster had higher distress and more behavioral symptoms than children indirectly exposed. Likewise, March et al. (1997) found that higher levels of exposure to technological disasters predicted more reported post-traumatic symptoms in survivors. Also, in the present study, student exposure groups differed significantly on levels of distress when compared across gender, SES, and resilience levels. These findings are similar to other studies that have consistently linked disaster exposure to higher stress symptoms and behavioral problems in adolescents (Khoury et al., 1997; La Greca, Silverman, & Wasserstein, 1998). Additionally, results of the logistic regression indicated that student exposure was a significant predictor of higher reported distress from the oil spill. Increasing exposure was related to higher distress and as students' reported exposure increased by 1, they were 1.46 times more likely to be classified as experiencing higher distress. Results for exposure were similar in both the high school and the middle school. These results are similar to findings that exposure levels to the Exxon Valdez oil spill were significantly related to PTSD symptoms and depression for Alaskan Natives and Euro-Americans (Palinkas et al., 2004; Palinkas et al., 1992).

**Gender results.** In the present sample, about 33% of students were male and about 64% were female, with significant differences for gender when compared across SES levels; males scored higher than females on reported distress from the spill, but with a small effect size. The finding that males had higher distress than females when compared across SES levels is contrary to the results of several related studies, yet similar to findings of other studies. In a post-earthquake study in Italy, Dell’Osso et al. (2011) found that female adolescents were about twice as likely as males to report high symptoms of PTSD. Several additional studies indicated that females experienced greater distress post-disaster (Anderson & Manuel, 1994; Khoury et al. 1997; March et al., 1997; Norris et al., 2002).

When comparing gender and SES on student reported distress from the oil spill, the interaction was not significant. However, middle school student results showed a significant interaction between gender and resilience on distress, with males in the high resilience group having the highest distress. A similar finding can be garnered from the research of Werner (1986) who noted that female children showed more resilience to growing up in the distressing environment of an alcoholic home. Still, overall, the present study’s results indicated that gender was a weak predictor of higher distress scores in the logistic regression analyses, which is similar to results from other studies (Sundin & Horowitz, 2003; Vila et al., 2001). Both Sundin and Horowitz (2003) and Vila et al. (2001) found no gender differences related to stressful events.

**SES results.** About 52% of students reported paying for lunch (i.e., full-pay and reduced price), considered higher-SES, and about 42% reported receiving free lunch, considered lower-SES. Economic resources have been viewed as a protective factor for children facing adversity (Garmezy, 1994). However, in the entire sample and in the middle school, students’ reported distress did not differ significantly when SES was compared across levels of exposure, gender,

and resilience. In the high school, 58% of students receiving free lunch, lower-SES, had significantly higher reported distress from the oil spill than students (40%) paying for lunch, higher-SES students. Effect sizes for SES across exposure, gender, and resilience were in the low to moderate range. The significant differences found in distress for SES are consistent with the research findings of Norris et al. (2002) who found that in 13 of 14 (93%) studies analyzed, SES was significantly associated with level of impact. The ability to rebound psychosocially after a toxic disaster has been associated with the amount of resources available to individuals (Picou, 2009a). Also, results of the logistic regression showed that high school students receiving free lunch were nearly 5 times as likely to report higher distress as high school students paying for lunch. According to Hobfoll (2001), individuals with fewer accumulated resources struggle more in recuperating lost resources. The results in the high school students are consistent with previous findings that lower-SES individuals may be at particular risk after disasters. However, results of the present study indicated that despite a large proportion of higher-SES students, paying for lunch, in the entire sample and in the middle school, many students still reported high symptoms of distress from the oil spill. Higher-SES levels did not appear to buffer the impact of the oil spill for students.

**Resilience results.** Resilience was conceptualized as a protective factor thought to be related to better coping. Studies with adults have shown that psychological resources such as coping, self-efficacy, mastery, self-esteem, optimism, and hope are linked to lesser impacts from disasters (Benight et al., 1999). In the present study, students were generally highly resilient with about 41% revealing resilience in the high range. About 38% of students reported resilience in the moderate range, and only about 21% of students indicated low resilience. Student distress

was high despite higher levels of resilience in the entire sample, which seems to indicate that the oil spill impacted students equally regardless of psychological resources.

Also, resilience was not a significant predictor of higher reported distress in the logistic regression. The resilience student groups did not differ significantly on reported distress from the oil spill in the entire sample or in the high school when compared across levels of exposure, gender, and SES. However, for the middle school students, results showed a significant interaction between gender and resilience on distress, but with a low effect size. Results for females were in the expected direction; females with higher resilience had lower distress than females with low to moderate resilience. Previous research indicated that females may be more resilient than males to certain harsh environmental conditions (Werner, 1986). Moreover, males in the present study with higher resilience actually experienced higher distress from the oil spill than males with low to moderate resilience. Results may signify that males, even those with strong psychological resources, are at particular risk to distress following technological disasters.

### **Implications for Counselors**

Counselors servicing students in coastal areas affected by the BP Deepwater Horizon oil spill should be aware of possible at-risk populations and how to screen for stress reactions to traumatic events. Using Horowitz's (2003) scoring system for the IES, approximately 21% of students in the present study had moderate impact scores (between 8.5 and 19) indicating the possible need for further clinical judgment to determine pathology, and about 29% of students had high scores of 19 or above indicating likely clinical significance and signs of post-traumatic stress. Further assessment of approximately half of students involved in the study and possible clinical mental health treatment for those most affected may be needed. Also, counselors should be aware of the ways adolescents may be most impacted by the spill, with the most commonly

noted impact symptoms related to avoidant thoughts. Students noted most often that they tried not to remember things or think about things related to the spill. Counselors could utilize additional assessment devices to further understand students' avoidance symptoms and design targeted interventions for dealing with intrusive or avoidant thoughts.

Counselors servicing affected coastal areas should be familiar with assessment instruments for exposure, understand the ways adolescents can be exposed to toxic disasters, and recognize how exposure can be related to symptoms of distress. Results of the study indicated that students were most likely to be exposed to the oil spill through having the hunting or fishing activities of household members affected; coming into contact with oil through hunting, fishing, or recreation; having utilized coastal areas affected by the spill; or incurring damage to areas fished commercially by household members. Students were less likely to have had property damaged by the spill or to have worked in clean-up activities, which is likely due to the age of students. Additionally, higher exposure student groups consistently had higher risk symptoms. Counselors should be alert to the possible dangers of high exposure levels and should implement appropriate interventions for higher exposure populations experiencing distress. Additionally, counselors working in areas affected by an oil spill disaster could teach students and families ways to prevent distress symptoms experienced from exposure to the spill and possibly mitigate future distress from exposure.

Although study results did not indicate great differences in impact between males and females, males did report higher symptoms. Results suggest that males may be a vulnerable population in the face of oil spills. Possible reasons could include a higher likelihood of utilizing affected areas such as fishing, cultural and societal traditions related to subsistence activities, and as discussed by Melecki and Demaray (2002), a comparative lack of interpersonal coping

resources or social support networks. Counselors assisting students in affected areas should be attuned to gender differences in impact and should design interventions that utilize coping resources.

Counselors working in schools and communities affected by the oil spill should be aware of how lower-SES students may be impacted. SES was not a significant predictor of distress in the middle school, but middle school students had a higher proportion of students paying for lunch, which could represent higher-SES populations. On the other hand, lower-SES populations like the high school students may be impacted differently. Having a lower-SES status, receiving free lunch, was related to greater impact in high school students who were nearly 5 times as likely to report high distress symptoms. Counselors should be aware of population SES demographics and develop programs for students who may be at-risk due to limited social and economic resources.

Results indicated that the student population sampled was generally highly resilient, but resilience was not a strong predictor of reported distress from the oil spill. Counselors working with affected populations should be aware that even though students may be resilient, they still may have been impacted by the oil spill disaster. Counselors should understand that resilience, as measured in the current study, assesses characteristics such as planning for the future, perseverance and self-reliance, and a can-do attitude. It is possible that problems caused by toxic contamination such as the oil spill are largely out of the students' control and are a challenge to their normal coping skills. Counselors should be leaders in teaching ways to cope with technological disasters and demonstrating how to apply coping skills and resilience characteristics to the oil spill recovery. Henderson and Milstein (2003) and Baum et al. (2009)

suggested ways that counselors and the school can help students to build resiliency through structured guidance lessons that teach coping skills.

### **Implications for Counselor Educators**

The purpose of this study was to explore the impact of the BP Deepwater Horizon oil spill on students of two coastal Louisiana secondary schools and determine how student factors influence psychosocial risks. Study results can be most readily applied to the field of disaster mental health and crisis intervention counseling. Counselor educators should take note of how study results relate to several of the newest standards of the Council for Accreditation of Counseling and Related Programs (CACREP, 2009). More specifically, results along with similar research could be used to target teaching of the following CACREP mental health standards: Section III.A.9; Section III.K.5; Section III.L.3; and Section IV.I.4 to counselors-in-training who may work with populations experiencing the aftermath of the oil spill or similar type disasters.

Two years after the BP Deepwater Horizon oil spill, distress levels were still relatively high in students sampled. As stated in the clinical mental health counseling standards, counselors should understand the impact of disasters on different groups of individuals (CACREP, 2009; Section III.A.9), such as individuals impacted by an oil spill disaster. Results indicate that children and adolescents are vulnerable populations in the face of disasters and coastal secondary students run a high risk of exposure to toxic contamination or stress reactions to the environment. Furthermore, males may be at slightly more risk of distress symptoms than females, possibly because of greater exposure and interruption of traditional subsistence activities. As found in the high school, lower-SES students receiving free lunch and students from lower-SES communities may be more impacted by oil spills.

Another essential area that counselors should understand is the appropriate use of diagnosis during crises and disasters and how to differentiate between diagnoses and developmentally appropriate reactions to crises (CACREP, 2009; Section III.K.5; Section III.L.3). The present study demonstrates methods for assessing exposure to disasters (Exposure Index; Palinkas et al., 2004; Palinkas et al., 1992), and methods for assessing distress after a disaster (Impact of Event Scale; Horowitz et al., 1979).

Also, counselors should have knowledge of crisis intervention models and strategies for responding to community, national, and international crises and disasters (CACREP, 2009; Section IV.I.4). The present study offers an example of how principles of Bronfenbrenner's (1979) ecological systems theory can be utilized to better understand the impact of a disaster on secondary students as well as their families and communities. Moreover, in this study interactions were explored across environmental characteristics of students (i.e. SES and exposure) and individual characteristics of students (i.e. gender and resilience). According to Bronfenbrenner, social interactions and interactions with other systems within one's environment are the building blocks of development. The environment or system influences the developing person, and subsequently, the developing person influences the environment. Likewise, how students interact with their environment after a disaster can influence the disaster's impact and students' recovery. A holistic approach to understanding a disaster's impact on students and communities has been recommended by previous disaster mental health researchers (James, 2008; Kilmer & Gil-Rivas, 2010).

Resilience is a concept of increasing interest to counselor educators and disaster mental health researchers. Resilience, a protective factor, is thought to lessen the impact of crises or disasters on different groups of people. However, resilience was generally high and student



distress did not vary significantly across levels of resilience. Counselor educators should be aware of how resilience and protective factors function after disasters. Results indicate that high resilience in certain populations and under specific circumstances may not be related to less distress. For example, Cajuns and coastal Louisiana communities have been characterized as fiercely independent and self-reliant, yet mistrustful of outsiders (Davis, 2010; Tidwell, 2003). If coping resources after the disaster come from outside of the local community (as described by James, 2008), then cultural mistrust may lead to negative attitudes about seeking help (Nickerson, Helms, & Terrell, 1994).

James (2008) recommended that counselor educators understand lessons learned from previous disaster mental health studies and apply knowledge to the teaching of disaster response interventions. Previous research has indicated that children are vulnerable after disasters (Norris et al., 2001) and that oil spills may continue to impact adults and subsistence populations several years after the event (Arata et al., 2000; Palinkas et al., 1992). Present study results add to lessons learned about the impact of disasters on children and adolescents, and in particular, the responses of youth to technological disasters like oil spills. Reported distress levels in students were high two years after the BP Deepwater Horizon oil spill, a finding which supported the argument put forth by Freudenburg (1997) that technological disasters may cause more insidious psychological harm than natural disasters. Furthermore, as evidenced by the types of exposure noted by students, students who practice subsistence activities may be more severely impacted by oil spills.

### **Future Research**

Children and adolescents have been identified as vulnerable populations in the face of disasters and current results add to those findings, but most of the previous research on oil spill

survivors, like research conducted after the Exxon Valdez oil spill, has focused on adults (Arata et al., 2000; Palinkas et al., 2004; Palinkas et al., 1992). More research is needed into children and adolescents' reactions to the impact from oil spills. Murray (2011) indicated that biological and social factors may place children and adolescents at greater risks for contamination during oil spills. Children's reactions to crisis events are thought to vary depending on their developmental level (Lepore, 2009). Some research has found younger children are more susceptible, which is in line with current findings that middle school students reported higher rates of distress than high school students (Vila et al., 2001). However, other studies have found that older children were more greatly impacted by disasters (Green et al., 1991). Future research should compare the impact of disasters on younger children to the impact on adolescents.

Post-disaster symptoms specific to youth have been noted including clinginess, dependence, refusal to sleep alone, temper tantrums, aggressive behavior, incontinence, hyperactivity, separation anxiety, and fear of the potential for new disasters (Gaffney, 2006; Norris et al., 2002). The current study found high rates of avoidant thoughts and distress in secondary school students. Future research should explore the specific reactions and behavioral concerns of children and adolescents exposed to technological disasters. Additional research should screen for other mental health concerns like depression or anxiety of survivors and examine the social and academic impact on youth.

Researchers would be justified in utilizing qualitative measures to explore the impact of oil spill exposure on youth and determine the longer-term effects of exposure on personal development and the possible multiple factors that can impact students. There seems to be much to be discovered about the role of protective factors in buffering the effects from man-made as well as natural disasters. Although researchers have shown how adult survivor characteristics of

coping skills and self-efficacy were related to less distress after disasters (Benight et al., 1999), less is known about how resilience characteristics function in children after disasters. Economic supports and social supports have been linked to the development of resilience in children (Bernard & Slade, 2009; Garmezy, 1994) and to lessen problems in children post-disaster (Khoury et al., 1997). Researchers should explore more in-depth the influences of SES, resilience, and social supports on how children and adolescents may be impacted by technological disasters. More specifically, researchers could determine through interviews the steps taken by students to cope with the stressors such as avoidance and obsessive thoughts related to the spill.

Previous research has shown that females may present with greater distress after disasters (Anderson & Manuel, 1994; Dell'Oso et al., 2011), but current results indicated a higher impact in males. As described by Garmezy (1994), differences may be related to gender identity development and how it relates to the processing of stress reactions, or, males and females may utilize social supports to cope differently (Melecki & Demaray, 2002), topics which deserve future research. Based on previous research with coastal Louisiana populations (Tidwell, 2003), one perspective that may be taken in the present study is that students have strong connections to the environment. Future studies could explore if this is true and if males and females feel equally connected to the environment. In particular, individuals who self-reported as Cajun were thought to have a deep connection to the local environment as were families involved in subsistence activities (i.e. fishing and seafood industries). Future studies could explore if self-identifying as Cajun and being involved in fishing and seafood are related to greater distress from toxic contamination of the environment.

Levels of exposure, which included direct exposure and family exposure, contained the greatest differences in distress levels. However, the effects of indirect exposure, like hearing stories from peers and the media, have yet to be determined. Previous research has shown that indirect exposure can be a significant predictor of distress in highly publicized and wide-spread disasters (Pfefferbaum et al., 2000). Future research could explore the effects of the entire community being exposed and if there are examples of a corrosive community as described by Picou, Marshall, and Gill (2004).

### **Limitations**

Limitations concerning the design of the study and data collection were reviewed in the first chapter. The first limitation was that the study was cross-sectional and self-report in nature and did not follow respondents over time. The self-report design of the study contains the risk that students may not self-report accurately due to a lack of self-understanding or social pressures to respond in a certain way. Additionally, the cross-sectional design of the study did not allow for the measurement of pre-existing student characteristics. Preexisting child characteristics like level of anxiety have been shown to place students at risk for stronger stress reactions when exposed to natural disasters (La Greca, Silverman, & Wasserstein, 1998).

Second, data collection occurred at two separate points in time. High school data collection occurred in the fall, two years after the oil spill, and the middle school data collection occurred in the spring, two and a half years after the spill. The lapse in time could have impacted students' response. Third, the two schools were selected because of their proximity to the Louisiana coast, thus the populations sampled were assumed to be representative of affected coastal populations, but the non-random selection of students leaves concerns about generalizing findings to other coastal Louisiana populations or other affected areas.

Fourth, only stress reactions of students were assessed, other symptoms such as mental, physical, cognitive or social health concerns that may influence student functioning were not measured. Prior traumatic experiences that happened in Louisiana, like exposure to Hurricane Katrina or the Murphy oil spill, were not measured. Previous research has found that both the home environment post-disaster and the stress responses of parents, neither of which was assessed in the present study, can be predictors of distress in children after a disaster (Green et al., 1991). Additionally, demographics of students' experiences with parents in clean-up activities or if parents had any negative health effects from working in clean-up activities were not included.

Resilience was measured in this study as an individual personality construct. However, resilience can include both characteristics of the individual as well as environmental characteristics like social supports and economic resources (Garmezy, 1994). Previous research has indicated that declines in social relationships were related to greater distress after disasters (Arata et al., 2000), but social supports were not measured because of the scope of the study.

## **Conclusions**

Results of the present study supported the conclusion that children and adolescents are vulnerable populations in the aftermath of technological disasters. Half of students reported moderate to high distress two or more years after the BP Deepwater Horizon oil spill. Oil spill exposure accounted for the greatest differences in reported distress of students. Also, SES was a strong predictor of reported distress in high school students, indicating the need for further exploration of the role of SES in a disaster's aftermath. Overall, gender was not a very strong predictor of distress in students. However, comparisons did indicate significantly higher distress in males, leaving questions for future research about how gender role identity and connections

with the environment influence the impact from oil spills or similar types of disasters. Likewise, questions arose about the role of protective factors in the recovery from oil spills. Students indicated high levels of resilience and still reported high levels of distress.

The present study highlights several important clinical areas for counselors to consider when providing mental health services for coastal populations affected by an oil spill.

Additionally, the present study is of value to counselor educators because of the relationship to several CACREP standards (2009) including the need for counselors to understand models of disaster response and the need for counselors to be aware of how environmental and individual characteristics influence children's responses to a disaster. The study draws attention to important community and cultural factors for counselors to consider from the perspective of Bronfenbrenner's (1979) ecological systems theory.

The BP Deepwater Horizon oil spill has caused unprecedented environmental contamination in the Gulf of Mexico and the longer-term effects on the coastal habitats and residents of Louisiana are yet to be known (Button, 2010). Nevertheless, Louisiana residents are highly resilient. Along with help from the federal government, local leaders have put in place a plan for the long-term recovery of Louisiana's coast. Congress recently passed the RESTORE Act in order to assist the recovery of the five coastal states most impacted by the oil spill (RESTORE Council, 2012). The legislation dedicated 80% of Clean Water Act penalties paid by parties responsible for the BP Deepwater Horizon explosion and spill to the region for ecological and economic recovery efforts. Louisiana schools will be important resources in helping students and their families to recovery from the oil spill disaster. Schools can assist families and their children in disseminating informational resources, providing counseling and social support,

teaching coping methods, and by reinstating familiar daily routines (Henderson & Milstein, 2003; Prinstein et al., 1996).

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**Appendix A:**  
**The Impact of Event Scale**

### The Impact of Event Scale

Below is a list of statements about the BP Deepwater Horizon oil spill. Please check each item, indicating how frequently these comments were true for you DURING THE PAST SEVEN DAYS. If they did not occur during that time, please mark the “not at all” column. If they occurred rarely, sometimes, or often, then mark that column.

*Frequency*

	<i>Not at all</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Often</i>
1. I thought about it when I didn't mean to.				
2. I avoided letting myself get upset when I thought about it or was reminded of it.				
3. I tried to remove it from memory.				
4. I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I stayed away from reminders of it.				
8. I felt as if it hadn't happened or it wasn't real.				
9. I tried not to talk about it.				
10. Pictures about it popped into my mind.				
11. Other things kept making me think about it.				
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.				
13. I tried not to think about it.				
14. Any reminder brought back feelings about it.				
15. My feelings about it were kind of numb.				

The Impact of Event Scale (Horowitz, Wilner & Alvarez, 1979)

**Appendix B:**  
**IES Permissions of Use**



## **IES Permissions of Use**

### **Permissions of Use**

**RATING SCALES:** Copies of, instructions for, and permission to use the **IMPACT OF EVENTS SCALE**, and the **POSITIVE STATES OF MIND SCALE** will be found in **Treatment of Stress Response Syndromes**. People in non-profit research or clinical work have my permission to use this scale. Also the **IES** can be found by clicking on and then scrolling through the "my works" page of this site.

Formats of **Process Notes** can be duplicated from the book **Horowitz, M. Formulation as A Basis for Planning Psychotherapy Treatments**. Clinicians have my permission to do so.

Formats for **Role Relationship Model Configurations** may be duplicated from these books: **Cognitive Psychodynamics**, **Person Schemas and Maladaptive Interpersonal Patterns**, or **Formulation as a Basis for Planning Psychotherapy Treatment**. Clinicians have my permission to do so.

**Appendix C:**  
**The Exposure Index**

### The Exposure Index

The following items are related to your exposure to the Deepwater Horizons oil spill. Please read the next 6 items and answer by circling *Yes* or *No*.

---

1. Did you or anyone in your household use, before the spill, areas along the coast that were affected by the spill?	<i>Yes</i>	<i>No</i>
2. Did you work on any of the shoreline or water clean-up activities of the oil spill?	<i>Yes</i>	<i>No</i>
3. Are there any other ways that you came into contact with the oil spill or clean-up activities, such as during recreation, hunting, or fishing activities?	<i>Yes</i>	<i>No</i>
4. Did you or your parents have any property that was lost or damaged because of the oil spill or clean-up?	<i>Yes</i>	<i>No</i>
5. Did the oil spill cause any damage to the areas you or other household members fish commercially?	<i>Yes</i>	<i>No</i>
6. Has the oil spill directly affected the hunting or fishing activities of any members of your household?	<i>Yes</i>	<i>No</i>

---

The Exposure Index (Palinkas, Russell, Downs & Petterson, 1992)

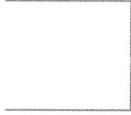
**Appendix D:**

**Permission Letter from Author for use of Exposure Index**

## Permission Letter from Author for use of Exposure Index

Reply Reply All Forward Chat

### Re: Request to use Exposure Index



Lawrence Palinkas [palinkas@usc.edu]

Tuesday, February 28, 2012 9:48 AM

**To:** Walt Whitman Hammerli

**Attachments:** (2) Download all attachments

Palinkas et al 1992.pdf (970 KB) [Open in Browser]; Palinkas et al AJPpsych 1993.pdf (1 MB) [Open in Browser]

You replied on 3/1/2012 5:06 PM.

Dear Walt: I apologize for the delay in responding to your email. You are more than welcome to use the Exposure Index. The index consists of yes or no responses to 6 questions, with no coded as 0 and yes as 1. A description of the questions can be found in the attached reprints. Best of luck with your study. Regards, Larry Palinkas

Lawrence A. Palinkas, Ph.D.  
Albert G. and Frances Lomas Feldman  
Professor of Social Policy and Health  
School of Social Work  
MRF 339  
University of Southern California  
Los Angeles, CA 90089-0411

----- Original Message -----

From: Walt Whitman Hammerli <whammerl@my.uno.edu>  
Date: Wednesday, February 15, 2012 5:28 pm  
Subject: Request to use Exposure Index  
To: "palinkas@usc.edu" <palinkas@usc.edu>

> Dear Dr. Palinkas,

>

>

>

>

>

> I hope this message finds you well. I am a doctoral candidate in

> the counselor education department at the University of New

> Orleans and I am interested in using your Exposure Index

> (Palinkas, Petterson, Russell & Downs, 2004; Palinkas,

**Appendix E:**  
**The Resilience Scale**

## The Resilience Scale

Please read the following statements. To the right of each you will find seven numbers, ranging from "1" (Strongly Disagree) on the left to "7" (Strongly Agree) on the right. Circle the number which best indicates your feelings about that statement. For example, if you strongly disagree with a statement, circle "1". If you are neutral, circle "4", and if you strongly agree, circle "7", etc.

	<i>Strongly Disagree</i>			<i>Strongly Agree</i>			
1. When I make plans, I follow through with them.	1	2	3	4	5	6	7
2. I usually manage one way or another.	1	2	3	4	5	6	7
3. I am able to depend on myself more than anyone else.	1	2	3	4	5	6	7
4. Keeping interested in things is important to me.	1	2	3	4	5	6	7
5. I can be on my own if I have to.	1	2	3	4	5	6	7
6. I feel proud that I have accomplished things in life.	1	2	3	4	5	6	7
7. I usually take things in stride.	1	2	3	4	5	6	7
8. I am friends with myself.	1	2	3	4	5	6	7
9. I feel that I can handle many things at a time.	1	2	3	4	5	6	7
10. I am determined.	1	2	3	4	5	6	7
11. I seldom wonder what the point of it all is.	1	2	3	4	5	6	7
12. I take things one day at a time.	1	2	3	4	5	6	7
13. I can get through difficult times because I've experienced difficulty before.	1	2	3	4	5	6	7
14. I have self-discipline.	1	2	3	4	5	6	7
15. I keep interested in things.	1	2	3	4	5	6	7
16. I can usually find something to laugh about.	1	2	3	4	5	6	7
17. My belief in myself gets me through hard times.	1	2	3	4	5	6	7
18. In an emergency, I'm someone people can generally rely on.	1	2	3	4	5	6	7
19. I can usually look at a situation in a number of ways.	1	2	3	4	5	6	7
20. Sometimes I make myself do things whether I want to or not.	1	2	3	4	5	6	7
21. My life has meaning.	1	2	3	4	5	6	7
22. I do not dwell on things that I can't do anything about.	1	2	3	4	5	6	7
23. When I'm in a difficult situation, I can usually find my way out of it.	1	2	3	4	5	6	7
24. I have enough energy to do what I have to do.	1	2	3	4	5	6	7
25. It's okay if there are people who don't like me.	1	2	3	4	5	6	7

The Resilience Scale™ © 1987 Gail M. Wagnild & Heather M. Young. Used by permission. All rights reserved. "The Resilience Scale" is an international trademark of Gail M. Wagnild & Heather M. Young.

**Appendix F:**  
**Terms of Use of Resilience Scale**



## Terms of Use of Resilience Scale

### 1. Rights in Site Content and the Site

**1.1** All content provided on the Site is protected by copyright, trademark, and other applicable intellectual property and proprietary rights laws and is owned, controlled, and/or licensed by Gail M. Wagnild and/or Heather M. Young, except as otherwise noted. The Site is protected by copyright, patent, trademark, and other applicable intellectual property and proprietary rights laws and is owned, controlled, and/or licensed by Gail M. Wagnild (hereinafter referred to as the OWNER). RESILIENCESCALE.COM™ is a trademark of Gail M. Wagnild. The Resilience Scale™, RS™, The 14-Item Resilience Scale™, and RS-14™ are trademarks of Gail M. Wagnild and Heather M. Young (hereinafter referred to as the RS-OWNERS). The Resilience Scale User's Guide™ is a trademark of Gail M. Wagnild (hereinafter referred to as the OWNER). All other trademarks appearing on the Site are the property of their respective owners.

**1.2** You will, upon completion of any study or dissertation in which you used The Resilience Scale (either the 25- or 14-item version), send an electronic copy of your results to the OWNER at [gwagnild@resiliencecenter.com](mailto:gwagnild@resiliencecenter.com) or if you are unable to send your results electronically, send your paper results to: The Resilience Center, Box 313, Worden, MT 59088 USA. By sending this report, you give the OWNER implicit permission to publish it on this Web site and to use your results for statistical purposes. Unless you specifically request that the OWNER does not publish your report, she will publish it (or not) at her discretion. If, however, you do not want your report published on this Web site, and you indicate this in your submission, then the OWNER will not publish your report, although she reserves the right to include your results in later statistical studies on The Resilience Scale.

**1.3** You will not modify, publish, transmit, participate in the transfer or sale, create derivative works, or in any way exploit, any of the content, in whole or in part, found on the Site except as set forth in these Terms of Use. You will download copyrighted content solely for your non-commercial use, but will make no commercial use of the content without the express written permission of the RS-OWNERS. You will not make any changes to any content that you are permitted to download under this Agreement without the express written permission of the RS-OWNERS, and in particular you will not delete or alter any proprietary rights or attribution notices in any content. You agree that you do not acquire any ownership rights in any downloaded content.

### 2. Disclaimer of Warranties & Limitation of Liability

**2.1** You expressly agree that use of the site is at your sole risk. Neither the RS-owners, nor any of their affiliates, employees, agents, third party content providers, or licensors warrant that the site will be uninterrupted or error free. Nor do they make any warranty as to the results that may be obtained from the use of the site, or as to the results that may be obtained from the use of the site, or as to the accuracy, reliability, completeness, or contents of any content, information, material, postings, or posting responses found on the site, any merchandise or services provided through the site, or any links to other sites made available on the site.

**2.2** The site and all content, material, information, postings, or posting responses found on the site are provided on an “as is” basis without warranties of any kind, either express or implied, including, but not limited to, warranties of title or implied warranties of merchantability or fitness for a particular purpose.

**2.3** Under no circumstances, including, but not limited to, negligence, shall the RS-owners or any of their affiliates, employees, agents, third party content providers, or licensors be liable for any direct, indirect, incidental, special or consequential damages that result from the use of, or the inability to use, any content, information, material, postings, or posting responses on the site or the site itself. These limitations apply regardless of whether the party liable or allegedly liable was advised, had other reason to know, or in fact knew of the possibility of such damages. You specifically acknowledge and agree that Gail M. Wagnild and Heather M. Young (and any of their affiliates, employees, agents, third party content providers, or licensors, and their respective directors, officers, employees, and agents), are not liable for any defamatory, offensive or illegal conduct of any user, including you.

### 3. Indemnification

You agree to defend, indemnify and hold harmless Gail M. Wagnild and/or Heather M. Young (and/or any of their affiliates, employees, agents, third party content providers, or licensors, and their respective directors, officers, employees, and agents) from and against all claims, liability, and expenses, including attorneys' fees and legal fees and costs, arising out of your use of the Site or your breach of any provision of this Agreement. The RS-OWNERS reserve the right, in their sole discretion and at their own expense, to assume the exclusive defense and control of any matter otherwise subject to indemnification by you. You will cooperate as fully as reasonably required in the defense of any claim.

#### **4. Fees and Payments**

The OWNER reserves the right, in her sole discretion, at any time to charge fees for access to and use of the Site, or any portions of the Site. If the OWNER elects to charge fees, she will post notice on the Site of all provisions pertaining to fees and payments.

#### **5. Notices between Us**

You will contact the OWNER by submitting your message via e-mail to [gwagnild@resiliencecenter.com](mailto:gwagnild@resiliencecenter.com). She will contact you by sending electronic mail to the address you provide to us, or by posting a notice on the Site.

#### **6. Termination**

The OWNER may terminate this Agreement and your use of the Site at any time. The OWNER shall have the right immediately to terminate your use of the Site in the event of any conduct by you which the OWNER, in her sole discretion, considers to be unacceptable, or in the event of any breach by you of this Agreement.

#### **7. Law Governing Performance and Disputes**

This Agreement, your performance under it, and any disputes arising under it shall be governed exclusively by the laws of the United States of America and the State of Montana, without giving effect to their conflict of laws principles. You expressly consent to the exclusive forum, jurisdiction, and venue of the Courts of the State of Montana and the United States District Court for the District of Montana in any and all actions, disputes, or controversies relating to this Agreement.

#### **8. General Terms**

This Agreement and any posted rules on the Site established by the OWNER constitute the entire agreement of the parties with respect to the subject matter hereof. No waiver by either the OWNER or you of any breach or default under this Agreement shall be deemed to be a waiver of any preceding or subsequent breach or default. This Agreement shall be binding upon and inure to the benefit of the OWNER and her successors, trustees, and permitted assigns. The OWNER may assign this Agreement, or any of its rights or obligations under this Agreement, with or without notice to you.

**Appendix G:**  
**IRB Approval Letter**

IRB Approval Letter

**University Committee for the Protection  
of Human Subjects in Research  
University of New Orleans**

---

*Campus Correspondence*

Principal Investigator: Roxane L. Dufrene  
Co-Investigator: Walt Hammerli  
Date: April 17, 2012  
Protocol Title: "Risk factors and resiliency in secondary schools after the BP Deepwater Horizon Oil spill"  
IRB#: 01Apr12

Your proposal was reviewed by the full IRB. The group voted to approve your proposal pending that you adequately address several issues. Your responses to those issues have been received and you have adequately addressed all of the issues raised by the committee. Your project is now in compliance with UNO and Federal regulations and you may begin conducting your research.

Please remember that approval is only valid for one year from the approval date. Any changes to the procedures or protocols must be reviewed and approved by the IRB prior to implementation. Use the IRB number listed on this letter in all future correspondence regarding this proposal.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best of luck with your project!  
Sincerely,



Robert Laird, Ph.D., Chair  
Committee for the Protection of Human Subjects in Research

**Appendix H:**  
**Principal Request Letter**

## Principal Request Letter

**Walt Hammerli, LPC, NCC, NCSC**  
618 St. Phillip St., Thibodaux, LA 70301  
Email: whammerl@uno.edu  
Phone: 985-227-1489

Chalmette High School  
1100 E. Judge Perez Dr.  
Chalmette, LA, 70043

May 28, 2012

Attn: Principal Wayne Warner  
Re: Approval for Dissertation Study

Dear Mr. Warner:

I am pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). I would like to seek your approval to conduct my dissertation research study at Chalmette High School. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on sophomores and juniors and determine what factors influence students' reactions. The research study should take students about 15 minutes to complete. I would like to utilize class time and have the questionnaires distributed by homeroom teachers coordinated through the school counselors. Students may experience uncomfortable thoughts and reminders about the oil spill by participating in this study. However, participating in this study is thought to be of minimal risk to students. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. My research results could be used to target students for counseling interventions and further assistance, or to design future student interventions. Student identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. By completing this research, students' names will be entered into a drawing to win one of two \$100 gift certificates.

Homeroom teachers will send the consent forms home to parents and parents will be asked to sign and return if they wish to have their child participate in the study. Adult students over the age of 18 will be given separate informed consent forms. Prior to the study, student assent to participate will be gained in writing for students under the age of 18. Consent forms and copies of the research documents are attached for your review.

Your written permission included in a letter to conduct this study at Chalmette High School would be greatly appreciated. I thank you for your consideration and I look forward to working with you in the future.

Sincerely,  
Walt Hammerli, Doctoral Student at the University of New Orleans

**Appendix I:**  
**Superintendent Request Letter**

## Superintendent Request Letter

**Walt Hammerli, LPC, NCC, NCSC**  
618 St. Phillip St., Thibodaux, LA 70301  
Email: [whammerl@uno.edu](mailto:whammerl@uno.edu)  
Phone: 985-227-1489  
May 30, 2012

Saint Bernard Parish Public Schools  
200 East St. Bernard HWY  
Chalmette, LA. 70043  
Attn: Superintendent Doris Voitier  
Re: Approval for Dissertation Study

Dear Superintendent Voitier:

I am pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). As part of my dissertation study, I propose to survey sophomore and junior students at Chalmette High School about their experiences in relation to the BP Deepwater Horizon oil spill. The survey should take students about 15 minutes to complete. I would like to utilize class time and have the surveys distributed by homeroom teachers. Students may experience uncomfortable thoughts and reminders about the oil spill by participating in this study. However, participating in this study is thought to be of minimal risk to students. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. Student identifying information will be protected throughout the study and individual student results will not be disclosed in the findings. By completing this survey, students' names will be entered into a drawing to *win one of two \$100 gift certificates*.

Informed consent forms will be sent home to parents and parents will be asked to sign and return if they wish to have their child participate in the study. Adult student over the age of 18 will be given separate informed consent forms. Prior to the study, student assent to participate will be gained in writing. Consent forms and a copy of the survey are attached for your review.

I would like to seek your approval to conduct this study in Saint Bernard Parish at Chalmette High School. Please also find enclosed a letter of permission from the principal of Chalmette High School, Mr. Wayne Warner. Your written permission included in a letter to conduct this study in Saint Bernard Parish Public Schools would be greatly appreciated. I thank you for your consideration and I look forward to working with you in the future.

Sincerely,

Walt Hammerli, Doctoral Student at the University of New Orleans



**Appendix J:**  
**Principal Permission Letter**

**Principal Permission Letter**

**CHALMETTE HIGH SCHOOL**  
1100 East Judge Perez Drive  
Chalmette, Louisiana 70043  
Phone 504.301.2600 Fax 504.301.2610

May 29, 2012

To Whom It May Concern:

Walter Hammerli had my permission to conduct a survey among our students. He worked with one of our teachers through the process of securing parental permission and distributing the surveys to the students.

We were happy to be of assistance to him as he continues to work on his graduate degree.

Sincerely,



Wayne Warner  
Principal

**Appendix K:**

**Request Letter to Teachers and Counselors**

## Request Letter to Teachers and Counselors

Dear Teachers and Counselors:

I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). I would like to seek your help in conducting my dissertation research study at Chalmette High School in May 2012. The purpose of my research is to explore the impact of the BP Deepwater Horizon oil spill on sophomores and juniors and determine what factors influence students' reactions. This study has been approved by Mr. Warner and Superintendent Voitier. By completing this research, students' names will be entered into a drawing to *win one of two \$100 gift certificates!*

**The questionnaires should take students about 15 minutes to complete.** Students' identifying information will be protected throughout the study and individual student results will not be disclosed in the findings. Participating in this study is thought to be of minimal risk to students. However, students may experience uncomfortable thoughts and feelings by participating in this study. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions.

*Counselors:* You can help me by acting as resources for students who may have basic concerns related to the topic of the study. Additionally, counselors will be asked to designate a *Lead Counselor* to collect completed forms and questionnaires from all of the homeroom teachers.

*Homeroom Teachers:* One week before the research, I would like you to distribute permission forms for students to take home to their parents. If you could distribute them during homeroom, it would be greatly appreciated. Parents are to sign and return the forms if they **CONSENT TO PARTICIPATE**. Adult students over the age of 18 can sign their own consent forms. When you receive the returned forms, please contact the *Lead Counselor* who will collect the forms for me. Once all the forms are collected, each homeroom teacher will be provided a list of the students in his or her homeroom who will participate in the study. One week after collection of informed consents, homeroom teachers will be asked to distribute questionnaires and student assent forms correspondent to the number of students on their lists during homeroom, collect completed forms and questionnaires, and return them to the lead counselor. I will collect the completed forms from the *Lead Counselor*.

Thank you very much in advance for your time and assistance. Please contact me with any questions

Sincerely,

Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans  
985-227-1489, [whammerl@uno.edu](mailto:whammerl@uno.edu)

**Appendix L:**  
**Parental Informed Consent Letter of Minor Participant**

## Parental Informed Consent Letter of Minor Participant

Dear Chalmette High Parent:

In May 2012, I will be conducting a research study surveying 10<sup>th</sup> and 11<sup>th</sup> grade Chalmette High students. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on students and determine what factors influence students' reactions. I would greatly appreciate it if you would allow your child to participate in this research. I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434).

**The research should take about 15 minutes to complete.** Questionnaires will be distributed by homeroom teachers. Your child's identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. Participating in this research study is thought to be of minimal risk to your child. However, your child may experience uncomfortable thoughts and feelings related to the BP Deepwater Horizon oil spill by participating in this study. Participation is completely voluntary. Students may decline to participate at any time during the study and may decline to answer particular questions if they do not feel comfortable. If you have any questions about you or your child's rights as a participant in this research, or if you feel you or your child have been placed at risk, you can contact Dr. Ann O'Hanlon at the University of New Orleans at 504-280-3990.

A possible benefit of this study includes your child gaining self-understanding about personal strengths. Furthermore, participating in this study may allow others to better understand the factors that influence adolescent development and how adolescents respond to disasters. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. By your child completing this research, your child's name will be entered into a drawing to *win one of two \$100 gift certificates!*

If you agree to your child's participation in the above described research, then please sign below under **CONSENT TO PARTICIPATE** and return this form to your child's homeroom teacher.

---

### CONSENT TO PARTICIPATE

Student's name: \_\_\_\_\_ Date: \_\_\_\_\_

Parent's signature: \_\_\_\_\_ Homeroom teacher: \_\_\_\_\_

---

Please contact me with any questions

Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans

985-227-1489, [whammerl@uno.edu](mailto:whammerl@uno.edu)

**Appendix M:**  
**Informed Consent for Adult Student**

## Informed Consent for Adult Student

Dear Chalmette High Student:

In May 2012, I will be conducting a research study surveying 10<sup>th</sup> and 11<sup>th</sup> grade Chalmette High students. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on students and determine what factors influence students' reactions. I would greatly appreciate it if you would agree to participate in the research. I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434).

**The research should take about 15 minutes to complete.** Questionnaires will be distributed by homeroom teachers. Your identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. Participating in this research study is thought to be of minimal risk to you. However, you may experience uncomfortable thoughts and feelings related to the BP Deepwater Horizon oil spill by participating in this study. Participation is completely voluntary. Students may decline to participate at any time during the study and may decline to answer particular questions if they do not feel comfortable. If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact Dr. Ann O'Hanlon at the University of New Orleans at 504-280-3990.

A possible benefit of this study includes you gaining self-understanding about personal strengths. Furthermore, participating in this study may allow others to better understand the factors that influence adolescent development and how adolescents respond to disasters. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. By completing this research, your name will be entered into a drawing to *win one of two \$100 gift certificates!*

If you agree to participate in the above described research, then please sign below under **CONSENT TO PARTICIPATE** and return this form to your homeroom teacher.

---

### CONSENT TO PARTICIPATE

Your name: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Homeroom teacher: \_\_\_\_\_

---

Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans



**Appendix N:**  
**Student Assent Letter**

## Student Assent Letter

Dear Student:

I am conducting a research study and would like to ask you to participate by completing questionnaires for the research study. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on students and determine what factors influence students' reactions. I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education.

**The research should take about 15 minutes to complete.** Questionnaires will be distributed by homeroom teachers. Your identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. Participating in this study is thought to be of minimal risk to you. However, you may experience uncomfortable thoughts and feelings related to the BP Deepwater Horizon oil spill by participating in this study.

Possible benefits of this study include gaining self-understanding, allowing others to understand the factors that influence your growth as a person, and helping others to learn about students' experiences after a disaster. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. By completing this research, your name will be entered into a drawing to win one of two \$100 gift certificates!

I sent a letter to your parents a few weeks ago asking for their consent for your participation in this study. If your parents did not want you to participate, or if you would not like to participate, then simply turn the questionnaires over. Participation is completely voluntary. You may decline to participate at any time during the study and you may decline to answer particular questions if you do not feel comfortable. *If you agree to participate, then please sign and date below.*

Name (print): \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Homeroom: \_\_\_\_\_

Thank you

Sincerely,

Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans

**Appendix O:**  
**Principal Request Letter**

## Principal Request Letter

Walt Hammerli, LPC, NCC, NCSC  
618 St. Phillip St., Thibodaux, LA 70301  
Email: whammerl@uno.edu  
Phone: 985-227-1489  
December 12, 2012

Larose-Cut Off Middle School  
13356 West Main Street  
Cut Off, LA 70345  
Attn: Principal Carla Robbins  
Re: Approval for Dissertation Study

Dear Mrs. Robbins:

I am pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). I would like to seek your approval to conduct my dissertation research study at Larose-Cut Off Middle School. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on secondary school students and determine what factors influence students' reactions. The research study should take students about 15 minutes to complete. I would like to utilize class time and have the questionnaires distributed by Science teachers coordinated through the school counselors. Students may experience uncomfortable thoughts and reminders about the oil spill by participating in this study. However, participating in this study is thought to be of minimal risk to students. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. My research results could be used to target students for counseling interventions and further assistance, or to design future student interventions. Student identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. By completing this research, students' names will be entered into a drawing to win one of two \$100 gift certificates.

Homeroom teachers will send the consent forms home to parents and parents will be asked to sign and return if they wish to have their child participate in the study. Prior to the study, student assent to participate will be gained in writing. Consent forms and copies of the research documents are attached for your review.

Your written permission included in a letter to conduct this study at Larose-Cut Off Middle School would be greatly appreciated. I thank you for your consideration and I look forward to working with you in the future.

Sincerely,  
Walt Hammerli, Doctoral Student at the University of New Orleans

**Appendix P:**  
**Superintendent Request Letter**

## Superintendent Request Letter

**Walt Hammerli, LPC, NCC, NCSC**  
618 St. Phillip St., Thibodaux, LA 70301  
Email: whammerl@uno.edu  
Phone: 985-227-1489  
December 14, 2012

Lafourche Parish School Board  
805 East 7th Street, Thibodaux, LA 70301  
PO Box 879, Thibodaux, LA 70302  
Attn: Superintendent Jo Ann Mathews

Re: Approval for Dissertation Study

Dear Superintendent Mathews:

I am pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). As part of my dissertation research study, I propose to survey students at Larose-Cut Off Middle School about their experiences in relation to the BP Deepwater Horizon oil spill. The survey should take students about 15 minutes to complete. I would like to utilize class time and have the surveys distributed by Science teachers. Students may experience uncomfortable thoughts and reminders about the oil spill by participating in this study. However, participating in this study is thought to be of minimal risk to students. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. Student identifying information will be protected throughout the study and individual student results will not be disclosed in the findings. By completing this survey, students' names will be entered into a drawing to win one of two \$100 gift certificates.

Informed consent forms will be sent home to parents and parents will be asked to sign and return if they wish to have their child participate in the study. Prior to the study, student assent to participate will be gained in writing. Consent forms and a copy of the survey are attached for your review.

I would like to seek your approval to conduct this study in Lafourche Parish at Larose-Cut Off Middle School. I have contacted the principal of Larose-Cut Off Middle School, Mrs. Carla Robbins, and she has expressed interest in my study. Your written permission included in a letter to conduct this study in Lafourche Parish Public Schools would be greatly appreciated. I thank you for your consideration and I look forward to working with you in the future.

Sincerely,

Walt Hammerli, Doctoral Student at the University of New Orleans

**Appendix Q:**  
**School Board Permission Letter**

## School Board Permission Letter

### RE: Research study

Show Details

From

- [CO/Bernard, Ray](#)

To

- [Walt Hammerli](#)

CC

- [CO/Matthews, Jo Ann](#)
- [LCOMS/Robbins, Carla L.](#)

Mr. Hammerli— Permission is granted for you to conduct your research study survey at LCO Middle School. I have conferred with the principal and reviewed your materials. Parental permission must be obtained for all students surveyed— Have a Happy Holiday !!!

*Ray C. Bernard, Supervisor*

Lafourche Parish School Board  
Child Welfare and Attendance  
Phone: 985-435-4612  
Fax: 985-446-0801

**From:** Walt Hammerli [mailto:walthammerli@yahoo.com]

**Sent:** Tuesday, December 18, 2012 3:03 PM

**To:** CO/Bernard, Ray

**Subject:** Fw: Research study

----- Forwarded Message -----

**From:** Walt Hammerli <[walthammerli@yahoo.com](mailto:walthammerli@yahoo.com)>

**To:** Jo Ann Matthews <[superintendent@lafourche.k12.la.us](mailto:superintendent@lafourche.k12.la.us)>

**Sent:** Thursday, December 13, 2012 10:03 PM

**Subject:** Research study

Dear Superintendent Mathews,

I am a counseling doctoral student at UNO and I am interested in completing my dissertation research study at Larose-Cut Off Middle School. The study has been approved by the UNO Institutional Review Board (please see attached). The study is about the impact of the oil spill on secondary students (please see attached survey, consent forms, teacher request letter, and a request letter to the parish). I have contacted the principal and she seems interested... could you please put me in contact with the person in charge of approving research studies for the parish? Thanks so much for your time and consideration!

Sincerely,

Walt Hammerli

985 227 1489

[whammerl@uno.edu](mailto:whammerl@uno.edu)



**Appendix R:**  
**Request Letter to Teachers and Counselors**

## Request Letter to Teachers and Counselors

Dear Teachers and Counselors:

I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434). I would like to seek your help in conducting my dissertation research study at Larose-Cut Off Middle School in January 2013. The purpose of my research is to explore the impact of the BP Deepwater Horizon oil spill on secondary students and determine what factors influence students' reactions. This study has been approved by Mrs. Robbins and the Lafourche Parish School Board. By completing this research, students' names will be entered into a drawing to win one of two \$100 gift certificates!

**The questionnaires should take students about 15 minutes to complete.** Students' identifying information will be protected throughout the study and individual student results will not be disclosed in the findings. Participating in this study is thought to be of minimal risk to students. However, students may experience uncomfortable thoughts and feelings by participating in this study. Hopefully, results of this study will benefit our understanding of how students may be impacted by the oil spill and what student characteristics are related to greater or lesser risks. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions.

*Counselors:* You can help me by acting as resources for students who may have basic concerns related to the topic of the study. Additionally, counselors will be asked to designate a *Lead Counselor* to collect completed forms and questionnaires from all of the Science teachers.

*Science Teachers:* One week before the research, I would like you to distribute permission forms for students to take home to their parents. If you could distribute them during class, it would be greatly appreciated. Parents are to sign and return the forms if they CONSENT TO PARTICIPATE. When you receive the returned forms, please contact the *Lead Counselor* who will collect the forms for me. Once all the forms are collected, each Science teacher will be provided a list of the students in his or her class who will participate in the study. One week after collection of informed consents, Science teachers will be asked to distribute questionnaires and student assent forms correspondent to the number of students on their lists during class, collect completed forms and questionnaires, and return them to the lead counselor. I will collect the completed forms from the *Lead Counselor*.

Thank you very much in advance for your time and assistance. Please contact me with any questions

Sincerely,

Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans  
985-227-1489, [whammerl@uno.edu](mailto:whammerl@uno.edu)

**Appendix S:**  
**Parental Informed Consent Letter of Minor Participant**

**Parental Informed Consent Letter of Minor Participant**

Dear Larose-Cut Off Middle School Parent:

In January 2013, I will be conducting a research study surveying Larose-Cut Off students. The purpose of my research study is to explore the impact of the BP Deepwater Horizon oil spill on students and determine what factors influence students’ reactions. I would greatly appreciate it if you would allow your child to participate in this research. I am a counselor pursuing a doctoral degree at the University of New Orleans and working under the supervision of Dr. Roxane L. Dufrene in the College of Education ([rdufren1@uno.edu](mailto:rdufren1@uno.edu), 504-280-7434).

**The research should take about 15 minutes to complete.** Questionnaires will be distributed by Science teachers during class. Your child’s identifying information will be protected throughout the study, will not be disclosed in the findings, and will be stored in a locked file cabinet for 3 years and then shredded. Participating in this research study is thought to be of minimal risk to your child. However, your child may experience uncomfortable thoughts and feelings related to the BP Deepwater Horizon oil spill by participating in this study. Participation is completely voluntary. Students may decline to participate at any time during the study and may decline to answer particular questions if they do not feel comfortable. If you have any questions about you or your child's rights as a participant in this research, or if you feel you or your child have been placed at risk, you can contact Dr. Ann O’Hanlon at the University of New Orleans at 504-280-3990.

A possible benefit of this study includes your child gaining self-understanding about personal strengths. Furthermore, participating in this study may allow others to better understand the factors that influence adolescent development and how adolescents respond to disasters. Study results could be used to target students for counseling interventions and further assistance, or to design future student interventions. By your child completing this research, your child’s name will be entered into a drawing to win one of two \$100 gift certificates!

If you agree to your child’s participation in the above described research, then please sign below under **CONSENT TO PARTICIPATE** and return this form to your child’s science teacher.

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**CONSENT TO PARTICIPATE**

Student’s name (Please print): \_\_\_\_\_ Date: \_\_\_\_\_

Parent’s signature: \_\_\_\_\_ Science teacher: \_\_\_\_\_

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Please contact me with any questions  
Walt Hammerli, LPC, NCC, NCSC  
Doctoral Student at the University of New Orleans 985-227-1489, [whammerl@uno.edu](mailto:whammerl@uno.edu)

**Appendix T:**  
**Demographic Information**

**Demographic Information**

**Age:** \_\_\_\_\_

**Please indicate each of the following by circling the item that applies to your information.**

**Gender:** Male Female

**Grade:** 6<sup>th</sup> 7<sup>th</sup> 8<sup>th</sup> 10<sup>th</sup> 11<sup>th</sup> 12<sup>th</sup>

**Ethnicity:**

White Black Hispanic Native American Asian/ Pacific Islander

Other \_\_\_\_\_

**Local Culture:**

Cajun Creole French Vietnamese Indian (Houmas, Chitimacha, or Choctaw)

None of the above \_\_\_\_\_

**School lunch status:** Free lunch Reduced price lunch Full-pay lunch

**Please describe your parents' or guardians' work in a few words.**

**Father's current job:**

**Father's job before the BP oil spill (2 years ago):**

**Mother's current job:**

**Mother's job before the BP oil spill (2 years ago)**

## **VITA**

Walt W. Hammerli was born and raised in Thibodaux, Louisiana. Walt graduated from the University of West Florida in 2001 where he majored in Psychology and played for the men's soccer team. He graduated from Nicholls State University in 2004 with a Master's of Arts in Psychological Counseling and from the University of New Orleans in May 2013 with a Doctorate of Philosophy in Counselor Education. Walt is currently working as a school counselor in the Jefferson Parish Public School System and has experience as a substance abuse counselor. He is a Nationally Certified Counselor, a Nationally Certified School Counselor, and a Licensed Professional Counselor registered with the Louisiana Board of Examiners.