WEIGHT STATUS, BULLYING INVOLVEMENT, AND INTERNALIZING SYMPTOMOLOGY IN ADOLESCENTS: EXAMINING A DIATHESIS-STRESS MODEL

by

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WEIGHT STATUS, BULLYING INVOLVEMENT, AND INTERNALIZING SYMPTOMOLOGY IN ADOLESCENTS: EXAMINING A DIATHESIS-STRESS MODEL

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Bullying is a pervasive societal issue that is consistently linked to negative outcomes that are emotionally, socially, behaviorally, and medically related. Most youth will encounter this negative life event in their childhood whether through perpetration, victimization, or observation. The purpose of this dissertation was to use a diathesis-stress model perspective to assess the relations between the negative life event of bullying involvement, youths' mental health, and youth weight status. Youth who have an unhealthy weight status, such as overweight, obese, or underweight are more likely to be involved in bullying than those with a healthy weight status (Browne, 2012; Puhl, Peterson, & Luedicke, 2013). Additionally, experiencing bullying and having an unhealthy weight status are both related to issues with internalizing symptomology (i.e., anxiety, depression; Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Fox & Farrow, 2009; Puhl & Latner, 2007; Warkentin, Borghese, & Janssen, 2017). Having an unhealthy weight status does not inherently cause individuals to have mental health concerns; rather, it was hypothesized that bullying involvement as a negative life event would serve as a catalyst for those with unhealthy weight statuses, as their weight serves as an individual vulnerability or diathesis, to develop internalizing symptomology. Data were collected from adolescents (ages 11-18) who participated in a larger study. The current study found a statistically significant association between bullying involvement and weight status. Additionally, the study found that together, weight status and bullying involvement predict depressive and anxious symptomology,

separately. As a result, the current study further supports the immense literature base that involvement in bullying predicts higher levels of internalizing symptomology. However, the current study found that those experiences may differ by gender and that involvement in the bullying dynamic may moderate the experience between weight status and internalizing symptomology. Also, results showed that internalizing symptomology differed for healthy and unhealthy weight statuses, but that specific weight status differed for anxious and depressive symptomology. This research demonstrated that bullying involvement served as a moderating variable for underweight females who experience bullying involvement and report higher levels of anxious symptomology when compared to those uninvolved in bullying. Although this research does not fully support a diathesis-stress model in which bullying consistently serves as a catalyst for developing internalizing symptomology, it does advance the field by providing further empirical support of the complex relationship between weight status, bullying involvement, and internalizing symptomology. Implications for research and clinical practices as well as study limitations are discussed.

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CHAPTER 1

INTRODUCTION

Bullying is a complex, widespread issue, affecting 13% to 66% of children and adolescents depending on their roles in bullying (i.e., bully, victim, bully-victim, or bystander; Robers et al., 2013; Storch & Ledley, 2005; Trach, Hymel, Waterhouse, & Neale, 2010). The negative outcomes of being involved in the bullying dynamic, irrespective of role, are indisputable. Researchers repeatedly demonstrate that bullying is related to negative outcomes such as low self-esteem, worsened school-related outcomes, and internalizing and externalizing symptomology (Birkett, Espelage, & Koenig, 2009; Hawker & Boulton, 2000; O'Brennan, Bradshaw, & Sawyer, 2009; Swearer, Song, Cary, Eagle, & Mickelson, 2001), among other problematic psychosocial outcomes that persist into adulthood (deLara, 2018; Ostberg, Modin, & Laftman, 2018). Contributing to its complexity, bullying can be perpetrated and experienced in various of ways, which include verbal, physical, relational, and electronic, all of which are related to negative outcomes. Those involved in bullying tend to move in and out of bullying roles (Ryoo, Wang, & Swearer, 2015), which include perpetrator, victim, bully-victim, and bystander (Wang, Iannotti, & Nanel, 2009). This dynamic nature of bullying roles also increases the complexity and difficulty in researching and understanding the bullying dynamic.

Researchers have identified several traits in youth that predict involvement in bullying, and they are starting to differentiate between roles within the bullying dynamic. Bullying perpetration is predicted by a tendency to be emotionally reactive and to rely on emotionally-oriented coping skills rather than problem-solving coping skills (Baldry & Farrington, 2005). This tendency makes these youth more likely to respond aggressively to negative peer interaction. Researchers found that predictors of bullying victimization are when youth are

perceived to be physically different or weaker than their peers (Frisen, Jonsson, & Persson, 2007; Swearer & Cary, 2003). Differences that have specifically been linked to increased bullying victimization include youth who have a physical or cognitive disability (Rose, 2011; Swearer, Maag, Siebecker, & Frerichs, 2012) and youth who have an unhealthy weight status (i.e., overweight, obese, underweight; Grindvik et al., 2009; Puhl & Latner, 2007;). Being underweight, overweight, and obese might make youth especially vulnerable to victimization because they may be perceived as both different from societal standards and physically weak, which are both significant predictors of bullying involvement.

Having an unhealthy weight status (i.e., underweight, overweight, obese) inherently has its negative outcomes as it is related to physical health concerns. Specifically, obesity is connected to cardiovascular disease, metabolic disease, cancer, and disability in adulthood (Farhat, Iannnotti, & Simons-Morton, 2010). Other medically-related complications related to obesity include high blood pressure, high cholesterol (Freedman, Mei, Srinivasan, Berenson, & Dietz, 2007), breathing problems, sleep apnea, and asthma (Han, Lawlor, & Kimm, 2010). Youth born with very low birth weight are more likely to develop neurological impairments (i.e., cerebral palsy, mental retardation, poor fine motor function; Saigal, 1995). An unhealthy weight status, which includes status of underweight, overweight, and obese, is also related to mental health issues (Bhutta, Cleves, Casey, Cradock, & Anand, 2002), which is likely due to the linked social pressures and stigmatization of an unhealthy weight status (Puhl & Latner, 2007). Having an overweight, obese, or underweight weight status is related to societal stigmatization, stereotyping, and peer victimization (Browne, 2012; Puhl et al., 2013). Simply having a specific weight status can put youth at increased risk for developing issues with internalizing symptomology, self-esteem, and body size dissatisfaction (Fox & Farrow, 2009; Puhl & Latner,

2007). This is especially concerning given that youth with an unhealthy weight status are at increased risk for being involved in the bullying dynamic (Puhl & Latner, 2007; Puhl et al., 2013).

Similar to the negative correlates of having an unhealthy weight status, involvement in the bullying dynamic is associated with negative outcomes, which include but are not limited to anxiety, depression, hopelessness, and poor self-esteem (Cook, Williams, Guerra, Kim, & Sadek, 2010; Hawker & Boulton, 2000; O'Brennan, Bradshaw, & Sawyer, 2009; Reijntjes, Kamphuis, Prinzie, & Telch, 2010). The associations between weight status, bullying involvement, and internalizing symptomology is well-established in the literature, but few studies have used a diathesis-stress model to better understand how bullying involvement might serve as a stressful life event, influencing the relationship between unhealthy weight status and internalizing symptomology. "Diathesis-stress" is used to describe the interaction of a negative life event or stressor and an individual's personal vulnerabilities. To understand the complex dynamic of bullying involvement and its related outcomes, researchers have traditionally relied on social ecological theory as an explanatory mechanism for these relationships. Recently, researchers have advocated for the diathesis-stress model and proposed that it could aid in disentangling the complicated relationship between bullying involvement, physical health issues, and psychological concerns (Swearer & Hymel, 2015). Therefore, the diathesis-stress model is an ideal framework to utilize when trying to understand the convoluted relationship between weight status, bullying involvement, and internalizing symptomology.

Theoretical Frameworks

Initially, researchers relied on within-person characteristics to understand phenomenon and disordered behavior, but this perspective was deemed inappropriate as it does not account for

environmental influences on development. Currently, bullying involvement is understood through social ecological theory (Huppert, 2009; Swearer & Doll, 2001). Rather than solely relying on within-person characteristics, researchers focus on the interacting contexts and environments described in social ecological theory to understand bullying and its relations (Swearer & Doll, 2011). Social-ecological framework and the diathesis-stress model provide a heuristic for understanding how specific youth are at increased risk for an unhealthy weight status, bullying involvement, and internalizing symptomology. Social ecological theory elucidates the various contexts and systems (e.g., microsystems, mesosystems, macrosystems, chronosystems) that influence an individual's development (Bronfenbrenner, 1977; 1979).

Researchers posit that individuals exists within interconnected environments that can serve as risk and protective factors. An important social-ecological context to examine in social ecological theory is society and culture, which is considered part of the macrosystem (Bronfenbrenner, 1977). The ideals that society and culture value can lead to biases, prejudices, and stigmatization. Youth are typically victimized because they are perceived to be different than their peers. If youth do not adhere to societal values and norms, they may be at increased risk for social rejection. Weight stigma is pervasive in the United States and can be linked to the maintenance and passive acceptance of weight-related victimization and bullying (Browne, 2012; Hayden-Wade et al., 2005). Examining societal and cultural ideals related to weight status provides a framework for understanding why youth who are underweight, overweight, and obese are more likely to be involved in bullying (Browne, 2012; Grindvik et al., 2009; Puhl & Latner, 2007).

The diathesis-stress model is used to explain the development of psychological and physical health problems, which are theorized to be a result of the dynamic interaction between

life stressors and individual vulnerabilities (Ingram & Luxton, 2005; van Heeringen, 2012). Researchers use this model to explain why developing a disorder is both individualized and varies by youth. This variability in development is explained by the dynamic nature and combination of negative life events and varying degrees of individual vulnerabilities. Researchers have used the diathesis-stress model to conceptualize the development of disorders such as schizophrenia, (Jones & Fernyhough, 2006; Walker & Diforio, 1997), anxiety (Bernstein, Leen-Feldner, Kotov, Schmidt, & Zvolensky, 2006; Zvolensky, Kotov, Antipova, & Schmidt, 2005), and depression (Chang, Chang, & Hirsch, 2016; Franck et al., 2016). Given the significant correlation between mental health issues and being overweight, underweight, or obese, the diathesis-stress model is likely a suitable framework to help clarify the relationship between internalizing psychopathology and having an unhealthy weight status given that youth who are underweight, overweight, or obese are more likely to experience bullying victimization. Researchers propose that the diathesis-stress model is an appropriate theory for understanding the negative outcomes of bullying involvement (Swearer & Hymel, 2015), which should be conceptualized as a negative life event or stressor. For the current dissertation study, bullying involvement was viewed as a life stressor, influencing the relationship between physical health vulnerabilities (i.e., unhealthy weight status) and the development of internalizing symptomology (i.e., anxiety, depression).

Weight Status, Bullying Involvement, and Internalizing Symptomology

Weight status is an important variable when considering healthy youth development. Unhealthy weight status (i.e., underweight, overweight, obese) is linked to a variety of negative outcomes, both medically- and psychologically-related. Obesity is associated with cardiovascular disease, high blood pressure and cholesterol, asthma, and many other physical health

consequences (Farhat, Iannotti, Simons-Morton, 2010). Having a very low birthweight puts individuals at increased risk for neurological impairments and perceptual problems (Saigal, 1995). Unhealthy weight status is related to social and psychological adversities as well. Overweight, obese, and underweight youth are more likely to experience bullying victimization when compared to their healthy-weight peers (Puhl, Luedicke, & Heuer, 2011; Wang, Iannotti, & Luke, 2010). Also, these youth are more likely to develop symptoms related to anxiety (Ostrovsky, Swencionis, Wylie-Rosett, & Isasi, 2013), depression (Luppino et al., 2010), and attention deficit/hyperactivity (ADHD) disorders (Cortese et al., 2015) when compared to healthy-weight individuals (Bhutta, Cleves, Casey, Cradock, & Anand, 2002). There is an overwhelming amount of research highlighting the adverse outcomes of being overweight or obese; however, less research exists on underweight individuals even though being underweight is related to physical, emotional, and social issues as well (Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Browne, 2012; Jackson, Grilo, & Masheb, 2000; Puhl & Latner, 2007; Saigal, 1995). This is likely due to societal contexts, which value and accept being thin over being obese. In summary, having an unhealthy weight status is related to poorer quality of life and adverse psychological outcomes and puts individuals at greater risk for bullying involvement.

Bullying is a complex social issue that is related to a variety of negative outcomes (e.g., depression, anxiety, low self-esteem, social marginalization; Cook et al., 2010; Grindvik et al., 2009; O'Brennan, Bradshaw, & Sawyer, 2009). Researchers identified that being different, having a disability, being physically weaker, and having an unhealthy weight status are all significant predictors of bullying victimization (e.g., Frisen, Jonsson, & Persson, 2007; Paul & Latner, 2007; Rose, 2011; Swearer & Cary, 2003; Swearer, Maag, Siebecker, & Frerichs, 2012). Consistently in the literature, outcomes of bullying involvement include increased risk of

internalizing psychological issues such as anxiety and depression (O'Brennan et al., 2009). Internalizing symptoms are related to a host of impairments including social and peer issues, intellectual and academic functioning, and cognitive distortions.

Bullying is recognized as a worldwide problem (Nansel, Craig, Overpeck, Saluja, & Ruan, 2004; van Geel, Vedder, & Tanilon, 2014), which is likely due to increased foci on bullying-related tragedies (e.g., school shootings, suicides). Bullying has many functions (e.g., attention, power, revenge) and can occur in various contexts (e.g., schools, workplace, media, technology, communities). Given the plethora of related emotional, behavioral, social, and medical correlates, bullying is considered a public health concern. Since the Columbine High School shooting in 1999, much research has been published to elucidate the complex dynamic of bullying involvement; however, additional research is warranted to fully understand and develop evidence-based bullying prevention and intervention strategies and policies, especially for those being specifically targeted due to their weight status.

Researchers have proposed the application of a diathesis-stress model to further understand the complex dynamic of bullying on vulnerable youth (Swearer & Hymel, 2015). A PsycINFO and PsycARTICLES literature search using key words of "diathesis-stress", "bullying", and "victimization" produced a total of seven search results. Of the seven studies, five were published empirical studies that aided in the theoretical review and conceptualization of the current research study. Those articles were used to help form the overview and conceptualization of the diathesis-stress model described in chapter two. Currently, scant research exists that utilizes a diathesis-stress model to understand how individual risk factors, negative life events such as bullying, and correlated negative mental health outcomes are related

(Cole et al., 2014; Iyer, Dougall, & Jensen-Campbell, 2013; Keenan et al., 2010; Shell, Gazelle, & Faldowski, 2014; Swearer & Hymel, 2015).

It is clear that unhealthy weight status (i.e., obesity, overweight) and depression have a reciprocal association (Luppino et al., 2010). Researchers consistently find that an unhealthy weight status is associated to mental health concerns; however, it is less clear what influences or moderates the bidirectional relationship between unhealthy weight status and mental health issues such as depression and anxiety. One specific study examined the moderating effect of peer victimization and harsh parenting on the relationship between cognitive reactivity and depression (Cole et al., 2014). Few studies have specifically examined the impact of bullying involvement on unhealthy weight status and internalizing symptomology and even fewer studies have examined this relationship with underweight youth. Most studies focus on overweight and obese individuals. This gap in the research is critical, because intervening on bullying involvement might indirectly impact levels of internalizing symptomology of vulnerable youth.

The Current Study

The purpose of this dissertation study was to test whether a diathesis-stress model is an appropriate framework for understanding the relationship between weight status, bullying, and internalizing psychopathology. It was hypothesized that a diathesis-stress model of internalizing symptomology can explain that an unhealthy weight status (i.e., underweight, overweight, obese) serves as an individual risk factor or vulnerability, and that bullying involvement is a negative life event or stressor that enhances the relationship between unhealthy weight status and internalizing symptomology (i.e., anxiety, depression). A separate hypothesis that the relationships may vary by gender was tested due to evidence supporting gender differences for weight stigma (Hebl & Turchin, 2005; Puhl, Andreyeva, & Brownell, 2008), weight status

(Ogden, Carroll, Fryar, & Flegal, 2015), depression (Girgus & Yang, 2015; Parker & Brotchie, 2010; Stapley & Haviland, 1989; Van de Velde, Bracke, & Levecque, 2010), anxiety (Lewinsohn, Gotib, Lewinsohn, Seeley, & Allen, 1998; McLean, Asnaani, Litz, & Hofmann, 2011), and bullying involvement (Smith, Lopez-Castro, Robinson, & Gorzig, 2018; Zsila, Urban, Griffiths, & Demetrovics, 2018). Specifically, the current study examined the association between weight status, depression, anxiety, bullying involvement, and weight-based victimization and if those relationships vary gender and specific weight status. The current study builds upon the existing literature by utilizing a diathesis-stress model to conceptualize how bullying serves as a catalyst or negative life event for developing internalizing symptomology specifically for youth with an unhealthy weight status when compared to those with a healthy weight status.

Data for the current study were obtained as a part of an ongoing study investigating bullying and victimization and related health correlates. Participants included 376 patients between the ages of 11 and 18 years old who scheduled appointments at their pediatrician's office in a mid-sized Midwestern city. This age range was consistent with the World Health Organization (WHO; 2014) definition of adolescence (10 to 19 years of age) and coincides with when bullying rates tends to increase (Long & Pellegrini, 2003; Pellegrini & Bartini, 2001) as well as when rates of obesity tend to increase (Ogden et al., 2016). In the previous study, individuals participated by either: (a) completing measures via paper-and-pencil in the office, (b) paper-and-pencil at home and returning via mail, or (c) by electronic methods via the Qualtrics survey software program. Results from this study increase providers' understanding of the relationship between weight status, bullying involvement, and internalizing symptomology. Results continue to support the literature that those involved in bullying generally experience

higher levels of internalizing symptomology when compared to individuals not involved in bullying. Gender differences were found for anxious symptomology and bullying involvement, which are discussed in the results. Providers may consider screening for bullying involvement and addressing concerns related to unhealthy weight and internalizing symptomology.

Chapter one provides an overview of the current study. Chapter two describes the theoretical models (i.e., social ecological theory, the diathesis-stress model, weight stigma) used to help explain existing empirical literature on weight status, bullying involvement, internalizing symptomology, and their relationships. First, the literature on social ecological theory, the diathesis-stress model, and weight stigma are reviewed to establish a supporting framework to understand the factors influencing and maintaining the relationship between unhealthy weight status, bullying involvement, and internalizing symptomology. Next, empirical research published on unhealthy weight status, bullying involvement, internalizing symptomology (i.e., anxiety, depression) is discussed along with a review of predictors, outcomes, and gender differences considerations. Finally, the chapter concludes with specific research questions and hypotheses for the current study. Chapter three provides information on the methods of the study as well as how study variables were defined and measured. The study results are in chapter four and chapter five provides a synthesis of the study including a discussion on the results, limitations of the study, and ideas for future research.

CHAPTER 2

LITERATURE REVIEW

For the last several decades, psychologists and researchers have argued against a within-child perspective, which stems from the medical model. This perspective attributes outcomes and development more to an individual rather than their environmental influences that might impact individual development (Huppert, 2009). This within-child perspective can be traced back to the nature versus nurture dichotomy, which states that individual differences and behavioral traits are caused by either (a) an individual's innate qualities or (b) an individual's personal experiences (Merrell, Ervin, & Peacock, 2012). Rather than choosing one or the other (i.e., nature versus nurture), researchers and practitioners take an ecological perspective, incorporating characteristics from various perspectives (e.g., developmental, cognitive-behavioral, normative-developmental, family systems, and neurobiological) and examining both nature and nurture and its combined effects of individual development. Currently, it is good practice to conceptualize human behavior as a result of individual differences *and* experiences (Sattler, 2014). Frameworks such as social ecological theory and the diatheses-stress model are important because they have profound implications on the conceptualization of the complex relationship between weight status, bullying involvement, and internalizing psychopathology.

Several theories explain the relationship between weight status, bullying involvement, and internalizing psychopathology. One of the most prominent and well-respected theories in child development is Urie Bronfenbrenner's social ecological theory (1977, 1979). The theory proposes that people exist within interconnected systems in which individual characteristics and environmental contexts influence development. Social ecological theory facilitates a general conceptualization of how social processes such as bullying can develop from the interaction

between individual characteristics (e.g., impulsivity, empathy, social skills, anxiety, depression, physical health) and larger social contexts (e.g., family, peers, school, community; Swearer, Espelage, & Napolitano, 2009). Bullying researchers have extended social ecological theory to predictive models of bullying involvement, arguing that bullying behavior does not occur in isolation, but rather, is a result of complex interactions between a variety of factors (e.g., individual, family, peer group, school, community; Espelage & Swearer, 2010; Hong & Espelage, 2012; Swearer & Espelage, 2011; Swearer & Doll, 2001; Swearer et al., 2009). Unfortunately, factors influencing and maintaining bullying are unclear and complex because of the multidirectional characteristic of social ecological theory (Cicchetti & Rogosch, 1996) and because of principals of equifinality and multifinality (Swearer & Hymel, 2015). Social ecological theory aids researchers in understanding antecedents and contexts that perpetuate bullying; but, given causality research showing bullying involvement leading to anxiety and depression (Baldry, 2004), it is important to examine how social ecological factors and individual diatheses (i.e., vulnerabilities) might propagate negative outcomes such as anxiety, depression, social withdrawal, delinquent behavior, and poor academic achievement.

To examine individual diatheses and environmental factors together, a diathesis-stress model from developmental psychopathology is helpful in the conceptualization of individuals developing internalizing psychopathology (Cicchetti & Toth, 1998; Lazarus, 1993; Swearer & Hymel, 2015). This model suggests that people's diatheses or vulnerabilities interact with life stressors and result in the development of internalizing and externalizing psychopathology (e.g., anxiety, depression; Cicchetti & Toth, 1998). Few studies have examined the utility of the diathesis-stress model in understanding the impact of bullying involvement. For the current study, bullying involvement, irrespective of role, was considered a stressful/negative life event

(Swearer & Hymel, 2015) and an unhealthy weight status (i.e., underweight, overweight, obese) was considered an individual vulnerability. The current study examined the relationship between the diathesis and negative life event and their predictability of developing internalizing psychopathology (i.e., anxious and depressive symptoms). Externalizing psychopathology was not reviewed or examined for the current study as data were used from a previous larger study that did not assess externalizing psychopathology outcomes.

Social Ecological Theory

Social ecological theory is an influential theory that can be used to understand the bullying dynamic among youth (Espelage, Rao, & de la Rue, 2013; Hong & Garbarino, 2012). It derives from Bronfenbrenner's (1977; 1979) ecological systems theory, which posits that individuals exists within and are shaped by interconnected systems (e.g., home, neighborhood, school, community, society). Bronfenbrenner's social ecological theory and resultant framework contrasts from a within-child perspective that focuses on the individual rather than a person existing with multiple environments (Huppert, 2009). Bronfenbrenner (1977; 1994) argued that the within-child perspective is too restrictive and limiting when explaining child development. Proponents of the within-child perspective believe that individual differences and behavioral traits are caused by innate qualities and individual experiences (Merrell, Ervin, & Peacock, 2012) rather than bidirectional interactions between individual characteristics and the environment (Bronfenbrenner, 1979). This is important because being involved in bullying is not due to innate characteristics. No gene serves as a marker and predetermines whether an individual will experience bullying; rather, bullying involvement is better explained by social contexts *and* individual diatheses. Bullying is a learned social behavior, influenced and maintained by relationships with peers, families, teachers, neighbors, social structures, and systems (e.g., media,

technology; Bronfenbrenner, 1977; Swearer & Hymel, 2015). This social ecological perspective is necessary when considering the assessment, prevention, and treatment of bullying.

Social ecological theory is beneficial because it focuses on the different contexts that may support bullying and, therefore, it can inform intervention and prevention efforts at varying levels. These various levels can be described as universal, selective, and indicated (Gutkin, 2012). The ecological perspective consists of five interconnected, socially organized subsystems that researchers and practitioners should consider when assessing youth development (Bronfenbrenner, 1994). Social ecological theory is described as a set of nested structures (i.e., microsystem, mesosystem, exosystem, macrosystem, chronosystem) with the person located at the center, illustrating that the individual and environment influence each other (Bronfenbrenner, 1977; Bronfenbrenner, 1994). Social-ecological frameworks are unique to every person because the system consists of personally relevant variables (e.g., temperament, biological capacities) at the center and is surrounding by unique environmental contexts.

Systems within social-ecological framework. The individual is at the center of the system and is firstly surrounded by their microsystem. This is considered the immediate environment (e.g., family, school, classroom) and it directly interacts with the individual typically on a daily basis. Within the microsystem, individuals are directly influenced by people and social situations that help form their social relationships and cultivate cognitive and physical skills (Bronfenbrenner, 1977). Youth personally experience successes and failures within the microsystem. Family and home contexts can have a significant, positive impact on student performance at school, specifically in the areas of academics, relationships, and behavior. Students who have positive family contexts display academic perseverance and positive attitudes toward schoolwork. They also demonstrate sophisticated interpersonal skills as well problem-

solving skills (Buerkle, Whitehouse, & Christenson, 2009). For this reason, researchers such as Christenson, Whitehouse, and VanGetson (2008) support caregivers as intervention agents, when possible, and encourage psychologists to partner with caregivers and community members to foster positive well-being in youth.

Mesosystems are the interconnections (e.g., home and school, school and extracurricular activities, home and community) between different microsystems that directly influence individuals (Bronfenbrenner, 1994). An example of a mesosystem is the parent-teacher partnership between caregivers and educators. The exosystem is like the mesosystem in that it is also an interconnection between processes in two or more settings. However, the difference is that at least one of the processes (e.g., parental workplace) does not directly affect the individual (Bronfenbrenner, 1994). An example of an exosystem is the link between a parent's workplace and the home. The exosystem has a direct effect on the parent, which indirectly affects youth. Parental workplace, family social networks, and the community are the three most important exosystems because of their influence on youth development (Bronfenbrenner, 1994).

The macrosystem consists of the typical characteristics and patterns of a culture or context. Examples of macrosystems are beliefs, common knowledge, material resources, customs, lifestyles, and opportunities (Bronfenbrenner, 1977). Macrosystems are embedded within microsystems and can be described as the roadmap for a specific culture. The chronosystem is the outermost layer of the ecological model in which the other systems are nested within. Traditionally, individual development was solely understood through the passage of time, specifically within an individual youth's chronological age and their life course. However, it is also important to understand youth development within the historical time period

in which individuals live and of those who have direct influence on youth development (Bronfenbrenner, 1977).

The social-ecological framework is foundational for the conceptualization of bullying (Hong & Espelage, 2012; Swearer & Doll, 2001; Swearer & Espelage, 2011; Swearer, Espelage, Vaillancourt, & Hymel, 2010). Researchers have identified a variety of variables that influence and maintain bullying at the individual (Nansel et al., 2001), peer (Swearer et al., 2009), family (Espelage, Bosworth, & Simon, 2000), school (Espelage & Swearer, 2010), and societal (Browne, 2012) levels. Researchers have examined family factors that contribute to or are related to bullying involvement. Youth who experience domestic violence (Duncan, 2011; MacKinnon-Lewis, Starnes, Volling, & Johnson, 1997), sibling aggression (Duncan, 1999; Wolke & Samara, 2004), and physical abuse (Iverson, McLaughlin, Adair, & Monson, 2014; Schwartz, Dodge, Pettit, & Bates, 1997; Strassberg, Dodge, Pettit, & Bates, 1994) in their family are at increased risk for being involved in bullying and anger-related dysregulation due to the modeling of aggressive behavior (Espelage, Low, & De La Rue, 2012; Espelage, Hong, & Valido, 2019; Tippett & Wolke, 2015). An authoritarian parenting style (Baldry & Farrington, 2000) that is punitive and unsupportive and the use of physical discipline (Espelage et al., 2000) both predict bullying involvement.

School-related variables that are linked to increased bullying involvement include negative school climate (Klein, Cornell, & Konold, 2012; Yang, Sharkey, Reed, Chen, & Dowdy, 2018) and student's lacking a sense of belongingness (Goldweber, Waasdorp, & Bradshaw, 2013; Waasdorp, Pas, O'Brennan, & Bradshaw, 2011). Researchers found that bullying typically occurs in schools that lack appropriate supervision, have poor teacher-student relationships, and have negative peer friendships (Doll et al., 2011; Swearer, 2011).

Researchers have also identified various community and societal factors that are linked to increased bullying involvement. Neighborhoods that are unsafe, violent, and disorganized are risk factors for bullying (Cook et al., 2010; Youngblade et al., 2007). The media is also linked to bullying through coverage of violence and aggressive behavior (Gentile & Bushman, 2012). Researchers found that adolescents who played mature video games were at increased risk for bullying perpetration (Olson et al., 2009). Societal intolerance (e.g., homophobia, sexism, classism, racism, weightism) of differences creates a culture in which feel open engage in bullying and aggression to defend their biases and prejudices.

The social ecological theory helps to elucidate the variables associated with bullying (e.g., being different), but it is limited in explaining the various outcomes (e.g., depression, anxiety) for youth involved in bullying. The diathesis-stress model is a useful framework that helps researchers understand how individual vulnerabilities and life stressors within environmental contexts can lead to the development of mental and physical problems.

A Diathesis-Stress Model

Swearer and Hymel (2015) proposed combining social-ecological framework and the diathesis-stress model to understand bullying involvement and its associated negative outcomes (Swearer & Hymel, 2015). The diathesis-stress model is a psychological theory that was developed to explain the interaction between a stressor and resultant psychological and physical health problems. In the psychological literature, the word, “diathesis” is commonly defined as a pre-dispositional factor or set of factors that contribute to the development of a disorder (van Heeringen, 2012). The specific term, “diathesis-stress” was introduced by Meehl, Bleuler, and Rosenthal in the 1960s when it was originally used to explain the development of schizophrenia through the interaction of stress and vulnerabilities (i.e., diathesis; Ingram & Luxton, 2005). The

model does not take a dichotomous perspective in that people either have or do not have a predisposition to developing disorders. Rather, the diathesis-stress model is dynamic and can change over time (van Herrigen, 2012). This means that individuals may differ in the development of a disorder because variability exists in levels of stress, sources of stress, types of vulnerabilities, chronicity of vulnerability, and stigmatization of vulnerability.

The diathesis-stress model proposes that psychological and behavioral disorders develop due to a combination of genetic vulnerabilities and risk factors in the environment (Ingram & Luxton, 2005). Individuals may inherit genes that put them at increased risk for developing depression, but a diathesis-stress model conceptualizes that simply being at-risk does not guarantee that someone will develop depression. In fact, those who are at risk for depression can avoid developing depression by experiencing few negative life events or stressors. In contrast, a chaotic environment with high stress could trigger the onset of depression even for individuals who are not genetically and biologically predisposed to developing depression. However, those who experience many stressors or negative life events but do not have individual vulnerabilities or predispositions may not develop disorders such as depression. For individuals who have diatheses as well as experience negative life events, they are at increased risk for developing psychological and physical health issues.

Bullying researchers propose that the diathesis-stress model can be used to understand the relationship between bullying involvement and developing internalizing psychopathology (Swearer & Hymel, 2015). It is theorized that internalizing psychopathology (e.g., anxiety, depression) develops from the combination of negative life events (e.g., bullying, abuse, acute health issue) and an individual's genetic vulnerabilities (e.g., obesity, underweight, diabetes, asthma, allergies) and negative perceptions of those events (Cicchetti & Toth, 1998; Lazarus,

1993; Swearer & Hymel, 2015). For example, a teenage boy with low weight and muscle mass is not predetermined to developing anxiety or depression. However, if that teenage boy experiences stressors such as bullying due to his weight status, he may be more likely to develop anxiety or depression when compared to a teenage boy with a socially accepted and preferred weight status, even if that boy experienced bullying as well. In this example, an underweight weight status was an individual diatheses or vulnerability and bullying involvement was the negative life event or stressor, which served as a catalyst for developing internalizing psychopathology.

The diathesis-stress model is empirically supported (e.g., Garber & Hilsman, 1992; Gibb & Alloy, 2006) and has contributed to the understanding of depressive symptomology in previous research (e.g., Chango, McElhaney, Allen, Schad, & Marston, 2012). Regardless of bullying role (i.e., bully, victim, bully-victim, and/or bystander), bullying involvement is considered a stressful life event, placing vulnerable youth at risk for negative outcomes such as internalizing symptomology (Ferguson et al., 2009; Kaltiala-Heino et al., 2000). It is clear that stressful life events (i.e., bullying involvement) play an important role in the development of internalizing issues such as depression (Copeland, Wolke, Angold, & Costello, 2013; Hammen & Rudolph, 2003; Wolke, Lereya, Fisher, Lewis, & Zammit, 2013) and anxiety (Leen-Feldner, Zvolsneky, & Feldner, 2006; O'Brennan, Bradshaw, & Sawyer, 2009). It is less clear why adolescents who are underweight, overweight, and obese are more likely to experience internalizing symptomology when compared to their healthy weight peers.

The diathesis-stress model can be used to explain the development of internalizing symptomology (i.e., anxiety, depression) through the interaction of negative life events (e.g., involvement in bullying) and individual vulnerabilities (e.g., weight, disability, race, gender, sexual orientation; Swearer & Hymel, 2015). Using this model can offer explanatory power to

understanding the varying psychological outcomes of being considered underweight, overweight, or obese. Swearer and Hymel (2015) posit that when considered within a social-ecological framework, the diathesis-stress model may serve as a useful lens for understanding and explaining the negative implications of experiencing bullying and it might be especially helpful to use for adolescents who are considered underweight, overweight, or obese. By using both of these frameworks together, relevant associated variables, vulnerabilities, and the potential for developing internalizing psychopathology can be examined.

Physical Health: Weight Stigma

Society and culture are two important areas in social-ecological framework that can greatly impact child development. The society and culture that individuals live within influence their values and ideals. From these, people can develop biases and preferences for specific traits, qualities, or characteristics, which can lead to the development of prejudices, which are preconceived judgements or opinions (Browne, 2012). When prejudices and biases are ingrained in cultures, devalued social identities (e.g., sexual minority, religious minority) and qualities (e.g., obesity, disability) are at risk for being stigmatized. A stigma is a social sign or label that is identified with victims and increases their vulnerability and opportunity for discrimination (Crocker, Major, & Steele, 1998). Weight stigma is evident and pervasive in the United States and it is, "characterized by negative weight-related attitudes and beliefs that are manifested by stereotypes, bias, rejection, and prejudice toward youth because they are overweight or obese" (Puhl & Latner, 2007).

Weight stigma can influence the way people think and behave. It can influence implicit biases, social preferences, and prejudices. Research suggests that anti-fat attitudes and weight stigma develops in early childhood (Brylinskey & Moore, 1994; Damiano, Yager, McLean, &

Paxton, 2018; Latner & Stunkard, 2003). Researchers examined youth's preferences for friends and found that they are likely influenced by ideals, values, and biases related to weight. Richardson and colleagues (1961) asked participants to rank their preference of friends based on six pictures (i.e., one healthy-weight child with no disability, four children with disabilities, one overweight child with no disability). The researchers found that youth were least likely to prefer friends who were overweight or obese. The study was replicated by Latner and Stunkard (2003) who found similar results; overweight individuals were least preferred as a friend. Depicting the growing impact of weight stigma over time, researchers found that the difference between the highest and lowest rankings from the years 1961 to 2003 increased by 40% (Latner & Stunkard, 2003). This finding suggested that weight stigma is a prevalent concern for youth and that weight bias may be worsening (Latner & Stunkard, 2003; Tomiyama et al., 2018).

Youth experience weight stigma from multiple sources, which typically includes peers, parents, adults, media, and society at large (Browne, 2012). Negative attitudes about weight start in early childhood and extend into adolescence and adulthood. Researchers found that weight stigma increases with age (Crystal, Watanabe, & Chen, 2000), making overweight and obese adolescents especially vulnerable to weight-related stigmatization. Overweight youth were consistently described as, "sloppy, stupid, ugly, and mean" by their peers at multiple developmental periods (early childhood, elementary age, adolescents; Bell & Morgan, 2000; Wardle, Volz, & Golding, 1995; Kraig & Keel, 2001). Other negative stereotypes and perceptions often associated with obesity are unhappy, less competent, lazy, socially isolated, and lacking in self-discipline, motivation, and personal control (Brylinksey & Moore, 1994; Crandall, 1994; Puhl & Brownell, 2001; Teachman, Gapinski, Brownell, Rawlins, & Jeyaram,

2003). Less is known about youth who are considered underweight due to less research on individuals within the underweight weight category.

In our society, those whom are socially accepted tend to be attractive and display athletic ability (Knack et al., 2012). In fact, physical attractiveness and athletic ability were found to be protective factors for socially rejected youth who are likely targets for victimization (Knack, Tsar, Vaillancourt, Hymel, & McDougall, 2012). Educators and parents might unintentionally show preference or bias toward healthy-weight youth, by lowering their expectations for overweight individuals (Neumark-Sztainer, Story, & Harris, 1999). Educators, despite being invested in the well-being of students, are not immune to societal beliefs on weight that make obese youth vulnerable to stigmatization. Researchers found that some parents feel personally responsible for their child's overweight status, contributing to weight stigma that youth might experience at home by caregivers and siblings (Holub, Tan, & Patel, 2011).

Although weight bias and stigma are pervasive, few studies have examined the relationship between weight stigma and psychological well-being (Puhl & Brownell, 2012). Researchers examining this relationship found that a greater frequency of stigma was positively related to body mass index (BMI) and poorer psychological functioning (i.e., higher levels of depression, psychiatric symptoms, body image distress, lower levels of self-esteem; Friedman et al., 2005; Myers & Rosen, 1999). Researchers also found that individuals who perceived that they were mistreated due to their weight reported low levels of self-acceptance (Carr & Friedman, 2005). The negative impact of weight stigma is just starting to be understood. More research is warranted, especially among more diverse samples including varying weight categories, ages, and types of stigmatization experienced.

More research is also needed in how weight stigma may differ by gender (Puhl & Brownell, 2006). Haines and colleagues (2006) found that weight teasing predicted unhealthy weight control behaviors for males and predicting increased dieting for females. Other findings have linked appearance-based teasing in childhood with higher frequencies of binge eating among women who are obese and have binge eating disorders (Jackson, Grilo, & Masheb, 2000). Researchers found that females are more likely to perceive themselves as overweight as well as be dissatisfied and concerned about their weight when compared to males (Cachelin, Rebeck, Chung, & Pelayo, 2002; Pritchard, King & Czajka Narins, 1997). Overall, the existing research supports inconsistent findings for gender differences in weight stigma, especially in adulthood. Clear differences between adult men and women as well as racial differences for weight-related stigmatization were found (Hebl & Turchin, 2005); however, other research has found no significant difference in experiencing weight stigmatization between men and women (Carr & Friedman, 2005; Friedman et al., 2005). Gray and colleagues (2011) examined weight-based stigmatization among youth (7 to 17 years old) and found that younger children and females were more likely to experience weight-based stigmatization. They also found that black females were less likely to endorse weight-based stigmatization than white females (Gray, Simon, Janicke, & Dumont-Driscoll, 2011). More research is needed to better understand how gender and weight stigma are related and whether experiences related to weight stigma differ by gender.

Even though weight stigma is linked to poorer psychological well-being, it is believed to be tolerated because shame is a successful motivator (Browne, 2012). The idea is that people who are overweight, obese, or underweight will feel ashamed of their weight status, pushing them to diet, lose weight, or gain weight to appear more socially acceptable. A common stereotype is that weight can be personally controlled rather than attributed to an external source

(e.g., thyroid dysfunction). Unfortunately, people who fail to lose weight are considered lazy or to have poor self-discipline and willpower (Browne, 2012). European culture silently tolerates weight stigmatization through law systems that safeguard discrimination in the form of race, gender, and religion; however, only three cities (i.e., Washington, DC, San Francisco, Santa Cruze) and one state (i.e., Michigan) prohibit discrimination of overweight people through laws and codes (Friedman & Puhl, 2012). There is a desperate need for more translational research to counter the social stigma of weight and its negative outcomes. It is clear that our cultural bias and perception of one's weight puts youth who have an unhealthy weight status at-risk and vulnerable to stigmatization, prejudice, and weight-related victimization.

Weight Status

Weight is an important issue in child development. From the first day children are born, their birthweight and length is assessed. Physicians continue to assess and monitor child growth with Growth Records during pediatric appointments (World Health Organization, 2008). Growth is monitored because it can be used to detect illness and problems early, which leads to early intervention and proper treatment. Weight is an important parameter for growth, especially in infancy and early childhood, because physicians can determine if children are growing within normal range and if they are at risk for over- or under-nutrition. Both over- and under-nutrition have negative consequences. Children with under-nutrition (i.e., failure to thrive, growth deficit) struggle to gain weight at a normal rate, which can occur for a variety of reasons (Motil, Duryea, & Bridgemohan, 2017). Difficulty gaining weight is important to study because it can lead to complications such as weakened immune system and difficulties learning (Motil et al., 2017). The inverse is also true, that over-nutrition can also lead to negative consequences such as obesity, which is linked to a myriad of physical and psychological issues.

Definitions of weight status. According to the CDC (2000), it is recommended to use age and height when assessing BMI for youth who are ages 2 to 19 years old. Using BMI as a screener can assess for weight concerns and determine youth who may be at risk for weight issues. Barlow (2007) recommends that pediatricians use BMI as a screener for excess body fat as a means of identifying at-risk youth for associated negative psychosocial outcomes. BMI as a screener could also be used to identify youth who might be considered underweight and at risk for under-nutrition and associated consequences. Body fat can be directly measured to assess weight status, but BMI is an inexpensive and easy alternative to screen for at-risk weight categories. BMI screening can help practitioners be aware of potential health and social problems for youth (CDC, 2016). The CDC developed a calculator that produce a BMI and a corresponding BMI-for-age percentile based on growth charts that control for age and gender. The uses the following formula to calculate BMI: weight in pounds / height in inches x 703 (CDC; 2014). The CDC also has categorized weight into four different categories: (1) underweight (less than the 5th percentile), (2) normal or healthy weight (5th to 84th percentile), (3) overweight (85th to 94th percentile), and (4) obese (95th percentile or greater; CDC, 2015).

Prevalence of an unhealthy weight status. Obesity is considered an epidemic (Anderson & Butcher, 2006; WHO, 2000) and a worldwide health concern because of its increasing prevalence and its associated negative outcomes and risk factors. Less research is conducted on underweight children when compared to childhood obesity, which is likely due to less prevalence and associated consequences with having an underweight status.

Prevalence of overweight and obesity weight status. The prevalence rates of obesity, regardless of age, have dramatically increased across ages, races, and ethnic groups within the past 30 years. In 2015 and 2016, nearly 40% of adults in the United States were considered obese

and 7.7% of adults were severely obese, which was an increasing trend compared to 10 years ago (Hales, Fryar, Carroll, Freedman, & Ogden, 2018). In research from 2011-2014, the prevalence of obesity was higher in women (38.3%) than in men (34.3%); however, there were no significant gender differences among youth (Ogden et al., 2015). Obesity trends tends to be higher in areas with a high concentration of poverty and for people who are African-American, Hispanic, and Native American (CDC, 2016; Crawford, Story, Wang, Ritchie, & Sabry, 2001).

Worldwide, childhood obesity has increased dramatically over the past two decades with approximately 10% of youth classified as overweight or obese throughout the world (World Health Organization, 2008). In the 1960s, prevalence rates were approximately 5% and recent estimates suggest that approximately 17% of children and adolescents are obese (Ogden, Carroll, Kit, & Glegal, 2012; Troiano & Glegal, 1998). The Centers for Disease Control and Prevention (CDC; 2016) considers childhood overweight and obesity a serious public health issue in the United States given that approximately 17% to 18.5% of individuals ages 2 to 19 years old meet criteria for obesity (Hales et al., 2018; Ogden, Carroll, Kit, & Flegal, 2012). However, prevalence rates appear to vary by age in childhood. The prevalence in obesity among children between ages 2 and 5 years old has started to decline whereas for children ages 6 and 11 years old, the obesity prevalence rate has stabilized (Ward et al., 2017). Unfortunately, the obesity prevalence rate continues to increase among adolescent and adult populations (Ogden et al., 2016; Flegal, Kruszon-Moran, Carroll, Fryar, & Ogden, 2016). The number of youth who are considered overweight or at-risk-for-overweight continues to increase (Hales et al., 2018; Ogden, Flegal, Carroll, & Johnson, 2002; Ogden, Carroll, Fryar, & Flegal, 2015). For the past 30 years, obesity has tripled among children and adolescents (Ogden et al., 2012).

Prevalence of underweight weight status. Childhood underweight is known as a worldwide public health concern due to its negative effects on human performance, health, and survival (Caulfield, de Onis, Blossner, & Black, 2004; Chang, Walker, Grantham-McGregor, & Powell, 2002; Walker, Grantham-McGregor, Powell, & Chang, 2000). In fact, Caulfield and colleagues (2004) found that over half of all deaths in young children, less then 5 years old, were attributed to being underweight. From 1971 to 2014, approximately 1.9% to 5.8% of children ages 2 to 19 years old were considered underweight (CDC, 2014; Fryer & Ogden, 2012).

Predictors of unhealthy weight status. Many variables and contexts shape the development of an unhealthy weight status. Similar to bullying, social ecological theory is an appropriate framework to conceptualize risk factors for developing an unhealthy weight status. The development of an unhealthy weight status is best understood as a complex, multilevel model system where multiple individual-level factors and socioenvironmental factors influence underweight, healthy weight, overweight, and obesity (Huang, Drewnoski, Kumanyika, & Glass, 2009). Given both frameworks (Bronfenbrenner, 1994; Huang et al., 2009), important variables to consider are the individual, peers, community, family, school, and social contexts that influence weight (Huang et al., 2009). Like the conceptualization of bullying, these factors are interdependent and interact dynamically (Huang & Horlick, 2007).

Predictors of overweight and obesity weight status. Some youth have a higher biological risk (e.g., thyroid complications, impaired glucose tolerance, intrauterine growth, intrauterine exposure to nicotine, elevated blood pressure; Deckelbaum & Williams, 2001) of being an unhealthy weight, but societal factors likely play the largest role in the development of childhood obesity (Lytle, 2009; McLeod, Fergusson, Horwood, Boden, & Carter, 2017; Qasim et al., 2017). One of the strongest predictors of childhood obesity is maternal obesity (Rooney, Mathiason, &

Schauberger, 2011). Times in which youth are most vulnerable to negative medical and environmental exposure is during pre-pregnancy, pregnancy, and early infancy (Halfon, 2009). Whitaker (2004) found that low income status and maternal obesity were significant predictors of youth becoming obese at age three (Whitaker, 2004). Infant sleep patterns were also related to weight, with infants who slept less than 12 hours per day being two times more likely to be obese at three years old (Taveras, Rifas-Shiman, Oken, Gunderson, & Gillman, 2008).

Societal and cultural values and trends influence weight status. Some of these trends perpetuate overweight and obesity by marketing to children and creating easy access to unhealthy foods (Koplan, Liverman, & Kraak, 2004). For example, companies entice youth to consume their unhealthy foods (e.g., fruit snacks, cookies, macaroni and cheese) by making them emulate popular characters (e.g., SpongeBob SquarePants, Scooby Doo, Elsa). Another systemic issue that perpetuates unhealthy eating patterns and obesity is that unhealthy foods tends to be more accessible, cheaper, and easier to prepare than healthy food choices (e.g., fresh fruits, vegetables, proteins, whole grains) with low calories and sugars. Also, society has normalized a sedentary lifestyle where people sit for much of the day during school. Recess and physical education are common times when educators pull students to make up coursework or to discipline students for misbehavior. Entertainment and play have also become increasingly sedentary with increased demand for activities such as videogames rather than outdoor physical activity (e.g., riding bikes). Technology and electronics are highly rewarding activities, but they tend to be incompatible with physical activity. Additionally, with the emphasis on competitive sports, youth might be apprehensive to participate in athletics events, because if they are not excellent athletes, they do not get to play. Although competitive sports have their physical and

social benefits, youth might be deterred from leading physically healthy lifestyles, especially those who do not meet the athletic societal values and ideals.

Predictors of underweight weight status. Little research on underweight youth in the United States has been conducted. However, childhood underweight is likely related to an underlying health condition and can be indicative of malnutrition (Fryar & Ogden, 2012; Sapkota & Gurung, 2009). Additionally, similar to overweight and obese youth, underweight is associated with poverty and insufficient access to nutritious food (Briefel & Woteki, 1992; Casey, Szeto, Lensing, Bogle, & Weber, 2001; Sapkota & Gurung, 2009). Researchers studying childhood underweight and malnutrition in Nepal found that being female and from a disadvantaged ethnic group significantly predicted underweight and malnutrition (Sapkota & Gurung, 2009). Similarly, Carvalheas and Benicio (2002) found that Pakistani female children were more likely to be underweight and malnourished when compared to male children. Additional risk factors for childhood underweight include single parenting, hospitalization of the mother during pregnancy, mother's poor mental health, and family stress factors including alcoholism and adverse familial structure (Carvalheas and Benicio; 2002).

Outcomes of unhealthy weight status. The consequences of having an underweight, overweight, or obese weight status are both medically- and psychologically- related. Underweight, overweight, and obese youth are also at increased risk for poor psychological and educational outcomes as well as social adversities when compared to their healthy weight peers (Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Cimino et al., 2016; Curtis, 2008; Grindvik et al., 2009). These youth face frequent stigmatization, stereotyping, and peer victimization (Browne, 2012; Puhl & Latner, 2007). In fact, overweight, obese, and underweight youth are more likely to experience bullying and teasing when compared to healthy weight peers (Lumeng

et al., 2010, Fox & Farrow, 2009; Wang, Iannotti, & Luk, 2010) and the victimization is most often weight-related (Hayden-Wade et al., 2005; Jones, 2011; Libbey, Story, Neumark-Sztainer, & Boutelle, 2008; Nelson, Jensen, & Steele, 2011; Puhl, Luedicke, & Heuer, 2011; Warkentin, Borghese, & Janssen, 2017).

Some research suggests a relationship between weight status and suicide risk in adults (Branco et al., 2017; Carpenter, Hasin, Allison, & Faith, 2000). Carpenter and colleagues found that obese adults were more likely to report suicide attempts when compared to healthy weight adults. Branco and colleagues (2017) researched the relationship between obesity and suicide in young adults (18- to 35-year-olds) and found that the relationship between obesity and suicide risk was significantly related among women, but not men. Eaton and colleagues (2005) found that high school students who perceived themselves to be overweight or underweight were more likely to report suicidal ideation and attempts. Additionally, Whetstone and colleagues (2007) found that both female and male adolescents who perceived themselves to have an unhealthy weight status were more likely to report suicidal thoughts and actions. For males, those who reported being underweight were more likely to report suicidal ideation and attempts when compared to overweight males (Whetstone, Morrissey, & Cummings, 2007).

Outcomes of overweight and obesity weight status. Obesity has a well-established relationship with cardiovascular disease, metabolic disease, musculoskeletal disorders, cancer, and an increased chance of premature death and disability in adulthood (Farhat, Iannotti, & Simons-Morton, 2010). Other medically-related health consequences of obesity during childhood include high blood pressure, high cholesterol (Freedman, Mei, Srinivasan, Berenson, & Dietz, 2007), breathing problems, sleep apnea, and asthma (Han, Lawlor, & Kimm, 2010; Sutherland, 2008). Other adverse outcomes of being overweight include type 2 diabetes, hypertension, lipid

problems, insulin resistance, and steatohepatitis (Bray, 2004; Dietz & Robinson, 2005). Researchers found that as BMI increases, vulnerability and risk for stigmatization and victimization also increased (Griffiths, Wolke, Page, Horwood, & Team, 2005; Hayden-Wade et al., 2005; Janssen, Craig, Boyce, & Pickett, 2004;) and that peers were least likely to pick overweight youth as a preferred friend (Latner & Stunkard, 2003; Richardson et al., 1961).

Outcomes of underweight weight status. Individuals born with very low birth weight have a history of developing neurological impairments such as cerebral palsy, mental retardation, poor fine motor function, and perceptual problems (Saigal, 1995). Additionally, those whom experienced childhood underweight are at increased risk for developing symptoms related to mental health issues such as attention deficit/hyperactivity (ADHD), anxiety disorders, depression, and autism spectrum disorder (Bhutta, Cleves, Casey, Cradock, & Anand, 2002; Cimino et al., 2016; Indredavik et al., 2004). Researchers have also found that underweight youth have lower self-esteem and experience greater social rejection when compared to healthy-weight peers (Rickards, Kelly, Doyle, & Callanan, 2001). Grindvik and colleagues (2009) found that adolescents with a very low birth weight were more likely to be bullied than their healthy weight peers. It is clear that these biological vulnerabilities increase the odds of being bullied in childhood and adolescence (Grindvik et al., 2009).

Less is known about the negative outcomes of underweight youth. Even though low birth weight has a high prevalence of associated risk factors with bullying involvement, little research has examined the association between bullying and being born with a very low birth weight (Grindvik et al., 2009; Wang, Iannotti, & Luk, 2010). Limited research in this area is likely due to a social acceptance and a high value on being thin, especially for females. Although there is weight stigma against obesity, there is also an anti-thin phenomenon for both women and men

(Falkner et al., 2001). Men seem to be the common target of anti-thin stereotypes and marginalization with society being more tolerant and accepting of overweight males. Falkner and colleagues (2001) found that adolescents who were underweight and obese had the highest prevalence of negative social, educational, and psychological outcomes. For instance, underweight boys were more likely to feel not cared about by their father and peers when compared to average weight peers (Falkner et a., 2001). Additionally, underweight boys were more likely to dislike school, consider themselves as below average students, and expect that they would not finish college when compared to their average weight counterparts. Falkner and colleagues (2001) also found that underweight and overweight boys were more likely to report not hanging out with friends when compared to average weight peers. This is consistent with previous research demonstrating that peers prefer friends who are of a healthy weight status (Latner & Stunkard, 2003; Richardson et al., 1961).

More research exists on the negative outcomes of overweight and obesity than underweight youth. Although being underweight is related to negative physical health consequences as well as social and emotional challenges (Cimino et al., 2016), its associated risks are not as heavily researched (Falkner et a., 2001; Jackson, Grilo, & Masheb, 2000), which is likely because underweight is less prevalent and has fewer associated negative health outcomes. More research is needed on associated risks and psychological outcomes of underweight youth and those born with very low birth weight. Overall, having an unhealthy weight status is related to a poorer quality of life (Branco et al., 2017; Brixval et al., 2012; Cimino et al., 2016; Schwimmer, Burwinkle, & Varni, 2003) and serves as a biological vulnerability or diathesis (Berger, 2007; Cimino et al., 2016) to developing negative outcomes

such as anxiety and depression, especially if one experiences negative life events or stressors such as stigmatization and victimization.

Outcomes of weight-related victimization. Having an unhealthy weight status has negative consequences on the social, emotional, and physical development of youth; therefore, clinicians should be aware of bullying and its impact on youth's well-being (Puhl et al., 2013; Storch et al., 2007). One of the most common reasons why youth are victimized is because their appearance deviates from the norm (Brixval et al., 2012). Puhl, Luedicke, and Heurer (2011) found that body weight is one of the most common reasons why adolescents are bullied. In fact, these bullying rates were highest for weight status when compared to race, religion, or disability (Puhl et al., 2011). Victimized youth are typically perceived as *different* than their peers through their appearance (e.g., unhealthy weight status, disability). Individuals with medical conditions are especially vulnerable and at-risk for peer victimization, especially if their conditions have overt characteristics that show their differences visibly (Storch et al., 2004). The consequences of weight-related victimization can last into adulthood. Jackson, Grilo, and Masheb (2000) found that female adults who developed binge-eating disorders had a childhood history of appearance-related teasing that was positively correlated with depression, body dissatisfaction, and poor self-esteem.

The development of youth who are under- and overweight is important to examine not only because of their associated physical health issues, but also because of the related stigmatization and mental health issues (e.g., depression, anxiety, disordered eating patterns, low self-esteem) they experience. When compared to healthy weight peers, underweight and overweight youth are more likely to experience chronic peer victimization, which likely contributes to their psychosocial functioning (Grindvik et al., 2009; Puhl et al., 2013; Storch et

al., 2007). Identifying and understanding the different psychological consequences related to individuals with an unhealthy weight status and who are victimized is important because internalizing issues (e.g., depression, anxiety) and bullying involvement can serve as barriers to treatment adherence and outcomes (Puhl et al., 2013; Storch et al., 2007). Pediatricians recommend increased physical activity for youth who are overweight, but if they struggle with depression due to bullying victimization, treatment outcomes might be hindered due to depressive symptoms (e.g., anhedonia, fatigue, excessive hunger, social isolation, irritability). Researchers found that bullying frequently occurs in settings with physical activity (i.e., physical education, sports teams; Frey et al., 2005). Therefore, victimized youth might learn to avoid social events with increased physical activity (e.g., sports teams, riding bikes, physical education class) as a way to avoid victimization. This learned avoidance maintains an inactive lifestyle (Storch et al., 2007) and is reinforced by the removal of bullying victimization, perpetuating inactivity, weight gain, and victimization. This creates a negative cyclical pattern of avoiding physical activities, feeling isolated, and in turn, increases the risk of weight-related stigmatization and victimization.

Bullying Involvement

Bullying is a complex, pervasive, social phenomenon that is related to many negative outcomes. Bullying is a social tool that can be used in various ways including physical, relational, verbal, and electronic (StopBullying.gov, 2019) and can serve many functions (e.g., attention, escape, tangible). Bullying is a social behavior and therefore occurs in social contexts, which can include but is not limited to school systems, the workplace, media, and technology (Swearer & Hymel, 2015). Much of the increased focus on bullying has been attributed to increased attention and coverage of bullying-related tragedies including school shootings and

youth suicides (Vossekuil, Fein, Reddy, Borum, & Modzeleski, 2002). Although researchers have not fully explained the complex relationship between bullying and these tragic events, it is clear that bullying is a public health concern that is related to significant emotional, behavioral, social, and physical health concerns (Kodish et al., 2016; Srabstein & Leventhal, 2010; Ttofi, Farrington, Losel, Crago, & Theodorakis, 2016). Bullying involvement, regardless of role, form, or function, is considered a negative life event and a stressor (Stilberg et al., 2016; Swearer & Hymel, 2015). Stilberg and colleagues (2016) specifically studied whether bullying can be considered a negative life event and they found that childhood bullying is a significant environmental trauma and should be considered when working with children. Since the late 1980s, researchers have begun to elucidate the complexity of bullying. Ways to prevent and effectively intervene in bullying have been discovered; however, there is still much need for more research to truly understand the bullying dynamic and to inform current and future practice and policy to ameliorate its negative consequences.

Definition. Initially, bullying was referred to as mobbing (Olweus & Roland, 1983), where it was depicted as a large group of children ganging up on a single child. Bullying is a subcategory of aggression (Hunter, Boyle, & Warden, 2007), which means that all bullying is considered aggressive, but not all aggression is considered bullying. Bullying has unique predictors, outcomes, and characteristics that make it distinguishable from aggression. It is instrumental aggression in that it serves a function for the individual engaging in bullying (Prinstein & Cillessen, 2003). This specific characteristic differentiates harmful accidents or playful teasing from bullying. For many years, no universal definition existed, but most researchers and practitioners agreed that bullying should be differentiated from aggression (Hanish et al., 2013). To differentiate bullying from aggression, Olweus (1993) proposed three

defining characteristics of bullying and they include: (1) intent to harm, (2) repetition over time or across contexts, and (3) an imbalance of power between the perpetrator and victim. Recently, the Centers for Disease Control and Prevention (CDC; CDC, 2016) released a universal definition that is similar to Olweus' bullying definition. CDC defines bullying as, "any unwanted aggressive behavior(s) by other youth or a group of youth who are not siblings or current dating partners that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated" (CDC, 2016, p.1).

Types of bullying. There are four types of bullying and they include physical, verbal, social or relational, and electronic (StopBullying.gov, 2019). Physical bullying (e.g., kicking, pushing, punching) consist of aggressive behaviors that result in bodily harm to the victimized person. Verbal bullying is aggressive verbal behavior and examples include teasing, threatening, and name-calling. Relational bullying consists of social aggression with the intent of damaging relationships by forms of spreading rumors or using exclusion (Nansel et al., 2001). Electronic bullying is a newer form of bullying but adheres to the traditional definition with the distinct differentiation of an electronic platform used to carry out the bullying behavior (Patchin & Hinduja, 2006). Examples of electronic platforms include social media, gaming devices, cellular phones, and online messaging (Hinduja & Patchin, 2008; Low & Espelage, 2012). Researchers found that bullying types tend to co-occur, resulting in victims experiencing multiple forms of bullying rather than solely one form (Swearer, Espelage, & Napolitano, 2009).

Bullying roles. Traditionally, researchers assumed that bullying roles were *fixed*. However, this perspective does not adequately represent the complex, dynamic social process of bullying (Swearer & Doll, 2001; Swearer et al., 2010). The notion that bullies are always bullies and victims are always victims is flawed. Rather, bullying roles change over time and are best

understood on a continuum in which perpetrators, victims, and bystanders move in and out of roles (Bosworth, Espelage, & Simon, 1999; Ryoo, Wang, & Swearer, 2015; Swearer & Doll, 2001). Based on empirical understanding of participant roles in bullying, outcomes and intervention efforts should vary by bullying roles and types (Barker, Arseneault, Brendgen, Fontaine, & Maughan, 2008; Haltigan & Vaillancourt, 2014). It is imperative to clearly define roles and types of bullying so that interventions can be more efficacious. The five different roles in the bully/victim continuum are victim, perpetrator/bully, bully-victim, bystander, and uninvolved (Wang et al., 2009).

Victims. Youth who are victims of bullying are those whom are actively targeted by bullying perpetrators and who do not bully others. Victims are perceived as weak or powerless and struggle to defend themselves (Gladden et al., 2014), which makes them likely targets for perpetrators to abuse their power (Naylor, Cowie, Cossin, de Bettencourt, & Lemme, 2006). Victims might appear weak because they are physically smaller in size, have a disability, are perceived as different, or have fewer friends. Approximately 13% to 30% of students ages 11 to 18 years old report experiencing bullying victimization (Nansel et al., 2001, 2004; Robers et al., 2013; Storch & Masia-Warner, 2004; World Health Organization, 2012; Ybarra, Boyd, Korchmaros, & Oppenheim, 2012).

Involvement in bullying through victimization is associated with a host of negative consequences including an increased likelihood of developing internalizing symptomology (e.g., anxiety, depression) when compared to perpetrators or uninvolved youth (Menesini, Modena, & Tani, 2009). More specifically, research found that victimized youth are at risk for elevated levels of depression and anxiety (Hawker & Boulton, 2000; Swearer, Collins, Fluke, & Strawhun, 2012; Swearer, Song, Cary, Eagle, & Mickelson, 2001), experience poorer physical

health (Gini & Pozzoli, 2013; Knack, Jensen-Campbell, & Baum, 2011), and have low levels of self-esteem (Dukes, Stein, & Zane, 2010; Espelage & Holt, 2001; Hawker & Boulton, 2000). Academically, bullying victimization is linked to school-related negative outcomes such as decreased academic performance (Juvonen, Wang, & Espinoza, 2011; Wei & Williams, 2004; Woods & Wolke, 2004), absenteeism (Beran & Li, 2008; Ybarra, Diener-West, & Leaf, 2007), and negative attitudes toward school (Meland, Rydning, Lobben, Breidablik, & Ekeland, 2010; Rueger & Jenkins, 2014).

Perpetrator/Bully. Youth who are considered perpetrators or bullies are those who report bullying others but not experiencing victimization. Perpetration is associated with a variety of individual factors such as callous-unemotional traits (Viding, Simmonds, Petrides, & Frederickson, 2009), conduct problems (Cook, Williams, Guerra, Kim, & Sadek, 2010), aggression and anger (Espelage & Holt, 2001; Golmaryami et al., 2016; Walter & Espelage, 2017), delinquency and criminality (Olweus, 1993; Ttofi, Farrington, Losel, & Loeber, 2011) and moral disengagement (Campaert, Nocentini, & Menesini, 2017; Thornberg, Pozzoli, Gini, & Jungert, 2015). According to Nansel and colleagues (2001), like victims, perpetrators are more likely to experience poorer levels of psychosocial adjustment when compared to uninvolved peers. Perpetrators are also more likely to report significant physical health problems (e.g., headaches, stomachaches) when compared to uninvolved youth (Srabstein et al., 2006). Studies have linked bullying perpetration to anxiety and depression (Baldry, 2004), social withdrawal (Bender & Losel, 2011), poor academic achievement (Ma, Phelps, Lerner, & Lerner, 2009), and an adult diagnosis of antisocial personality disorder (Copeland et al., 2013).

Bully-Victims. Youth who are considered bully-victims are those who move in and out of bullying roles. In one context or time, they perpetrate but are victimized in another. For instance,

a bully-victim might be victimized at school by an older student, but they bully a younger, weaker peer in their neighborhood. Compared to pure bullies and pure victims, bully-victims tend to experience the worst outcomes. Bully-victims have been described as "reactive victims" (Olweus, 1993) and are at risk for internalizing issues typically associated with victimization as well as externalizing issues that are characteristic of perpetration (Marini, Dane, Bosacki, & YLC-CURA, 2006). Researchers theorize that bully-victims appear to have a compounded negative impact of bullying from experiencing both victimization and perpetration (Swearer & Hymel, 2015). The bully-victim group is specifically at risk for developing conduct disorder, anxiety disorders, mood disorders, low self-esteem, suicidal ideation, suicidal behaviors, and substance abuse (Leanne, Cross, Shaw, & Dooley, 2012; Marini, Dane, Bosacki, & YLC-CURA, 2006). The bully-victim role is also are at greater risk for negative school-related outcomes such as absenteeism, poor perceptions of school safety, and poor perceptions of teacher support (Berkowitz & Benbenishty, 2012).

Bystanders. Individuals who witness bullying rather than personally experiencing bullying through perpetration or victimization are considered bystanders (Salmivalli, 2010). They make up the largest group of students involved in bullying with approximately 66% of students who reported observing bullying in their lifetime (Smith & Shu, 2000; Trach, Hymel, Waterhouse, & Neale, 2010). Most bullying incidents occur in the presence of bystanders, leading researchers to believe that bullying is a group phenomenon, likely requiring whole-school, universal approaches to prevention and intervention (Craig & Pepler, 1997; Polanin, Espelage, & Pigott, 2012). Bystanders have a distinct role in the bullying dynamic and should be distinguished from uninvolved youth given their associated negative outcomes and their potential to reinforce bullying behaviors (Rivers & Noret, 2010; Rivers, Poteat, Noret, & Ashurst, 2009).

Witnessing bullying puts people at risk for variety of negative mental health outcomes such as depression, anxiety, substance use, and feelings of inferiority (Rivers et al., 2009). Even controlling for those who were involved in bullying through perpetration or victimization, bystanders still reported significantly higher levels of these negative outcomes when compared to uninvolved youth (Rivers et al., 2009), suggesting that witnessing bullying has deleterious outcomes as well.

Uninvolved. Individuals who report no involvement in bullying through any of these roles (i.e., victim, perpetrator, bully-victim, bystander) are considered uninvolved (Rivers & Noret, 2010). Individuals who are not involved in bullying have better outcomes than youth who endorse witnessing bullying (Rivers et al., 2009) or experience it through victimization, perpetration, or both (Menesini et al., 2009). Researchers found that students who were uninvolved report more positive views toward school staff and viewed their school as more open and welcome to diversity when compared to students who were involved in bullying as a bully, victim, or bully-victim (Berkowitz & Benbenishty, 2012; Rueger & Jenkins, 2014; Wei & Williams, 2004).

Predictors of bullying involvement. The social-ecological framework helps researchers understand the contexts and conditions that maintain bullying behavior. Knowing the variables that predict bullying involvement will help prevention and intervention efforts to ameliorate bullying. It is important to understand what makes youth more likely to engage in bullying behavior, so that practitioners can decrease the likelihood of perpetration. Research about whether gender is a predictor for bullying involvement in inconclusive. DeSmet and colleagues (2018) found no gender differences in bullying victimization and perpetration among youth who were 12 to 18 years old. In contrast, other researchers found that males were more likely to be

involved in bullying via perpetration and victimization when compared to females (Smith, Lopez-Castro, Robinson, & Gorzig, 2018). Smith and colleagues (2018) found that this gender difference in involvement decrease in mid-adolescence. Researchers found that males were more likely to engage in cyberbullying in response to being bullied online and after experiencing high levels of anger rumination (Zsila, Urban, Griffiths, & Demetrovics, 2018). Females were more likely to engage in cyberbullying in response to experiencing repeated traditional bullying victimization (Zsila et al., 2018).

Predictors of bullying perpetration. Predictors of bullying perpetration should be examined at all levels (e.g., individual, peer, family, community, school, society) of the social-ecological framework of bullying. Aggressive youth are more likely to engage in bullying and it is likely learned through modeling (Bandura, 1978) where violence and aggression may be a part of their daily lives either at home (e.g., witnessing domestic abuse, experiencing victimization from neighbors) or in their community (e.g., gang violence, criminal activity; Baldry, 2003). Punitive and unsupportive parenting types (i.e., parent-child conflict, low supportive parenting) as well as physical discipline (i.e., corporal punishment) are predictors of bullying perpetration (Baldry & Farrington, 2000). Also, youth who are emotionally reactive and rely on emotionally-orientated coping skills rather than problem-solving coping skills are more likely to engage in aggressive behavior (Baldry & Farrington, 2005). Some variables predicting perpetration also predict victimization; however, there are differences in the conditions that perpetuate bullying victimization and they warrant examination.

Predictors of bullying victimization. It is also important to understand the variables related to victimization that make youth more likely to be targets of bullying. There are several risk factors at multiple levels including individual, peer, and family. One of the most common

findings is that youth who are considered physically different or weaker than their peers are more likely to be victimized (Frisén, Jonsson, & Persson, 2007; Olweus, 1993; Rigby, 2002; Swearer & Cary, 2003). Other ways that youth might be considered different is if they have a physical or cognitive disability or if their weight status varies from healthy standards and is different from societal expectations. Researchers found an association between increased bullying victimization and disability status (Rose, 2011; Swearer, Wang, Maag, Siebecker, & Frerichs, 2012) as well as increased victimization for youth considered obese or overweight (Puhl & Latner, 2007) and underweight or born with very low birth weight (Grindvik et al., 2009).

Outcomes of bullying involvement. Bullying roles and types have been clearly delineated and explicated in the extant literature, but outcomes of bullying perpetration and victimization are complicated because of the dynamic process, fluidity, and variability of bullying experiences and involvement (Swearer & Hymel, 2015). It is undeniable that involvement in bullying is a negative life event, associated with negative outcomes that are related to psychological health, academic performance, and physical health. Neurological changes and dysregulations are associated with bullying victimization. Researchers found that youth who endorsed bullying victimization have a dysregulated response to stress and experience victimization similarly to pain (Vaillancourt, Hymel, & McDougall, 2013). Other neurological changes linked to victimization include changes in cortisol levels (Vaillancourt, Duku, Decatanzaro, Macmillan, Muir, & Schmidt, 2008) and an increase in CRP, which is a protein associated with chronic illness and inflammation (Copeland et al., 2014). Furthermore, bullying involvement puts youth at higher risk for developing comorbid psychological issues such as depression (Wolke, Lereya, Fisher, Lewis, & Zammit, 2013) and anxiety (O'Brennan, Bradshaw, & Sawyer, 2009). It is related to negative self-thoughts, loneliness, low self-esteem, and social

marginalization (Grindvik et al., 2009; O'Moore & Kirkham, 2001; Roland, 2002). Youth who are involved in bullying are more likely to experience health issues as well psychosomatic symptoms when compared to uninvolved youth (Srabstein et al., 2006; Wolke et al., 2013). Bullying involvement is also related to externalizing psychopathology such as conduct issues, violent convictions, and an increased likelihood of engaging in dating aggression.

Internalizing Psychopathology

Child psychopathology is assessed and classified into specific, well-researched childhood disorders. Concerns that cause impairment to individuals' daily functioning can be categorically classified and dimensionally classified. The Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5; APA, 2013) is a diagnostic system used to categorically classify problematic, impairing behavior. Dimensional classification refers to specific traits and characteristics of behaviors, which are commonly identified through the traditional two-dimensional taxonomy (i.e., internalizing behavior, externalizing behavior) of child psychopathology (Shaw, Keenan, Vondra, Delliquardi, & Giovannelli, 1997; Tandon et al., 2009). Internalizing problems tend to include concerns of anxiety, depression, somatic symptoms, and withdrawn behavior. In contrast, externalizing problems refer to overt behaviors such as aggression, delinquency, impulsivity, and overactivity (APA, 2013). Although some researchers debate one classification over the other, a growing consensus is that a combined approach is most appropriate (Pickles & Angold, 2003). According to the DSM-5, internalizing disorders are characterized by depressed mood and anxiety, as well as the related physiological and cognitive symptoms (APA, 2013).

Across the lifespan, anxiety and depression make up the most common psychological concerns (Beesdo, Knappe, & Pine, 2009; Kessler, Chiu, Demler, & Walter, 2005); however,

youth are typically referred more for externalizing behaviors than internalizing behaviors because externalizing concerns are overt and more readily seen by adults. Parents are typically poor reporters of youth's internalizing problems, so relying on youth to report their internalizing experiences is important (Grills & Ollendick, 2003). However, individuals younger than nine years old might not have the cognitive or affective abilities to identify their thoughts and feelings. Approximately 20% of youth from the United States are expected to experience an anxiety disorder (Beesdo et al., 2009) as well as a major depressive episode before reaching age of legal majority (Lewinsohn et al., 1993). Internalizing issues (i.e., anxiety, depression) are associated with impairments in functioning in the areas of social and peer problems (Forbes, Fitzpatrick, Magson, & Rapee, 2018; Qualter, Brown, Munn, & Rotenberg, 2010), intellectual and academic functioning (Guyer, Chaote, Grimm, Pine, & Keenan, 2011; Snyder, 2013), negative self-esteem (Cantwell, Muldoon, & Gallagher, 2015; Hankin & Abramson, 2001), cognitive biases and distortions (Hankin, Gibb, Abela, & Flory, 2010; Lakdawalla, Hankin, & Mermelstein, 2007), family problems (Cummings, Koss, & Davies, 2015; Kovacs, 1997; Machell, Rallis, & Esposito-Smythers, 2016; Sheeber, Davis, Leve, Hops, &Tildesley, 2007), and increased risk for suicidal behavior (Dervic, Brent, & Oquendo, 2008; Kodish et al., 2016; Machell et al., 2016).

Internalizing issues are also associated with bullying involvement (Blood & Blood, 2007; Card, Isaacs, & Hodges, 2007; Espelage & Holt, 2001; Kodish et al., 2016). The relationship between bullying and mental health issues for both bullies and victims is well-established (Card, Isaacs, & Hodges, 2007; Copeland, Wolke, Angold, & Costello, 2013; Craig, 1998; Espelage & Holt, 2001; Graham & Juvonen, 1998; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999). However, the causal relationship between internalizing psychopathology and

bullying victimization and perpetration is unclear. Developmental pathways, the diathesis-stress model, and social ecological theory help researchers understand the dynamic processes that account for the course and nature of normal and abnormal development (Pickles & Hill, 2006). Two important concepts, multifinality and equifinality (Ciccheitti & Rogosch, 1996) help disentangle how life experiences can affect childhood development. Multifinality refers to situations in which similar early experiences (e.g., bullying victimization) lead to different outcomes (e.g., anxiety, depression, eating disorder, obesity) and equifinality is the reciprocal, where different factors (e.g., overweight, appear different, low self-esteem, victimization) lead to a similar outcome (e.g., depression, anxiety; Ciccheitti & Rogosch, 1996; Luyten, Vliegen, Van Houdenhove, & Blatt, 2008).

Depression. Although depression is quite rare in young children (1% to 3%; Bufferd, Dougherty, Carlson, Rose, & Klein, 2012; Egger & Angold, 2006), the risk for developing depression is increasing and the age of onset is steadily decreasing. Those who experience depression tend to report feelings of loneliness, withdrawal, sadness, anger, hopelessness, and worthlessness (Graham & Juvonen, 1998; Kaltiala-Heino, Rimpela, Marttunen, Rimpela, & Rantanen, 1999). Individuals who experience depression often have difficulties in their relationships as well as intrapersonal issues such as problem-solving, distorted thinking, loss of appetite, fatigue, insomnia, irritability, and suicidal ideation (Friedberg & McClure, 2002). An important quality of depression includes a negative cognitive style, characterized by youth having negative perceptions about themselves, the world, and their future (Beck, Rush, Shaw, & Emery, 1979).

The development of depression can be understood through experiencing stressful life events (e.g., parental loss, social issues, family illness, mobility, parental conflict, bullying),

which can serve as an antecedent of depressive symptoms (Hammen, 2016; Hammen & Rudolph, 2003; Rudolph, Hammen, & Daley, 2006). Depending on individual vulnerabilities and additional negative life events, a cyclical pattern can form in which a person experiences continued life stressors and additional depressive symptoms (Hammen, 2016; Patthoff, Holahan, & Joiner, 1995). Common stressors that are related to depression include events related to relationships with friends, physical health, threats to self-esteem, and rejection (Birmaher et al., 1996; Cantwell et al., 2015; Eley & Stevenson, 2000), all of which can be impacted through bullying.

Depression and bullying involvement. Considering the significant, bi-directional (Arseneault, Bowes, & Shakoor, 2010) relationship between depression and bullying involvement (Kaltiala-Heino et al., 2000; Kodish et al., 2016; Swearer et al., 2001) as well as bullying victimization and suicide (Copeland et al., 2013; Dervic et al., 2008; Kodish et al., 2016), bullying should be conceptualized as a stressful life event. Researchers found that involvement in bullying, whether as a victim, perpetrator, or both, is related to experiencing depressive symptoms (Austin & Joseph, 1996; Gini & Pozzoli, 2008; Wolke et al., 2013). Youth experiencing bullying victimization tend to report higher levels of depression and psychosomatic issues when compared to those whom perpetrate bullying (Menesini et al., 2009; Juvonen, Graham, & Schuster, 2003; Veenstra, Lindenberg, Oldehinkel, Winter, & Verhulst, 2005). Youth who have experienced bullying through both victimization and perpetration (i.e., bully-victims) are the most at-risk role on the bullying continuum (Graham, Bellmore, & Mize, 2006; Nansel, Haynie, & Simons-Morton, 2003; Swearer et al., 2009).

Researchers found that victims, when compared to non-victims, reported higher levels of depression (Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Hawker & Boulton,

2000) and suicidal ideation (Klomek et al., 2007; Kim, Koh, & Levanthal, 2005; Mills, Guerin, Lynch, Daly, & Fitzpatrick, 2004; Reed, Nugent, & Cooper, 2015). However, results are inconsistent given that researchers also found that bully-victims were at the highest risk for experiencing suicidal ideation when compared to pure victims and pure bullies (Kaltiala-Heino et al., 1999; Klomek et al., 2007). Klomek and colleagues (2007) found that all types of bullying victimization were related to depression and suicidality and that as the frequency of victimization increased, so did the risk for depression and suicidality.

Hopelessness and learned helplessness are key characteristics predictive of depression and they have also been linked to victimization (Seligman, 1974; Swearer et al., 2011). Learned helplessness has been described as a passive coping style in which youth are less likely to make interpersonal and intrapersonal changes to stressful life situations, furthering the negative depressive cycle (Abramson, Metalsky, & Alloy, 1989; Swearer et al., 2011; Swearer et al., 2001).When youth experience negative life events that feel out of their control, it results in feelings of hopelessness and helplessness.

Anxiety. The prevalence of anxiety disorders in childhood is the highest of all diagnosed mental health issues in children and adolescents (Beesdo, Knappe, & Pine, 2011; Costello & Angold, 1995). Anxiety is a common emotional state and a mood experienced by all individuals. In specific situations and at certain ages, anxiety is expected and normal. An appropriate level of anxiety promotes effective and efficient thinking. When anxiety is not experienced in excessive amounts or chronically, it is an adaptive emotion. However, too much or too little anxiety can be damaging for youth (Mash & Wolfe, 2016). Anxiety is considered disordered when individuals anticipate danger or threat and feel strong, negative, impairing emotions and bodily symptoms

(e.g., tension, nausea, heart palpitations; Barlow, 2002). Anxiety is disordered when it is experienced in disproportionate amounts and causes life impairment.

To fully understand anxiety, researchers argue that taking a developmental psychopathology perspective is important. Solely using one theory is insufficient at explaining the complexity of anxiety. Important interacting areas include biological and environmental contexts such as child temperament, genetic vulnerability, neurobiological factors, and family influences and risk factors (Gregory & Eley, 2007; McClure & Pine, 2006; Monk, 2008). Negative life events are also related to the onset and maintenance of anxious symptomology. Those who experience anxious symptoms tend to perceive the world as a threatening place, which invokes emotions of worry and fear (Beck, Emery, & Greenberg, 1985). Common characteristics and outcomes of anxiety disorders are cognitive disturbances, physical symptoms, social and emotional deficits, depression, and social avoidance (Craig, 1998; Espelage & Holt, 2001).

Having an anxiety disorder in childhood is one of the strongest predictors for having other mental health issues later in life (Kessler et al., 2012). When youth experience anxiety disorders that persist into adulthood, they are more likely to have relationship issues and develop other mental health issues such as depression. Individuals with anxiety disorders are more likely to perceive themselves as shy and socially withdrawn. Anxious youth also report lower self-esteem, more loneliness, and more difficulty initiating and maintaining friendships when compared to peers without anxiety disorders. Unfortunately, these characteristics may predispose youth for negative social interactions such as bullying.

Anxiety and bullying involvement. Researchers found that youth who were described as insecure, cautious, anxious, and quiet were common targets of bullying victimization (Espelage

& Holt, 2001; Olweus, 1993). In fact, researchers found that individuals who experienced bullying victimization reported high levels of anxious symptomology (Blood & Blood, 2007; Eastman et al., 2018). It is clear that an association between anxiety and bullying involvement exists (Blood & Blood, 2007; Eastman et al., 2018; Olweus, 2003; Totura, Karver, & Gesten, 2014; Ybarra, Espelage, & Mitchell, 2014).

Some youth who experience bullying respond passively while others respond aggressively; however, all involved individuals report higher levels of anxiety than uninvolved youth, highlighting that bullying is a negative life event. Researchers hypothesized that passive victims of bullying might fear social evaluations and respond to victimization by isolating and avoiding social situations. On the other hand, aggressive victims of bullying might fear physical harm and respond defensively with aggression to victimization. This defensive response can result in revenge bullying, placing youth in the bully-victim role, which is the most common and most impaired group along the bullying continuum (Graham et al., 2006; Nansel et al., 2003). Out of all the bullying roles, researchers found that bully-victims and victims were most consistently self-reporting higher rates of anxiety when compared to other people involved in bullying (Craig, 1998; Duncan, 1999a; Gámez-Guadix, Gini, & Calvete, 2015; Kumpulainen et al., 1998; Swearer et al., 2001).

The diathesis-stress model is a psychological theory that can help explain why youth involved in bullying are more likely to be diagnosed with anxiety and/or depression when compared to those who have not been victimized. Bullying, a stressful life event, serves as a catalyst to developing internalizing symptomology. The association between bullying and anxiety can also be understood through a developmental context, in which the vicious cycle of bullying exacerbates psychological issues such as anxiety and futher perpetuates bullying

(Rigby, 1996; Salmivalli, Karhunen, & Lagerspetz, 1996; Swearer et al., 2001). When individuals experience bullying, it may lead to heightened anxiety and increased somatic complaints, illness, and absenteeism, making victimized youth stand out from their peers. As bullying continues and social situations become increasingly difficult, youth engage in increased avoidant- and escape-maintained behavior, negatively reinforcing their fears and making them even more vulnerable to bullying and developing internalizing psychopathology (Swearer et al., 2001).

Summary

Youth weight status is an increasingly important topic due to the prevalence of obesity as well as the associated risks and outcomes of youth who are underweight, overweight, and obese (CDC, 2016; Grindvik et al., 2009; WHO, 2000). Weight stigma is pervasive in the United States and those who appear different from their healthy-weight peers are at increased risk for stigmatization, weight-related victimization, and discrimination (Browne, 2012). Youth who are considered physically different or weaker (Swearer & Cary, 2003) and who are emotionally reactive and have poor problem-solving skills are more likely to engage in aggressive behavior such as bullying (Baldry & Farrington, 2005).

The social-ecological framework helps to break down the complex, dynamic process of bullying (Cairns & Cairns, 1994; Swearer & Doll, 2001; Swearer & Espelage, 2004), while the diathesis-stress model helps disentangle the relationship between biological vulnerabilities (e.g., unhealthy weight status), environmental stressors (e.g., bullying), and experiencing internalizing psychopathology (Swearer & Hymel, 2015). This model helps researchers understand how underweight, overweight, and obese youth might come to develop internalizing psychopathology such as depression and anxiety and how that relationship varies by exposure to stressors such as

bullying (Cicchetti & Toth, 1998; Lazarus, 1993; Swearer & Hymel, 2015). A combined social-ecological diathesis-stress model might be useful when explaining the relationship between an unhealthy weight status, bullying involvement, and internalizing psychopathology. Researchers have yet to test the applicability of this integrated model to understand and address the complexities of bullying and its related outcomes. The current study sought to address this gap in the literature by testing the moderating effects of bullying involvement on the relationship between an unhealthy weight status and internalizing psychopathology. More specifically, if moderating effects exist, bullying involvement would exacerbate the relationship between unhealthy weight statuses and internalizing symptomology when compared to those with unhealthy weight statuses who do not experienced bullying involvement.

Research Questions and Hypotheses

Based on a literature review of the diathesis-stress model, weight stigma, and social ecological theory and empirical research on bullying- and weight-related issues, this study aimed to examine the complex relations between weight status, bullying involvement, and internalizing symptomology. Specifically, this study examined the following research questions and hypotheses:

1. Is there a significant relationship between involvement in the bullying dynamic (i.e., involved, uninvolved) and weight status (i.e., underweight, healthy weight, overweight, obese)?

Hypothesis 1a: Youth involved in bullying, irrespective of role, will be more likely to fall in the obese, overweight, and underweight statuses than uninvolved participants.

Hypothesis 1b: Participants uninvolved in bullying will be more likely to fall in the healthy weight status.

2. Do underweight, overweight, and obese youth report higher levels of depressive symptomology when compared to healthy weight youth?

Hypothesis 2: Youth who are underweight, overweight, and obese will report higher levels of depressive symptomology compared to healthy weight youth.

3. Do underweight, overweight, and obese youth report higher levels of anxious symptomology when compared healthy weight youth?

Hypothesis 3: Youth who are underweight, overweight, and obese will report higher levels of anxious symptomology when compared to healthy weight youth.

4. After controlling for age, parental income, and race, do weight status (i.e., underweight, healthy weight, overweight, obese), bullying involvement (i.e., involved, uninvolved), weight-based victimization endorsement (i.e., yes or no), and gender (i.e., female, male) have a significant impact on internalizing symptomology (i.e., anxiety, depression)?

Hypothesis 4: There will be a significant multivariate main effect for weight status, bullying involvement, weight-based victimization, and gender on internalizing symptomology, after controlling for age, parental income, and race.

5. For females, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on anxious symptomology?

Hypothesis 5: For females, bullying involvement will moderate the effect of weight status on anxious symptomology.

6. For males, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on anxious symptomology?

Hypothesis 6: For males, bullying involvement will moderate the effect of weight status on anxious symptomology.

7. Does the relationship among weight status, bullying involvement, and anxious symptomology vary for males and females?

Hypothesis 7: The relationship among weight status, bullying involvement, and anxious symptomology will differ for males and females.

8. For females, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on depressive symptomology?

Hypothesis 8: For females, bullying involvement will moderate the effect of weight status on depressive symptomology.

9. For males, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on depressive symptomology?

Hypothesis 9: For males, bullying involvement will moderate the effect of weight status on depressive symptomology.

10. Does the relationship among weight status, bullying involvement, and depressive symptomology vary for males and females?

Hypothesis 10: The relationship among weight status, bullying involvement, and depressive symptomology will differ for males and females.

CHAPTER 3

METHODS

Participants

Data for the current study were collected as part of a larger study examining bullying victimization and perpetration and physical health issues, which was approved by the University of Nebraska—Lincoln Institutional Review Board (IRB #11846; Appendix A). Given that original raw were available and contained identifiable information, the current study required review and was approved by the UNL IRB (#17346; Appendix B). In the original study, parental consent and participant assent were required for participation. Parental consent and participant assent were not required for the current study as no new data were collected and no identifying information from the original raw were accessed. Only data from adolescent participants were included in this study, with the exception of the demographic variable of income, which was measured by a self-report description of maternal and paternal income. The age demarking adolescence was determined by the World Health Organization's (2014) definition of adolescence comprising individuals who are 10 to 19 years old. Participants were included in the original study if English was their primary language.

The sample included 376 participants who were 11 to 18 years of age (M = 13.05, SD = 1.96) and were recruited from a total of five pediatric primary care offices in a mid-sized Midwestern city. The sample consisted of 193 females (51.3%) and 183 males (48.7%). The grade distribution of all the participants was 84 (22.6%) 6th graders, 87 (23.4%) 7th graders, 66 (17.7%) 8th graders, 39 (10.5%) 9th graders, 20 (5.4%) 10th graders, 30 (8.1%) 11th graders, 18 (4.8%) 12th graders, 28 (7.5%) other, and 4 (1.1%) did not report their grade. Other consisted of 4th graders (.3%), 5th graders (6.4%), and college freshman (1.2%). Self-reported race

distribution was consistent with the ethnic distribution of the area where participants were recruited. The sample consisted of 330 (88.2%) White/European American, 17 (4.5%) Biracial, 5 (1.3%) Black/African American, 7 (1.9%) Latino/Hispanic, 6 (1.6%) Native American, 6 (1.6%) Asian, 2 (.5%) Middle Eastern, 2 (.5%) did not report, and 1 (.3%) Multiracial Other.

Instrumentation

Demographic variables. Self-reported and clinic-reported demographic variables were collected through questionnaires and medical record reviews. Clinic-reported variables were obtained through medical record reviews in the original study using the clinics' electronic medical system. Self-reported variables were obtained using the Bully Survey—Student Version (BYS-S; Swearer, 2001), which are located at the end of the BYS-S questionnaire. Demographic variables in the original study included age, weight, height, body mass index, gender, race, grade, academic grades, and parental income. Variables used in the current study include age, body mass index, gender, race, grade, and parental income.

Weight status. Participants' weight status was measured by body mass index (BMI), BMI percentiles, and weight categories (i.e., underweight, healthy weight, overweight, obese; CDC, 2014). In the original study, a medical record review was conducted to obtain information on BMI, height, and weight. If participant BMI was not provided during the medical record review, the previous researchers calculated BMI for participants using their height and weight and the BMI formula provided by Centers for Disease Control, which is body mass divided by height^2 (kg/m^2; CDC, 2014). In the current study, weight status was measured in various ways (i.e., continuous, categorical), which depended on analytic strategy (i.e., Chi Square, ANOVA, moderated multiple regression). BMI is a validated indicator for individuals in the age range of 2 and 19 years old (Mei et al., 2002) and is correlated with levels of body fat and is an accurate

predictor of overweight and obesity in adulthood (Barlow, 2007). Weight status was also measured by four difference categories, which are determined by BMI and defined by the Center for Disease Control growth charts. The CDC defines obesity in youth as a BMI of greater than or equal to the age- and sex-specific 95th percentile (CDC, 2015). Individuals were considered overweight if their BMI was equal to or within the range of the 85th to 94th percentile. Youth were considered normal- or healthy-weight if they were equal to or within the range of the 5th to 84th percentile and individuals considered underweight had a BMI that was less than the 5th percentile (CDC, 2015). Although BMI is not a direct measure of fatness (Barlow, 2007), it is an established gauge of weight. BMI is often used as a screener and a way to monitor progress for physicians; therefore, it was an appropriate indirect measure of weight for this current study.

Bullying experiences. There is no standardized, universal measurement system that researchers rely on to assess bullying involvement (Card & Hodges, 2008). Researchers have yet to identify the most reliable way to assess those involved in bullying as well as the severity and chronicity of their experiences (Cornell & Cole, 2012; Swearer et al., 2010). However, the most common way to assess bullying involvement is through self-report questionnaires (Espelage & Swearer, 2003; Furlong, Sharkey, Felix, Tanigawa, & Grief-Green, 2010; Swearer, Siebecker, Johnsen-Frerichs, & Wang, 2010). In fact, self-report assessment is considered the most reliable source of bullying involvement information (Berger, 2007; Grindvik et al., 2009). Most researchers support including a definition in the measure to reduce ambiguity (Cornell & Bandyopadhyay, 2010; Ybarra et al., 2012). Further supporting this idea, Vaillancourt and colleagues (2008) found that when they omitted a bullying definition, youth self-reported higher rates of bullying victimization. Anonymous self-report measures are beneficial because they assess covert instances of bullying involvement that might be unknown to peers, teachers, and

caregivers (Crothers & Levinson, 2004). Self-report questionnaires can also assess the multiple roles and forms of bullying involvement, given that most youth move in and out of roles and experience multiple types of bullying (Card & Hodges, 2008; Swearer et al., 2009). The current study assessed bullying involvement with the Bully Survey—Student Version (BYS-S; Swearer, 2001), which utilizes is a self-report format and includes a definition of bullying. Literature has shown it to be a valid measurement of bullying involvement.

Bully Survey—Student Version (BYS-S; Swearer, 2001; Appendix C). For the current study, bullying involvement was measured by involvement in the bullying dynamic (i.e., involved, uninvolved). Participants who self-reported involvement in bullying could have bullying roles of victim, perpetrator, or bullying-victim. Bullying involvement data were obtained through the BYS-S (Swearer, 2001), which is a 41-item, four-part questionnaire about participants' experience with bullying. The current study solely used the initial victimization and perpetration items of the BYS-S; therefore, characteristics of the remaining parts of the survey are not discussed. Part A queried about victimization and Part B asked about perpetration. To assess bullying involvement, the victimization (Part A) and perpetration (Part B) scales were used. At the beginning of the victimization scale (Part A), participants were asked, "Have you been bullied this school year?" In Part B of the perpetration scale, participants were asked, "Did you bully anyone this year?" For both questions, participants were instructed to answer, "*yes* or *no*." In the original study, participants completed the entire questionnaire which has seven items that assess verbal bullying and four items that assess physical bullying within Part A and Part B. It also contains two other parts (Part C and Part D) that assess bystander experiences and attitudes about bullying. In the original study, participants were instructed to skip Part A, B, or C if it did not pertain to them. For example, if participants reported no victimization in the current

academic year in Part A, they were instructed to, "*If you have not been bullied this year, you may move onto Part B.*"

Prior to completing Part A and Part B in the BYS-S, participants were primed with a definition of bullying similar to the CDC definition, which includes characteristics such as perceived imbalance of power, repetition, causing harm or distress, and unwanted aggressive behavior. The purpose of providing the definition was to ensure that participants' responses were related to bullying specifically rather than any aggressive behavior or teasing that might not qualify as bullying. Bullying was defined in the questionnaire as, "Bullying happens when someone hurts or scares another person on purpose and the person being bullied has a hard time defending himself or herself. Usually, bullying happens over and over (Swearer, 2001)." Specific examples were provided after the definition and included, "punching, shoving, and other acts that hurt people physically; spreading bad rumors about people; keeping certain people out of a group; teasing people in a mean way; and, getting certain people to 'gang up' on others."

The BYS-S has a history of being a reliable measure of bullying experiences. The BAS (Part D) has acceptable internal consistency reliability using coefficient alpha. Previous research has reported it to range from .71 (Swearer, Turner, Givens, & Pollack, 2008) to .75 (Haye, 2005). Swearer and colleagues (2008) reported internal consistency of .87 for the victimization scale in Part A. For the current study, internal consistency reliability using coefficient alpha was not calculated because bullying involvement was created from a single-item question (i.e., *yes* or *no*)

Internalizing symptomology. The current body of literature on self-reported internalizing symptomology is limited because it mostly relies on parent/caregiver report of child psychological functioning, which might under- or overestimate internalizing symptoms (Grills & Ollendick, 2002, 2003; Storch et al., 2007; Zeller, Saelens, Roehrig, Kirk, & Daniels, 2004). Few

studies have used psychometrically sound and valid measurement systems to examine the relationship between bullying involvement and internalizing symptomology (Storch et al., 2007). Additionally, most studies have a limited range of adjustment variables, making a more comprehensive assessment of internalizing symptomology necessary (Storch et al., 2007).

The Children's Depression Inventory-Short (CDI-S; Kovacs, 1992; Appendix C). The Children's Depression Inventory (CDI) is one of the most frequently used self-report assessments to measure depressive symptomology for children and adolescents who are seven to 17 years old (Kovacs, 1992; Kovacs & Beck, 1977). It was designed as a screening measure and has proven to be a valid screening instrument for depression in medically ill youth (Allgaier et al., 2012). The CDI-S uses a three-point scale to assess whether people's perceptions of their cognition, affective, and behavioral symptoms related to depression are absent, within normal limits, or significant. Participants were asked to rate the severity of an item on a three-point scale from 0 to 2 during the two weeks prior to assessment. Items on the CDI-S are summed to reach a total depressive symptom score. Raw scores range from 0-20 and are converted T-scores, which is a standardized test statistic that allows an individual's score to be compared to norms and other individuals' scores. CDI-S T-scores range from 0-100. While calculating T-scores for CDI-S, missing data ($N = 148$) were found for item three on the CDI-S, resulting in missing data when computing the variable for the CDI-S T-score. The CDI-S has a history of acceptable construct validity and reliability with Cronbach's α ranging from .71 to .89 and test-retest coefficients ranging from .74 to .83 (Craighead, Smucker, Craighead, & Ilardi, 1998; Kovacs, 1992; Storch et al., 2007). Researchers found a significant positive relationship between the CDI and the CDI-S (Allgaier et al., 2012; Houghton, Cowley, Houghton, & Kelleher, 2003) and support the CDI-S as an effective and efficient screener for assessing depressive symptomology. In the current

study, the internal consistency reliability for the CDI-S using coefficient alpha was .86, suggesting high internal consistency of the measure.

CDI-S item three missing data. For item three on the CDI-S, participants were instructed to read a group of three sentences and asked to, "pick one sentence that describes you BEST for the past two weeks." The sentences that participants were asked to select from included, "*I do most things O.K.*; *I do many things wrong.*; *I do everything wrong.*" To account for the 148 (43.27%) participants with a missing CDI-S item three score and T-score, reasons for missingness and methods of dealing with missing data were researched. A one-way ANOVA was used to assess difference between missing data and method of participation. Results indicated significant differences in method of participation and missing data $F(1, 374) = 447.77$, $p = .000$. A visual analysis of the CDI-S item three data indicated that participants who had missing data from item three were those who participated in the study via Qualtrics rather than by completing questionnaires via pencil and paper in the office or via pencil and paper and then submitting through the mail. A visual analysis of Qualtrics and the revision history of the surveys indicated that all CDI-S items were included in the original upload and survey template. Additionally, a visual analysis of the dataset on Qualtrics revealed that data were collected for CDI-S item three starting June 29, 2013, which is after the original data collection start date, even though there were no revisions to Qualtrics at that time. According to the Qualtrics revision history, no revisions to the surveys occurred around June 29, 2013. It was undetermined why CDI-S item three was withheld from the published survey on Qualtrics and it appeared that Qualtrics had a technical error and displayed CDI-S item three starting on June 29, 2013.

To help determine type of missingness, participant differences for those with missing data were analyzed. An independent-sample t-test revealed that the CDI-S item three Missing

Data Group (M = 48.39, SD = 11.58) did not differ from CDI-S item three Nonmissing Data Group (M = 43.31, SD = 12.84) on the MASC T-score, $t(356) = 3.84$, $p = .115$. An independent-sample t-test revealed that the CDI-S item three Missing Data Group (M = 61.77, SD = 27.40) did not differ from CDI-S item three Nonmissing Data Group (M = 56.89, SD = 39.65) on the BMI Percentile, $t(354) = 1.54$, $p = .076$. With all of these results together, it can be concluded that data from item three on the CDI-S are missing completely at random (MCAR), which is defined as, "when the probability that data are missing is not related to either the specific value which is supposed to be obtained or the set of observed responses (Kang, 2013, p. 402-403)." An example of MCAR provided by Kang (2013) is if data are missing by design or equipment failure, which would include the current issue of Qualtrics not publishing CDI-S item three until June 29, 2013. According to Kang (2013), if data are missing, it is ideal that they are MCAR because analyses remain unbiased because estimated parameters are not biased by the absence of the data from CDI-S item three.

No firm guidelines exist to determine how much missing data can be tolerated for a given sample size (Tabachnick & Fidell, 2013). However, it is ideal that there are more non-missing item three data than missing item three data, especially when using non-missing data to predict missing data. Methods of dealing with missing data include mean imputation, participant mean imputation, Winer imputation, multiple imputation, and predicting values through multiple regression (Tabachnick & Fidell, 2013). Mean imputation and participate mean imputation are typically not recommended due to the bias produced through this method (Schafer & Graham, 2002). However, these biases have the potential to be relatively small since the remaining items in the CDI-S are highly intercorrelated, meaning that the items have high internal consistency. Another method of dealing with missing data is to use multiple regression to create an equation

to predict and estimate replacement values (Farrell, 1999), which is the method that was used in the current study. The regression analysis revealed that the model significantly predicted CDI3 for missing data, $F(9, 208) = 21.60$, $p = .000$. R^2 for the model was .48 and adjusted R^2 was .46. The equation to predict missing data for CDI-S item three was CDI3Predicted = -0.04 + .165CDI1 + .091CDI2 + .209CDI4 + -.007CDI5 + .055CDI6 + .003CDI7 + .134CDI8 + .071CDI9 + .130CDI10. Predicted values for CDI-S item three were used to create CDI-S Total raw scores. Raw scores were summed to reach a total depressive symptom score with higher scores indicating more severe symptoms. Raw scores ranged from 0 to 20 and were converted to T-scores to determine clinical significance. A T-score greater than 65 indicates clinically significant depressive symptoms (Kovacs, 1992).

The Multidimensional Anxiety Scale for Children-10 (MASC-10; March, 1997; Appendix A). The Multidimensional Anxiety Scale for Children (MASC) is a commonly used self-report measure for individuals ages 8 to 19 years old to assess anxious symptomology (March, 1997). The MASC is a reputable assessment tool and has demonstrated high test-retest reliability with an internal consistency alpha of .83 (March, 1997). The MASC-10 (Appendix C) is a short version of the MASC and was designed to screen for anxiety concerns (March, 1997; Ryann et al., 2006). The MASC-10 is efficient and consists of 10 items that assess general symptoms of anxiety. Youth were asked to rate the severity of each item based on a four-point multipoint scale from 0 ("Never true about me") to 3 ("Often true about me"). Items on the MASC-10 are summed to reach a total anxiety symptom score. Raw scores range from 0-30 and were converted T-scores, which can range from 29-90. The MASC-10 has a history of satisfactory test-retest reliability ($\sigma = 0.82$; March, 1997) and good internal reliability with alpha coefficients ranging from .76 to .81 (Swearer, Collins, Radliff, & Wang, 2011). In the current

study, the internal consistency reliability for the MASC-10 using coefficient alpha was .83, suggesting high internal consistency of the measure.

Procedures

Data for the prior study were collected from 2014 to 2015 from five different primary care physician sites in a Midwestern urban community of approximately 280,000 people. Across all pediatric offices, 376 adolescents completed survey data collection via electronic or paper-and-pencil measures in the office or at home and mailed them in, depending on participant preference. In addition to survey data collection, medical record reviews were conducted in the original study to obtain birthdate, height, weight, BMI, and BMI percentile. In the original study, medical record reviews were conducted on all participants expect four (1.07% of the total sample) because they did not complete a Private Health Information (PHI) Authorization (Appendix B). The investigators in the original study counterbalanced the measures across participants. To safeguard participants' identity, numerical codes were assigned to their responses. In the original study, researchers calculated inter-rater reliability for 25% of the sample to assess the accuracy of data input and had 98.6% agreement across the measures assessing specific variables of interest. All researchers in the original and current study completed the Collaborative Institutional Training Initiative (CITI) training. Risks for the current study were minimal. Identifying information was removed from the dataset during the original study and the current study de-identified electronic dataset was securely stored on a password protected computer.

Analysis Plan

SPSS software (Version 25; IBM Corporation, 2017) was used to answer all statistical analyses and preliminary analyses as well as to understand data missingness, data distribution,

outliers, and normality. Specifically, a visual inspect of the dataset and a one-way ANOVA was used to determine if there were differences in missing data based on participants' method of participation. To ensure appropriate and accurate analysis and interpretation, assumptions of each test were reviewed.

Assumptions. To conduct a chi-square goodness-of-fit test for association the following assumptions must be met: (a) each observation is independent of other participants' response, and (b) a maximum of 20% of the counts can be less than (Yates, Moore, & McCabe, 1999). Neither of these assumptions were violated; thus, a chi-square goodness-of-fit test for association was conducted for Research Question 1 to determine if there was a significant relationship between the bullying dynamic and weight status.

To conduct an independent samples t-test or a one-way analysis of variance (ANOVA), the following assumptions must be met: (a) all observations are independent, (b) variances of each group or approximately equal (i.e., homogeneity), and (c) the dependent variable is normally distributed (Leech, Barrett, & Morgan, 2011). The first assumption was met, because in the original study, the data were independently and randomly sampled. The second assumption was tested by calculating Levene's statistic. The third assumption was tested by analyzing skewness prior to data analysis. To conduct a multivariate analysis of covariance (MANCOVA), the same assumptions of an ANOVA must be met with the addition of the following assumptions: (a) predictor variables should be categorical and outcome variables should be continuous, but covariates can be continuous, ordinal, or dichotomous; (b) outcome variables cannot be correlated more than $r = .90$; and, (c) a statistically significant relationship must exist between covariates and the outcome variable (Tabachnick & Fidell, 2013).

To conduct a hierarchical multiple regression, five key assumptions must be met. Those assumptions include: (a) the relationship between the outcome variable and the predictors is linear; (b) multivariate normality, (c) predictor variables are not highly correlated with each other; (d), no auto-correlation exists; and (e) variance of error terms are similar across all predictor variables (i.e., homoscedasticity). Another basic rule for regression analysis regrading sample size is that at least 20 cases per independent variables must exist in the analysis. None of these assumptions were violated with the exception of anxiety and depressive symptomology T-score non-normality.

Assumptions were tested by examining Levene's test, normal probability plots of residuals, and scatter diagrams of residuals versus predicted residuals. For depressive symptomology, the Levene's test of homogeneity of variances was significant, $F(1, 343) = 10.393$, $p = .001$, indicating that the variance between the groups significantly differed, violating the assumption of homogeneity of variances. For anxious symptomology T-score, the Levene's test of homogeneity of variances was not significant, $F(1, 348) = .003$, $p = .959$, indicating that the variance between the groups did not significantly differ, meeting the assumption of homogeneity of variances. Additionally, the Shapiro-Wilk test for depressive symptomology T-score was statistically significant (.694), $p = .000$, indicating that the assumption of normality was violated. The Shapiro-Wilk test for anxious symptomology T-score was statistically significant (.957), $p = .000$, indicating that the assumption of normality was violated. Overall, violations of normality and homoscedasticity were detected for depressive symptomology. Violations of normality were also detected for anxious symptomology, but the assumption of homoscedasticity was not violated. No violations of linearity were detected. Box plots and standardized values of variables revealed evidence of outliers specifically for depressive

symptomology and anxious symptomology. The assumption of multicollinearity within the anxious symptomology and depressive symptomology was not violated, which was concluded by the relationship between anxious and depressive symptomology being statistically significant and within the range of .20 and .80. A Pearson's product moment correlation below or above that range would indicate that the relationship between the outcome variables is either too weak or too strong.

Response to violating assumptions. To correct for these violations, examining standardized values (i.e., Z scores) of anxiety and depression, Tukey's rule for identifying outliers, and a log transformation were considered (Hoaglin, Iglewicz, & Tukey, 1986; Tukey, 1977). Standardized values of depressive symptomology T-score and anxious symptomology T-score were created and those that were less than -2.68 or greater than 2.68 were flagged as outliers. Additionally, the 25th percentile and 75th percentile Tukey's hinges were calculated for outlier analysis as these hinges have been shown to yield better outlier definitions than the standard percentiles (Hoaglin, Iglewicz, & Tukey, 1986). For depressive symptomology, the upper bound formula was 47 + 1.5(47 – 41), which produced an upper bound of 56. The lower bound formula was 41 – 1.5(47 – 41), which produced a lower bound of 32. With this formula, approximately 33 cases would need to be deleted as 33 cases fell outside the range of 32 to 56. When completing the CDI-S to measure depressive symptomology, the possible range in T-scores is 36 to 100. Given this possible range, it is concerning to restrict the range of scores to truncate outliers in order to meet the assumption of normality. For anxious symptomology, the upper bound formula was 54 + 1.5(54 – 35), which produced an upper bound of 82.5. The lower bound formula was 35 – 1.5(54 – 35), which produced a lower bound of 6.5. With this formula, approximately five cases would need to be deleted as five of the cases fell outside of the range.

The possible T-score range when completing the MASC-10 is 29 to 90. Two scores fell outside the appropriate MASC-10 T-score range and were deleted as they were likely errors. In attempt to meet assumptions to run proposed analyses, these outliers were removed, and analyses were re-conducted to determine if improvements in normality and homoscedasticity were observed. Slight improvements were found with meeting the assumption of homoscedasticity; however, no improvements in meeting the assumption of normality were observed. To correct for the positive skewness of depressive symptomology, a log transformation was conducted. A Base-10 Log transformation is suggested if positive skewness falls within the range of 1.0 to 3.0 and the depressive symptomology T-score skewness was 2.537 (Tabachnick & Fidell, 2013). A Base-10 Log transformation was computed for depressive symptomology in an attempt to conform to proposed analytic assumptions. Analyses were re-conducted and although skewness improved, a Levene's test of homogeneity of variances for depressive symptomology was still statistically significant. Researchers propose that log transformations are not always suitable and might compromise interpretability if data are analyzed on a different scale.

It was determined that non-normality and asymmetric distributions are less of a concern and more of a characteristic of the current study. Depression and anxiety are not normally distributed in the population; therefore, assuming normality in the current study is unlikely. Additionally, measurements systems and ratings forms to assess health status often result in an asymmetric, long-tailed distribution (Counsell, Cortina-Borja, Lehtonen, & Stein, 2011), which was consistent with the distribution of depressive symptomology and anxious symptomology in the current study. Screening questionnaires are common measurement systems that often produce a distribution in which the majority of healthy participants have low values and a few individuals report high values, reflecting certain symptoms, diagnoses, or disorders (Counsell et al., 2011).

For this specific study, it was important to account for the values (i.e., anxiety, depression) that reflect a possible disorder while maintaining the nearly normal distribution of the majority of the participants, which accurately reflect the typical distribution of the general population. Conforming to assumptions is not always appropriate. In certain cases, such as in this current study, violating assumptions is accepted as an inevitable nuisance (Counsell et al, 2011).

Overview of analytic plan. Research questions two and three were addressed with a nonparametric Kruskal-Wallis H test. For research question four, a MANCOVA was conducted to investigate the relationship between weight status, bullying involvement, weight-based victimization, gender, and internalizing symptomology. No nonparametric that is an equivalent alternative to a MANCOVA exists; therefore, a MANCOVA was used for this analysis and the violation of assumptions was considered when interpreting results. Research questions five, six, eight, and nine were addressed with modeling procedures (i.e., hierarchical multiple regression) to investigate the hypothesized indirect and moderating effects. Research questions seven and 10 were investigated using a Z-test to compare raw regression weights of two different group models to determine if the models differed by gender.

CHAPTER 4

RESULTS

Sample Characteristics

The sample in the original study consisted of 448 participants and 74 participants were removed for reasons including: missing all adolescent data (n = 65), outside targeted age range (n = 6), not a patient at pediatrician's office (n = 3). Removing these participants resulted in a total of 376 participants who were included in the final analyses. Table 1 displays the demographic characteristics and frequencies for participants. Gender was distributed evenly in the total sample with 51.3% female and 48.7% male. Participants were between ages 11 to 18 years old, with a mean age of 13.05 years (SD = 1.96). The majority of participants were in grades 6th (22.3%) and 7th (23.1%). The remaining participants were in grades 8th (17.6%), 9th (10.4%), 10th (5.3%), 11th (8%), 12th (4.8%), and Other (7.4%). Participants who endorsed "Other" for grade reported that they were either a freshman in college or in 5th grade. Given that the inclusion criteria for the study was based on age rather than grade, these participants were not excluded from the study. The majority of participants identified their ethnicity/race as White/Caucasian (87.8%) and the remaining participants identified as Biracial (4.5%), Latino/Hispanic (1.9%), Asian (1.6%), Native American (1.6%), Black/African American (1.3%), Middle Eastern (.5%), and Multiracial (.3%). Participants weight status ranged from underweight to obese with BMI percentile range from .06th percentile to 99.29th percentile with a mean percentile of 58.89th (SD = 29.42). The majority of participants had a BMI that corresponded with healthy weight status (67.1%) with other participants having a BMI corresponding with underweight (6.8%), overweight (14.4%), and obese (11.7%) statuses. Most participants reported no bullying involvement (66.4%) in the current academic year, with the remaining participants (33.6%) endorsing involvement in

bullying in the current academic year. Table 4 depicts bullying involvement according to weight status.

Construct Characteristics

Important variables related to the research questions and constructs of this study other than the characteristics of the sample included the following variables: anxious symptomology, depressive symptomology, weight-related victimization, and paternal and maternal income. Given that maternal income did not have a statistically significant relationship with the outcome variables (i.e., depressive symptomology, anxious symptomology), it was removed from the model as a covariate in the question (i.e., research question four) examining the relation between bullying involvement, weight-based victimization, and gender on internalizing symptomology (i.e., anxious and depressive symptomology). Paternal income was included in the model since it has a statistically significant relationship with depressive symptomology and would be considered a reasonable variable to control for within the model in the fourth research question. Descriptive statistics for the constructs of interest are provided in Table 2. Standardized T-scores were calculated for participants who completed the questionnaires measuring symptoms of anxiety and depression. Participants' (n = 356) anxiety T-scores ranged from 29 to 88 (M = 45.64, SD = 12.29). Participants' (n = 351) depression T-scores ranged from 39 to 90 (M = 45.69, SD = 8.59). The majority (75.6%) of participants (n = 127) endorsed that they had not experienced weight-based victimization in the current academic year. The majority (30.4%) of participants' parents (n = 349) reported paternal income in the range of $50,001-$75,000. The remaining paternal income fell in the following ranges: 20.5% of participants in the $35,001-$50,000 range, 18.9% of participants in the $100,001 or greater range, 14.9% of participants in the $75,001-$100,000 range, 8% participants in the $20,001-$35,000 range, 3.7% of participants

in the $10,000 or less range, 2.9% of participants in the $15,001-$20,000 range, and .6% participants in the $10,001-$15,000 range.

Preliminary Analyses

A series of Pearson product-moment correlations (see Table 3) were conducted to determine the relationship between the independent variables (i.e., BMI, bullying involvement, weight-based victimization, age, gender, maternal and paternal income) and dependent variables (i.e., anxious symptomology, depressive symptomology). This analysis provided support for using hierarchical multiple regression analyses to answer specific research questions five, six, eight, and nine and whether to include specific covariates into models of analysis. A significant positive correlation was found between gender (male = 1) and BMI percentile scores ($r = .153$, $p = .004$). A significant positive correlation was found between participant age and their depressive symptomology T-score ($r = .147$, $p = .006$). A significant positive correlation was found between participants' depressive symptomology T-score and their anxious symptomology T-score ($r = .435$, $p = .000$). A significant positive correlation was found between bullying involvement (1 = involved) and BMI percentile ($r = .122$, $p = .022$). A significant positive correlation was found between bullying involvement and anxious symptomology T-score ($r = .260$, $p = .000$). A significant positive relationship was found between bullying involvement and depressive symptomology T-score ($r = .505$, $p = .000$). A significant positive relationship was found between BMI percentile and those who endorsed experiencing weight-based victimization ($r = .455$, $p = .000$). A significant positive correlation was found between depressive symptomology T-score and those who endorsed experiencing weight-based victimization ($r = .206$, $p = .025$). A significant negative correlation was found between age and paternal income ($r = -.120$, $p = .026$). A significant negative correlation was found between depressive symptomology T-score and

paternal income (r = -.157, p = .005). Research questions and results are summarized in Table 8 and are discussed in detail in the rest of this chapter.

Relationship Between Bullying Involvement and Weight Status

The aim of the first research question was to determine if there was a significant relationship between involvement in the bullying dynamic (i.e., involved, uninvolved) and weight status (i.e., underweight, normal weight, overweight, obese). It was hypothesized (1a) that youth involved in bullying would fall in the obese, overweight, and underweight statuses and (1b) youth uninvolved in bullying would fall in the normal weight status. A chi-square goodness-of-fit test for association was used to test the hypothesis. Consistent with the hypothesis, a 2 X 4 Pearson Chi-Square test indicated that the relationship between weight status and bullying involvement was significant χ^2 (3, N = 364) = 11.23, p = .011, V = .176. Cramer's V is a percentage variance effect size that is an appropriate measure for chi-quires tests that are larger than 2 X 2 (Howell, 2002). Cramer's V indicates that weight status accounted for 17.6% of the variance in the sample. According to Cohen's (1988) guidelines for effect sizes, there is a medium effect of weight status on bullying involvement. Therefore, hypothesis 1 was supported.

Relationship Between Depression and Weight Status

The purpose of the second research question was to determine if youth who have an unhealthy weight status (i.e., underweight, overweight, obese) have higher mean levels of depressive symptomology when compared to youth with a healthy weight status. It was hypothesized (2) that youth who have an unhealthy weight status would report higher mean levels of depressive symptomology when compared to healthy weight youth. Therefore, the nonparametric Kruskal-Wallis H test was utilized to test Research Question 2. Significant differences in depressive symptomology were found between unhealthy weight (i.e.,

underweight, overweight, obese) and healthy weight status groups, $\chi^2(1) = 5.04$, $p = .025$, with unhealthy weight group reporting statistically significantly higher levels of depressive symptomology; therefore, Hypothesis 2 was supported.

To further explore this hypothesis, post hoc analyses were conducted to examine depressive symptomology differences for each weight status group. Mann-Whitney U tests were conducted comparing depressive symptomology of each weight status group. No significant differences in depressive symptomology were found between underweight status and healthy weight status ($U = 2348$, $p = .189$), underweight status and overweight status ($U = 522.5$, $p = .519$), underweight status and obese status ($U = 453.5$, $p = .712$), healthy weight status and overweight status ($U = 5{,}233.5$, $p = .476$), or overweight status and obese status ($U = 791.5$, $p = .154$). However, a Mann-Whitney U test found a statistically significant difference in depressive symptomology between the healthy weight group and the obese group ($U = 3{,}545$, $p = .014$), indicating that the obese weight group reported statistically significantly higher depressive symptomology than the healthy weight group. Thus, hypothesis 2 was supported.

Relationship Between Anxiety and Weight Status

The aim of the third research question was to determine if youth who have an unhealthy weight status (i.e., underweight, overweight, obese) have higher mean levels of anxious symptomology when compared to youth with a healthy weight status. It was hypothesized (3) that youth who have an unhealthy weight status would report higher mean levels of anxious symptomology when compared to healthy weight youth. Therefore, the nonparametric Kruskal-Wallis analysis of variance test was utilized to test Research Question 3. Significant differences in anxious symptomology were found between unhealthy weight (i.e., underweight, overweight,

obese) and healthy weight status groups, $\chi^2(1) = 4.11$, $p = .043$; therefore, Hypothesis 3 was supported.

To further explore this hypothesis, post hoc analyses were conducted to examine anxious symptomology differences for each weight status group. Mann-Whitney U tests were conducted comparing anxious symptomology of each weight status group. No significant differences in anxious symptomology were found between underweight status and overweight status ($U = 492$, $p = .172$), underweight status and obese status ($U = 378.5$, $p = .205$), healthy weight status and overweight status ($U = 5{,}404.5$, $p = .291$), healthy weight status and obese status ($U = 4{,}136$, $p = .349$), or overweight status and obese status ($U = 956.5$, $p = .757$). However, a Mann-Whitney U test found a statistically significant difference in anxious symptomology between the healthy weight group and the underweight group ($U = 2{,}013$, $p = .022$), indicating that the underweight group reported statistically significantly higher anxious symptomology than the healthy weight group. Therefore, hypothesis 3 was supported.

Relationship Between Bullying Involvement, Weight Status, Weight-Based Victimization, and Gender on Internalizing Symptomology After Controlling for Age and Paternal Income

The aim of the fourth research question was to determine if weight status (i.e., underweight, normal weight, overweight, obese), bullying involvement (i.e., involved, uninvolved), weight-based victimization (i.e., yes, no), and gender (i.e., female, male) have a significant impact on internalizing symptomology (i.e., anxiety, depression), after controlling for age, parental income, and race. It was hypothesized (4) that there would be a significant multivariate main effect for weight status, bullying involvement, weight-based victimization, and gender on internalizing symptomology while controlling for age, parental income, and race.

Race and maternal income were removed from the model as covariates. Race was not normally distributed with the majority (87.7%) of the sample identifying as White/Caucasian. Maternal income did not have a statistically significant relationship with anxious symptomology nor depressive symptomology; therefore, maternal income was not included in the model as a covariate. Age and paternal income were left in the model as covariates to control for as age and paternal income both had a statistically significant relationship with depressive symptomology, which is one of the factors loading into the internalizing symptomology outcome variable in the model. A multivariate analysis of covariance (MANCOVA) test was utilized to test Research Question 4.

A 4 x 2 x 2 x 2 between-subjects MANCOVA was conducted on two dependent variables: anxious symptomology and depression symptomology. Independent variables were weight status, bullying involvement, weight-based victimization, and gender. Box's test of equality of covariance matrices was not statistically significant, $p = .111$, which indicated that use of Wilks' Lambda criterion for statistical significance. With the Wilks' criterion, the combined dependent variables (i.e., anxious and depression symptomology) were not statistically significantly affected by weight status, $F(6, 146) = 1.822$, $p = .099$, bullying involvement, $F(2, 73) = .578$, $p = .563$, weight-based victimization, $F(2, 73) = .721$, $p = .490$, and gender, $F(2, 73) = .279$, $p = .757$, nor the interactions for each independent variable. Results of this analysis are summarized in Table 5. Thus, hypothesis 4 was not supported.

Predicting Anxious Symptomology with Weight Status and Examining Bullying Involvement as a Moderator for Females

The purpose of the fifth research question was to determine if weight status (i.e., BMI) predicted anxious symptomology for females and whether the relationship between weight status

and anxious symptomology varied by bullying involvement (i.e., involved, uninvolved). It was hypothesized (5) that bullying involvement would moderate the effect of weight status on anxious symptomology for females. A hierarchical multiple regression was conducted to test hypothesis five. The results of these regressions are presented in Table 6.

In the first step, weight status (i.e., BMI) and bullying involvement were regressed on anxious symptomology for females. Together, weight status and bullying involvement significantly predicted anxious symptomology for females, F (3, 168) = 4.53, p = .004, accounting for approximately 8% of the variance in anxious symptomology. No main effects were found for weight status and bullying involvement.

In the second step, the interaction of weight status and bullying involvement was entered into the model to test whether the association of weight status varied by bullying involvement. The second model significantly predicted anxious symptomology, F (5, 155) = 3.23, p = .042, accounting for approximately 11% of the variance in anxious symptomology for females. A main effect was found for weight status on anxious symptomology for females, (β = -2.55, p = .046). An interaction effect of bullying involvement on weight status was statistically significant, F (5, 165) = 4.08, p = .002. Within the interaction term, having an uninvolved status in bullying significantly moderated the relationship between weight status and anxious symptomology (β = 2.258, p = .036) for females, but the interaction did not hold true for females involved in bullying (β = 1.347, p = .056). Figure 4 shows the significant interaction effect in which within females with lower BMIs, higher levels of anxious symptomology is moderated by bullying involvement. More specifically, females involved in bullying were more likely to report higher levels of anxious symptomology. Thus, hypothesis 5 was supported.

Predicting Anxious Symptomology with Weight Status and Examining Bullying Involvement as a Moderator for Males

The purpose of the sixth research question was to determine if weight status (i.e., BMI) predicted anxious symptomology for males and whether the relationship between weight status and anxious symptomology varied by bullying involvement (i.e., involved, uninvolved). It was hypothesized (6) that bullying involvement would moderate the effect of weight status on anxious symptomology for males. A hierarchical multiple regression was conducted to test hypothesis 6. The results of these regressions are presented in Table 6.

In the first step, weight status (i.e., BMI) and bullying involvement (i.e., uninvolved, involved) were regressed on anxious symptomology for males. Together, weight status and bullying involvement significantly predicted anxious symptomology for males, F (3, 160) = 3.199, p = .025, accounting for approximately 6% of the variance in anxious symptomology. No main effects were found for weight status and bullying involvement.

In the second step, the interaction of weight status and bullying involvement was entered into the model to test whether the association of weight status varied by bullying involvement. No direct effect for weight status was found on anxious symptomology and no interaction effect of bullying involvement on weight status was found. See Figure 5 for a graph of the nonsignificant interaction effect. Therefore, hypothesis 6 was not supported.

Gender Differences for Predicting Anxious Symptomology with Weight Status and Bullying Involvement as a Moderator

The purpose of the seventh research question was to determine whether the relationship among weight status, bullying involvement, and anxious symptomology varied for females and males. It was hypothesized (7) that the relationship among weight status, bullying involvement,

and anxious symptomology would differ for females and males. A Z-test for comparing raw regression weights of models from different groups was conducted (Cohen, 1983) to determine if there was a significant difference by gender for the model. A significant difference between males and females ($Z = 2.806$, $p = .005$) was found in the model, indicating that the model was a better fit for females when compared to males. Therefore, hypothesis 7 was supported.

Predicting Depressive Symptomology with Weight Status and Examining Bullying Involvement as a Moderator for Females

The purpose of the eighth research question was to determine if weight status (i.e., BMI) predicted depressive symptomology for females and whether the relationship between weight status and depressive symptomology for females varied by bullying involvement (i.e., involved, uninvolved). It was hypothesized (8) that bullying involvement would moderate the effect of weight status on depressive symptomology for females. A hierarchical multiple regression was conducted to test hypothesis 8. The results of these regressions are presented in Table 7.

In the first step, weight status (i.e., BMI) and bullying involvement (i.e., uninvolved, involved) were regressed on depressive symptomology for females. Together, weight status and bullying involvement significantly predicted depression symptomology for females, F (3, 170) = 20.397, $p = .000$, accounting for approximately 25% of the variance in depressive symptomology. No main effects were found for weight status and bullying involvement.

In the second step, the interaction of weight status and bullying involvement was entered into the model to test whether the association of weight status varied by bullying involvement. No direct effects for weight status was found on depressive symptomology and no interaction of effect of bullying involvement on weight status was found for females. See Figure 6 graph of the nonsignificant interaction effect. Hypothesis 8 was not supported.

Predicting Depressive Symptomology with Weight Status and Examining Bullying Involvement as a Moderator for Males

The purpose of the ninth research question was to determine if weight status (i.e., BMI) predicted depressive symptomology for males and whether the relationship between weight status and depressive symptomology for males varied by bullying involvement (i.e., involved, uninvolved). It was hypothesized (9) that bullying involvement would moderate the effect of weight status on depressive symptomology for males. A hierarchical multiple regression was conducted to test hypothesis 9. The results of these regressions are presented in Table 7.

In the first step, weight status (i.e., BMI) and bullying involvement (i.e., uninvolved, involved) were regressed on depressive symptomology for males. Together, weight status and bullying involvement significantly predicted depression symptomology for males, F (3, 155) = 15.91, p = .000, accounting for approximately 24% of the variance in depressive symptomology. No main effects were found for weight status and bullying involvement.

In the second step, the interaction of weight status and bullying involvement was entered into the model to test whether the association of weight status varied by bullying involvement. No direct effects for weight status was found on depressive symptomology and no interaction of effect of bullying involvement on weight status was found for males. Thus, hypothesis 9 was not supported.

Gender Differences for Predicting Depressive Symptomology with Weight Status and Bullying Involvement as a Moderator

The aim of the tenth research question was to determine whether the relationship among weight status, bullying involvement, and depressive symptomology varied for females and males. It was hypothesized (10) that the relationship among weight status, bullying involvement,

and depressive symptomology would differ for females and males. A Z-test for comparing raw regression weights of models from different groups was conducted (Cohen, 1983) to determine if there was a significant difference by gender for the model. A significant difference was not found was not found between males and females for the model ($Z = 1.428$, $p = .153$), indicating that the model did not differ by gender. Thus, hypothesis 10 was not supported.

CHAPTER 5

DISCUSSION

The purpose of the current study was to examine the relations between childhood weight status, internalizing symptomology, and involvement in the bullying dynamic among youth. Additionally, the study sought to better explain the relationship between childhood unhealthy weight statuses and internalizing symptomology and how bullying involvement might serve as a diathesis and a catalyst for developing internalizing symptomology among those with unhealthy weight statuses. Research clearly demonstrates the relationship between an unhealthy weight status and increased internalizing symptomology, including anxiety and depression (Bhutta et al., 2002; Cimino et al., 2016; Indredavik et al., 2004; Rickards et al., 2001). Importantly, this study also examined how these relations might differ by specific weight statuses, gender, and whether or not an individual has experienced weight-based victimization. These characteristics were important to investigate to understand their influence on youth's experiences with a goal of improving provider's response and support to youth dealing with stressors related to their weight, internalizing symptomology, and/or bullying experiences. While previous research has studied the association between weight statuses, internalizing symptomology, and bullying, few studies have examined how bullying involvement might serve as a diathesis and how these relations might vary by specific weight statuses, gender, or age. Thus, the current study contributes to the literature by further examining the relationship between unhealthy weight status, anxiety, and depression, and how bullying involvement and gender moderate the relationship between weight status and internalizing symptomology.

Results from the current study supported the diathesis-stress model for of bullying involvement for underweight females experiencing anxious symptomology. More specifically,

for underweight females, those who were involved in bullying were more likely to report higher levels of anxious symptomology when compared to underweight females who were uninvolved in bullying. However, this diathesis-stress model of bullying involvement was not consistently supported throughout the study as this relationship did not hold true for males when examining the relation between weight status and anxious symptomology. Additionally, the diathesis-stress model of bullying involvement was not supported for females nor males when examining the relation between weight status and depressive symptomology. Although the current study did not consistently support bullying involvement serving as a diathesis, strengthening or explaining the relationship between unhealthy weight status and internalizing symptomology, it did find evidence further supporting the literature base that connects weight status, bullying involvement, and internalizing symptomology. Additionally, results of the current study extend the broader literature regarding gender differences in internalizing symptomology as well as differences among weight status categories, which may have implications in designing screening procedures for providers and physicians. In this chapter, the current study results are reviewed and discussed. Additionally, study limitations, directions for future research, and clinical implications are considered.

Bullying Dynamic and Weight Status among Children and Youth

One aim of the current research study was to assess the relation between the bullying dynamic and childhood weight status, which was hypothesized to have a significant relationship based on a previous research (Browne, 2012; Lumeng et al., 2010; Puhl & Latner, 2007; Warkentin, Borghese, & Janssen, 2017). A chi-square goodness-of-fit test for association found a significant relationship between weight status and bullying involvement with weight status accounting for 17.6% of the variance in bullying involvement. These findings replicate the past

research, further supporting the relationship between weight status and bullying involvement. Researchers consistently find that individuals with unhealthy weight status are more likely to be involved in the bullying dynamic. These findings highlight the relationship between weight status and bullying involvement. In the current study, participants with higher BMI percentiles were more likely to endorse involvement in bullying as well as endorse experiencing weight-based victimization. Youth with unhealthy weight status (i.e., underweight, overweight, obese) are more likely to experience weight-based victimization and to be involved in the bullying dynamic when compared to their healthy weight peers.

Relationship between Weight Status, Internalizing Symptomology, and Bullying Experiences

Research has established a long-standing relationship between anxious and depressive symptomology (APA, 2013; Axelson & Birmaher, 2001; Beesdo et al., 2009). While depression and anxiety are discrete disorders (APA, 2013), comorbidity is common and together they are conceptualized as internalizing disorders (APA, 2013). Given their commonalities, it is not surprising that youth who endorsed bullying involvement also reported higher levels of both anxious and depressive symptomology (Menesini et al., 2009). Research also supports the relationship between bullying and negative psychological outcomes such and depression and anxiety (Gini & Pozzoli, 2013; Knack et al., 2011; Swearer et al., 2011), which was replicated in the current study. In the current study, youth who reported high levels of anxious symptomology were more likely to report high levels of depressive symptomology. The current study examined an overall model of how weight status, bullying involvement, weight-based victimization, and gender altogether impacted internalizing symptomology (i.e., anxious symptomology, depressive symptomology) and found that none of the variables significantly impacted internalizing

symptomology; however, several limitations related to analysis and assumptions existed, which are discussed in the limitations section.

The current study found that as participants' BMI increased, they were more likely to endorse experiencing weight-based victimization. Differences in internalizing symptomology and weight-based victimization were also found. Youth who endorsed experiencing weight-based victimization were more likely to report higher levels of depressive symptomology than youth who did not experienced weight-based victimization. This relationship did not hold true for anxious symptomology.

Another purpose of this research study was to examine if internalizing symptomology varied by weight status. For both depressive symptomology and anxious symptomology, significant differences were found between individuals with a healthy weight status and those with an unhealthy weight status, which is consistent with previous literature (Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Cimino et al., 2016; Curtis, 2008; Grindvik et al., 2009). Individuals with unhealthy weight statuses were more likely to report higher levels of internalizing symptomology. However, differences existed between anxiety and depression when examining specific unhealthy weights status categories. For depressive symptomology, youth with an obese weight status had statistically significantly higher levels of depressive symptomology that their peers with a healthy weight status. For anxious symptomology, youth with an underweight weight status were more likely to report higher levels of anxious symptomology when compared to their peers with a healthy weight status.

Bullying Experiences as a Diathesis in the Relation between Weight Status and Internalizing Symptomology

Overall, the hypothesized diathesis-stress model in which involvement in bullying serves as a catalyst in developing internalizing symptomology for those with an unhealthy weight status was not fully supported for all models. However, a moderation was found for females in which an interaction effect of bullying involvement on weight status (i.e., BMI) for females experiencing anxious symptomology was found. This interaction effect indicated that females with lower levels of BMI who endorse bullying involvement endorsed higher levels of anxious symptomology when compared to females who were uninvolved in bullying. This relationship was not found for males. Also, this moderating, interaction effect was not found for depressive symptomology for females nor males. More generally, the current study supports that together, weight status and bullying involvement significantly predict anxious and depressive symptomology. Neither variable solely significantly predicted anxious nor depressive symptomology. Instead of demonstrating a diathesis effect, it appears that a compounding or additive effect of risk factors (e.g., bullying involvement, social support, parental support, coping strategies, motivation, SES) might be more accurate model of youth well-being with an unhealthy weight status with the exception of underweight females experiencing anxious symptomology who are also involved in the bullying dynamic.

Age and Gender Differences of Weight Status, Bullying Experiences, and Internalizing Symptomology

Currently, gender differences in bullying experiences are inconclusive because much research assessing the impact of gender often have varying results. One aim of the current study was to assess the relationship of weight status, bullying involvement, and internalizing symptomology and how those relationships might vary by age and gender. Age and gender have both been implicated as variables that affect the degree of another variable, including many of

the variables in the current study. For example, research supports gender differences in the areas of weight stigma (Puhl, Andreyeva, & Brownell, 2008), weight status (Ogden, Carroll, Fryar, & Flegal, 2015), depression (Girgus & Yang, 2015), anxiety (McLean, Asnaani, Litz, & Hofmann, 2011), and bullying involvement (Smith, Lopez-Castro, Robinson, & Gorzig, 2018). As youth age, BMI and bullying involvement tend to increase in adolescence from early childhood; therefore, this study examined whether that finding held true for the current study. A significant association was found between BMI and gender, with males reporting higher BMI percentiles than females. Another gender difference found in the current study was that as BMI decreased, an increase in anxious symptomology was reported for female participants. This relationship was not found for male participants. Several research questions examined whether significant gender differences existed among the models assessed in the research questions examining the predictability of weight status on internalizing symptomology and whether bullying involvement moderated that relationship. The model in which weight status and bullying involvement predicted anxious symptomology varied by gender, with the model being a better fit for females than males. No gender differences were found for the model that found weight status and bullying involvement significantly predicting depressive symptomology. The model predicting depressive symptomology fit equally for both females and males, but the model predicting anxious symptomology was a better fit for female participants. Age was not significantly associated with many of the study variables (i.e., BMI, anxious symptomology, bullying involvement, weight-based victimization, maternal income). However, as age increased, depressive symptomology also increased, indicating that older youth are more likely to report higher levels of depressive symptomology than younger adolescents.

Implications and Clinical Significance

These findings highlight the importance of supporting youth with unhealthy weight statuses as they are more likely to be involved in bullying and experience weight-based victimization compared to their healthy weight peers. Results showed that weight status accounted for nearly 20% of the variance in bullying involvement. This means that providers and physicians working with youth with unhealthy weight statuses should screen for bullying involvement and weight-based victimization. Providers who work specifically with youth in weight management programs should also screen for bullying involvement as well as create programing for youth to learn to appropriately respond to weight stigma, weight-based victimization, and learn strategies for escaping the bullying dynamic. Additionally, interventions should focus on learning coping strategies for youth who experience negative outcomes (e.g., anxiety, depression) due to involvement in bullying. Programs to help with anxious and depressive symptomology might include the Coping Cat Workbook (Kendall, 2006) and ACTION (Stark, Streusand, Arora, & Patel, 2012) as well as treatment modalities such as Acceptance Commitment Therapy and Cognitive Behavioral Therapy.

The current study replicated longstanding findings that anxious and depressive symptomology are related; however, differences were also found between anxiety and depression that might impact clinical practice and future research. This study supports the general premise for providers and physician that youth with unhealthy weight statuses are more likely to report higher levels of anxious and depressive symptomology. However, it is important to note that weight status nor bullying involvement alone did not predict anxious nor depressive symptomology. Rather, together, weight status and bullying involvement predicted anxious and depressive symptomology. Providers might conceptualize these findings as youth with unhealthy weight statuses or youth who are involved in the bullying dynamic are “at risk” for developing

anxious and depressive symptomology. For these youth, behavioral and mental health screening are highly encouraged. If a patient has an unhealthy weight status and the provider learns that their patient has a history of bullying involvement or is currently involvement in bullying, then behavioral/mental health screening is best practice. For anxious and depressive symptomology, providers might consider using the MASC-10 (March, 2997) and the CDI-S (Kovacs, 1992), respectively as they are psychometrically sound and cost- and time-effective screening measures.

Additionally, the current study found differences in specific unhealthy weight status categories that might aid in the conceptualization of screening and treating negative outcomes and health correlates for youth within an unhealthy weight status category. Specifically, youth who were obese were significantly more likely to report higher levels of depressive symptomology when compared to their healthy weight peers. This relationship did not hold true for anxious symptomology. In fact, the inverse was found in which underweight youth were more likely to report higher levels of anxious symptomology when compared to their healthy weight peers. Although anxiety and depression are similar and are often comorbid (APA, 2013; Axelson & Birmaher, 2001), providers should consider their specific differences and how anxiety and depression might be differentially impacting youth with unhealthy weight statuses. Another difference between anxiety and depression found in this study was that youth who experienced weight-based victimization were more likely to report higher levels of depressive symptomology. This relationship did not hold true for anxious symptomology—no significant relationship existed between experiencing weight-based victimization and higher levels of anxious symptomology. This is likely due to the item measuring weight-based victimization, which specifically asked youth if they were involved in bullying due to their perception of, "they think I'm fat." Based on the study findings, future research might consider examining the impact

of weight-based victimization for those who are involved in bullying do to their perception of, "they think I'm too skinny," since anxious symptomology was more related to underweight youth.

A main purpose of the current study was to examine how bullying involvement might moderate the relationship between weight status and internalizing symptomology. Previous researchers have proposed a diathesis-stress model (Swearer & Hymel, 2015), supporting the idea that bullying serves as a negative life event that might function as a catalyst for developing negative outcomes such as anxiety and depression. The current study did not consistently support the diathesis-stress model (Swearer & Hymel, 2015) of bullying involvement on anxious and depressive symptomology for those with unhealthy weight statuses. Most models did produce a significant moderation, interaction effect. However, the diathesis-stress model of bullying involvement for anxious symptomology was supported specifically for females within lower BMI percentiles and an underweight weight status. Researchers and providers should consider the unique experiences contributing to this specific group of youth.

Furthermore, the current study found that being involved in bullying and having an unhealthy weight status are risk factors of developing anxious and depressive symptomology. Bullying involvement nor weight status alone predicted anxious or depressive symptomology. Rather, anxiety and depression were predicted when weight status and bullying involvement were both entered into the model. This means that providers might conceptualize involvement in bullying and an unhealthy weight status as risk factors for developing anxiety and depression. Providers might consider these variables to be Adverse Childhood Experiences (ACEs), which are experiences (e.g., neglect, household dysfunction, mental abuse, physical abuse) that researchers found to be directly correlated to physical and mental health problems in adults

(Felitti et al., 1998). Since Felitti and colleagues' study, researchers have learned more about the psychological effects of ACEs on youth as well as the long-term health complications associated with chronic stress and ACEs (Shonkoff & Garner, 2012). When providers learn that their patient has experienced or is currently experiencing an adverse event, they should follow up and assess how that patient is coping and adjusting to that adverse experience.

Lastly, an additional aim of the study was to understand how gender and age might impact the relationships between weight status, bullying involvement, and internalizing symptomology. The current study found that males reported higher levels of BMI when compared to females and that males were also more likely to report higher levels of depressive symptomology. This finding contradicts research which tends to show that females are more likely to report higher levels of depressive symptomology when compared to males. This contradicting finding might be due to males in the current study having higher levels of BMI, which might serve as a moderating variable in this study. Additionally, the study found that as BMI decreased in females, they were more likely to report higher levels of anxious symptomology. This relationship was not supported for males. A research question that highlighted gender differences was the research question that examined the model predicting anxious symptomology with weight status and bullying involvement. This model was significantly a better fit for females than males. A similar model predicting depressive symptomology was tested for gender differences, but that model was equally a good fit for both male and female youth—indicating no gender differences. The current study did not find that age was a major contributing factor impacting the relationship of study variables (i.e., anxious symptomology, bullying involvement, weight-based victimization, BMI, maternal income); however, the current study focused on adolescents, so age range was somewhat limited. One

important finding was that age and depressive symptomology were significantly related. Older youth were more likely to endorse higher levels of depressive symptomatology. Interestingly, this relationship was not true for anxious symptomology. Age and gender are important variables to consider when working with youth regarding their bullying experiences, weight status, and internalizing symptomology. There are clear differences in expectations and weight stigma for males and females. Females are more likely to experience anxiety when compared to males and this relationship was also found in this study. Although the current research supports that gender differences exist in the relationships between weight status, bullying involvement, and internalizing symptomology, it is important to note that these findings do not support that providers should respond differently or adjust screening procedures based on gender. Rather, providers and researchers should continue to try to understand the underlying mechanisms of why these experiences and relationships might differ by gender and ensure that gender bias does not interfere with appropriate screening procedures.

Limitations and Future Directions

No study is without limitations and the current study is no exception. Results from this study should be interpreted with these limitations in mind. The current study drew from a clinical population, which resulted in a non-normative distribution for weight status, anxious symptomology, and depressive symptomology. Research suggests that a non-normative distribution is appropriate and expected for clinical populations, especially in the areas of anxiety and depression (Counsell, Cortina-Borja, Lehtonen, & Stein, 2011). Additionally, literature indicates that screening measures such as the CDI-S (Kovacs, 1992) and MASC-10 (March, 1997) are likely to produce non-normative distributions due to a majority of healthy individuals reporting low values and a few participants reporting larger values, reflecting the typical

distribution of disorders in the youth population (Counsell, Cortina-Borja, Lehtonen, & Stein, 2011). Although this limitation of non-normality is expected, it served as a barrier in data analysis as many appropriate analyses (i.e., ANOVA, MANCOVA) assume normality in the sample. To correct for these limitations, equivalent nonparametric analyses were selected when possible; however, an equivalent alternative to a MANCOVA did not exist. Therefore, results from the research question examining the relations between weight status, bullying involvement, weight-based victimization, and gender on internalizing symptomology should be interpreted considering the limitation that many important assumptions (i.e., normal distribution of anxious and depressive symptomology, homogeneity of variances in depressive symptomology) of the analysis were not met. Given study results that indicated differences in anxious and depressive symptomology and differences in the youth who endorsed those symptoms, it is important for researchers to examine anxious and depressive symptomology separately. Analyses that combine these dependent variables might be masking important findings regarding anxious symptomology or depressive symptomology. Initially, the idea of examining anxiety and depression together was for simplicity of the physician providing screening; however, these findings suggest that it is important to screen for depression and anxiety separately. Future studies might use alternative analytic strategies such as structural equation modeling that combines factor analyses and multiple regression to examine the structural relationship between measured variables (e.g., BMI) and latent constructs (e.g., anxiety, depression).

Another limitation of the study was that the frequency, severity, the time that the bullying occurred, and for how long youth were within an unhealthy or healthy weight status were not assessed. To measure bullying involvement, youth were asked to indicate if they were involved in bullying "in the current academic year," which did not capture the frequency of bullying

involvement. The chronicity of both bullying involvement and unhealthy weight status likely contributes to whether youth experience and develop negative outcomes such as anxiety and depression. Future research should consider longitudinal methodology in which prolonged exposure to bullying involvement and chronic concerns with unhealthy weight can be accounted for and examined. Additionally, the study relied on a single-item, self-report scale to identify bullying involvement, which is an additional limitation. Measurement of bullying involvement continues to be debated among researchers; however, some research has found that a single item is unambiguous and can be just as effective as a multi-item scale assessing bullying (Bergkvist, 2014; Bergkvist & Rossiter, 2007; Diamantopoulos et al., 2014; Rossiter, 2002; Wanous & Hudy, 1997). More researchers are starting to use these single-item indicators as they are time- and cost-effective as well as reduce respondent fatigue. Some researchers might question the validity and accuracy of youth self-reporting their bullying experiences; however, research has found that self-report is a more accurate methodology compared to other report (Berger, 2007; Grindvik et al., 2009). Researchers who use self-report scales to assess bullying involvement understand that youth's perception is important, and that bullying is a sophisticated social behavior which is often exhibited in the absence of others (e.g., teachers, parents, powerful bystanders) who might report the bullying. Therefore, assessments other than self-report might underestimate the occurrence of bullying given that they miss capturing youth's perspective.

An important strength of the current study was the use of BMI and weight status categories that were collected from medical record reviews. This procedure provided a valid and accurate measure of healthy and unhealthy weight statuses. Some researchers might argue that perceived weight status might also be an important variable to assess, especially when considering its relation to anxious and depressive symptomology. Future research might consider

examining both BMI as well as perceived weight status and how that impacts mental and behavioral health and vulnerability to bullying involvement. Another variable to consider is perceived weight stigma, which likely relates to people's perspective of their weight status. Capturing the attitudes and values related to weight would likely aid in the conceptualization of how anxious and depressive symptomology are related to an unhealthy weight status. Future research could assess how youth within an unhealthy weight status are impacted by weight stigma. Researchers might find that having low weight stigma and not having a perception of being within an unhealthy weight status might serve as protective factors from developing anxious and depressive symptomology.

The current study supported the diathesis-stress model that bullying serves as a catalyst for developing anxious symptomology for females who have lower BMI percentiles and are considered underweight. However, the diathesis-stress model of bullying involvement was not supported for depressive symptomology for youth with unhealthy weight statuses. Researchers should continue to assess this model, especially the unique findings for underweight females who endorse high levels of anxious symptomology. Additionally, researchers might consider examining this model within the perspective of risk and protective factors. Rather than a diathesis, bullying involvement and an unhealthy weight status might be better conceptualized as an adverse childhood experience and researchers should assess which protective factors contribute to developing healthy mental and behavioral health outcomes. This research would be important for practitioners so that they can help youth and their families cultivate protective factors and mitigate negative outcomes of weight stigma, weight-related victimization, and bullying involvement.

The current study was designed with the specific role of physicians and providers in mind as the sample came from pediatric medical clinics. Future research might consider separating bullying involvement, examining differences between the various roles (e.g., perpetrators, victims, bully-victims, bystanders, uninvolved). As a screening mechanism, there is benefit to knowing whether being involved in bullying, regardless of role, is a risk factor; however, teachers and mental/behavioral health providers would likely benefit from knowing how these results and experiences vary by bullying involvement (i.e., bully, bully-victim, victim, bystander).

Similar to bullying involvement researchers should continue to examine the unique experiences of individuals with an underweight weight status, overweight weight status, and an obese weight status. The current study found that negative psychological outcomes varied by unhealthy weight status categories. Youth who were obese were more likely to report higher levels of depression while youth with an underweight weight status were more likely to report higher levels of anxiety. This supports the idea that separating anxiety and depression as dependent variables is an important procedure in future research. Also, this research supports the idea of examining the unique experiences of youth within specific unhealthy weight status categories. Future research should examine the variables that contribute to underweight youth experiencing more symptoms of anxiety while obese youth experience more symptoms depression when compared to their healthy weight peers. In general, the literature base on underweight youth is sparse and research must continue to examine the experiences and negative outcomes of being underweight. Likely, the current social climate and the thin-ideal phenomenon biases researchers from further examining the experiences of underweight youth. However, the

current study, as well as other literature, demonstrates that these youth experience negative outcomes that are related to being within the underweight weight status and need support as well.

Conclusions

Bullying is a complex social behavior that negatively impacts many children and adolescents and is related to negative outcomes and psychological concerns. Obesity is also a pervasive problem in the United States and is related to many negative outcomes that are emotionally- and medically-related. The negative psychological outcomes and correlates related to both bullying and obesity are well-researched. Literature continues to demonstrate that youth with an unhealthy weight status are more likely to be involved in the bullying dynamic, increasing their risk for developing negative behavioral and mental health outcomes. The current study examined the differences among unhealthy weight statuses, gender, bullying involvement, and anxious and depressive symptomology and researchers should continue to evaluate these relations. Specifically, the development of anxiety and depression in youth with an unhealthy weight status and experiencing bullying has been less researched and warrants continued research. The role of whether bullying serves as a diathesis or an adverse childhood experience and how to ameliorate the effects of bullying involvement and stigmatization needs to continue to be researched.

An unhealthy weight status and involvement in the bullying dynamic is clearly related to negative psychological effects such as anxiety and depression. The current study emphasizes the importance of using screening measures and to assess bullying involvement, especially for youth within an unhealthy weight status. Much research focuses on youth in the obese and overweight weight statuses; however, providers must also consider the negative correlates identified in this study specifically for female, underweight youth. Societal standards and weight stigma might

bias providers, leading to less screening and assessment due to the thin-ideal or societal definitions of "healthy." Overall, this study demonstrates the importance of screening for adverse childhood experiences and psychological concerns within a pediatric clinical setting, especially for youth who have a BMI that is considered underweight, overweight, or obese. Findings from the current study suggest that future research should continue to investigate the relations between weight status, bullying involvement, internalizing symptomology, and gender. Ongoing research will aid in the understanding of how these variables are related and what experiences might serve as protective factors for youth. Researchers and practitioners can develop appropriate assessment, intervention, and supports to ultimately decrease negative social and psychological outcomes related to unhealthy weight and bullying involvement so that youth can maximize healthy psychological and physical development.

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Table 1

Demographic Characteristics for the Total Sample of the Current Study

Variable	Frequency	Percentage
Gender (n = 376)		
Female	193	51.3%
Male	183	48.7%
Grade (n = 372)		
6th	84	22.3%
7th	87	23.1%
8th	66	17.6%
9th	39	10.4%
10th	20	5.3%
11th	30	8%
12th	18	4.8%
Other	28	7.4%
Ethnicity (n = 374)		
White/Caucasian	330	87.8%
Biracial	17	4.5%
Latino/Hispanic	7	1.9%
Asian	6	1.6%
Native American	6	1.6%
Black/African American	5	1.3%
Middle Eastern	2	.5%
Multiracial	1	.3%
Weight Status (n = 368)		
Underweight	25	6.8%
Healthy	247	67.1%
Overweight	53	14.4%
Obese	43	11.7%
Bullying Involvement (n = 372)		
Involved	125	33.6%
Uninvolved	247	66.4%

Table 2

Descriptive Statistics for Study Variables

Variable	*n*	Min	Max	*M*	*SD*
Age	371	11	18	13.05	1.96
BMI percentile	356	.06	99.29	58.89	29.42
Anxious Symptomology	356	29	88	45.64	12.29
Depressive Symptomology	351	39	90	45.69	8.59

Note. Anxious and depressive symptomology are measured in T-scores, which is a standardized score. A T-score of 65 or higher indicates clinically significant symptoms.

Table 3

Correlations Between Study Independent and Dependent Variables

Variable	1	2	3	4	5	6	7	8	9
1. Age	_								
2. Gender	.01	_							
3. BMI percentile	.06	.15**	_						
4. Anxious Symptomology	.05	.09	.04	_					
5. Depressive Symptomology	.15**	-.07	.05	.44***	_				
6. Bullying Involvement	.07	-.01	.12*	.26***	.51***	_			
7. Weight-based Victimization	.06	.02	.46***	.10	.21*	-.15	_		
8. Mom Income	.04	-.02	.06	-.05	-.07	.02	-.08	_	
9. Dad Income	-.12*	-.05	-.04	-.09	-.16**	-.10	.02	-.06	_

Note. *$p < .05$, **$p < .01$, ***$p < .001$

Table 4

Bullying Involvement According to Weight Status Category

Weight Status	Involved	Uninvolved	Total without Involvement
Underweight	5%	7%	6.3% ($N = 23$)
Healthy Weight	57.9%	72%	67.3% ($N = 245$)
Overweight	21.5%	11.1%	14.6% ($N = 53$)
Obese	15.7%	9.9%	11.8% ($N = 43$)
Total	100% ($N = 121$)	100% ($N = 243$)	100% ($N = 364$)

Note. Self-reported bullying involvement by participants' weight status category.

Table 5

MANCOVA Results Examining Differences in Internalizing Symptomology between Study Variables

Effect	*F*	*df*	*p*	ηp^2
Intercept	15.224	2, 73	.000***	.294
Paternal Income	2.057	2, 73	.135	.053
Age	.139	2, 73	.871	.004
Weight status (WS)	1.822	6, 146	.099	.07
Bullying involvement (BI)	.578	2, 73	.563	.016
Weight-based victimization (WBV)	.721	2, 73	.49	.019
Gender (G)	.279	2, 73	.757	.008
WS x BI	.243	2, 73	.785	.007
WS x WBV	.65	6, 146	.69	.026
WS x G	.779	6, 146	.587	.031
BI x WBV	.785	2, 73	.46	.021
BI x G	2.326	2, 73	.105	.06
WBV x G	.978	2, 73	.381	.026
+WS x BI x WBV +WS x BI x G WS x WBV x G +BI x WBV x G +WS x BI x WBV x G	.284	4, 146	.888	.008

Note. ***$p \leq .001$, **$p \leq .01$, *$p \leq .05$.

Wilks Lambda test was used due to the Box's test being non-significant.

+Due to limited sample size in certain category groupings, some of the interactions were unable to be added into the model.

Table 6

Hierarchical Multiple Regressions with Weight Status and Bullying Involvement Regressed on Anxious Symptomology

	Females (N = 172)				Males (N = 164)			
Variable	*B*	*SE(B)*	β	R^2	*B*	*SE(B)*	β	R^2
Step 1				.08**				.06*
Weight status	.03	.03	.06		-.03	.03	-.06	
Bullying involvement (uninvolved)	-3.48	7.87	-.14		3.98	12.44	.15	
Bullying involvement (involved)	3.01	7.95	.12		10.28	12.55	.39	
Step 2				.11*				.06
Weight status	-1.08	.54	-2.55*		.00	.04	.00	
Bullying involvement (uninvolved)	-2.99	7.77	-.12		2.58	12.50	.10	
Bullying involvement (involved)	3.14	7.85	.13		9.56	12.56	.36	
Bullying involvement (uninvolved) x weight status	1.14	.54	2.26*		-.08	.07	-.11	
Bullying involvement (involved) x weight status	1.04	.54	1.35					

Note. ***$p \leq .001$, **$p \leq .01$, *$p \leq .05$. Weight status was measured by BMI percentile. Bullying involvement was coded as 1 = involved and -1 = uninvolved. For males, bullying involvement (involved) x weight status was excluded from the model.

Table 7

Hierarchical Multiple Regressions with Weight Status and Bullying Involvement Regressed on Depressive Symptomology

	Females (N = 174)				Males (N = 159)			
Variable	*B*	*SE(B)*	β	R^2	*B*	*SE(B)*	β	R^2
Step 1				.27***				.24***
Weight status	.00	.02	.00		-.01	.02	-.01	
Bullying involvement (uninvolved)	-7.71	5.94	-.38		2.81	6.27	.19	
Bullying involvement (involved)	2.81	5.99	.14		9.96	6.33	.67	
Step 2				.27				.24
Weight status	-.42	.41	-1.18		.01	.02	.03	
Bullying involvement (uninvolved)	-7.66	5.96	-.38		2.26	6.31	.15	
Bullying involvement (involved)	2.93	6.01	.14		9.68	6.34	.66	
Bullying involvement (uninvolved) x weight status	.41	.41	.94		-.03	.04	-.08	
Bullying involvement (involved) x weight status	.44	.41	.72					

Note. ***$p \leq .001$, **$p \leq .01$, *$p \leq .05$. Weight status was measured by BMI percentile. Bullying involvement was coded as 1 = involved and -1 = uninvolved. For males, bullying involvement (involved) x weight status was excluded from the model.

Table 8

Current Study Research Questions and Summary of Results

Research Question	Results
1. Is there a significant relationship between involvement in the bullying dynamic (i.e., involved, uninvolved) and weight status (i.e., underweight, healthy weight, overweight, obese)?	• Weight status was significantly associated with bullying involvement • Weight status accounted for 17.6% of the variance in the sample
2. Do underweight, overweight, and obese youth report higher levels of depressive symptomology when compared to healthy weight youth?	• Mean levels of depressive symptomology significantly differed between unhealthy weight and healthy weight status groups • Unhealthy weight status groups reported significantly higher mean levels of depressive symptomology • Mean levels of depressive symptomology significantly differed specifically between healthy weight group and the obese group • Obese weight group reported significantly higher depressive symptomology than healthy weight group
3. Do underweight, overweight, and obese youth report higher levels of anxious symptomology when compared healthy weight youth?	• Mean levels of anxious symptomology significantly differed between unhealthy weight status and healthy weight status groups • Mean levels of anxious symptomology significantly different specifically between healthy weight group and the underweight group • Underweight group reported significantly higher anxious symptomology than the healthy weight group
4. After controlling for age, parental income, and race, do weight status (i.e., underweight, healthy weight, overweight, obese), bullying involvement (i.e., involved, uninvolved), weight-based victimization endorsement (i.e., yes or no), and gender (i.e., female, male) have a significant impact on internalizing symptomology (i.e., anxiety, depression)?	• Weight status, bullying involvement, weight-based victimization, gender, and their interactions did not significantly affect internalizing symptomology (i.e., anxious and depressive symptomology)

5. For females, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on anxious symptomology?	• Together, weight status and bullying involvement significantly predicted anxious symptomology for females • Weight status and bullying involvement accounted for 8% of the variance in anxious symptomology • An interaction effect of bullying involvement on weight status (underweight) was found—females involved in bullying were more likely to report higher levels of anxious symptomology
6. For males, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on anxious symptomology?	• Together, weight status and bullying involvement significantly predicted anxious symptomology for males • Weight status and bullying involvement accounted for 6% of the variance in anxious symptomology • No interaction effect of bullying involvement on weight status was found
7. Does the relationship among weight status, bullying involvement, and anxious symptomology vary for males and females?	• The model predicting anxious symptomology with weight status and bullying involvement significantly differed for males and females • The anxious symptomology model was a better fit for females
8. For females, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on depressive symptomology?	• Together, weight status and bullying involvement significantly predicted depressive symptomology for females • Weight status and bullying involvement accounted for 25% of the variance in depressive symptomology • No interaction effect of bullying involvement on weight status was found
9. For males, does bullying involvement (i.e., involved, uninvolved) moderate the effect of weight status on depressive symptomology?	• Together, weight status and bullying involvement significantly predicted depressive symptomology for males • Weight status and bullying involvement accounted for 24% of the variance in depressive symptomology • No interaction effect of bullying involvement on weight status was found
10. Does the relationship among weight status, bullying involvement, and depressive symptomology vary for males and females?	• The model predicting depressive symptomology with weight status and bullying involvement did not differ for males and females

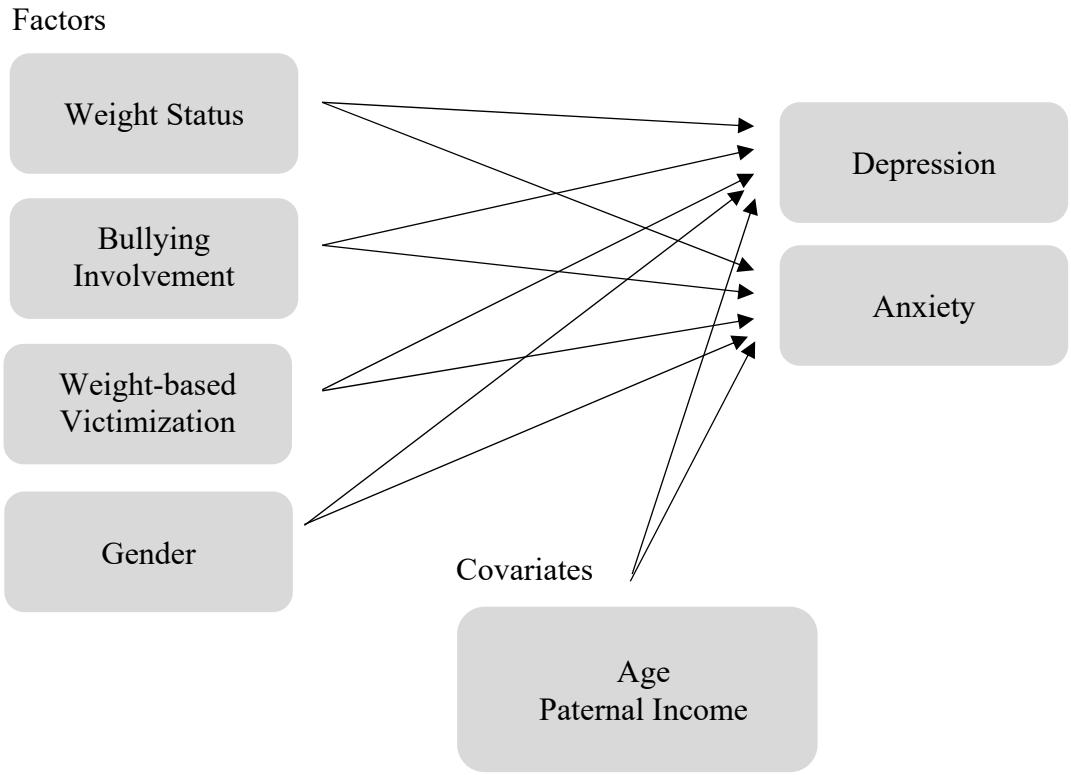

Figure 1. A multivariate analysis of covariance model for research question four.

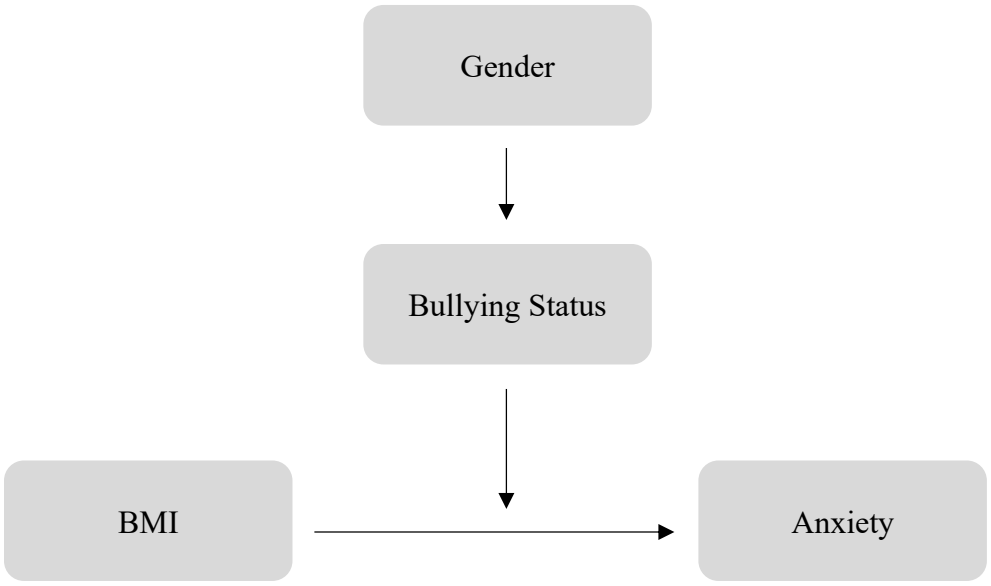

Figure 2. Model for research questions five through seven in which a hierarchical regression analysis was conducted and an independent samples t-test was conducted to determine gender differences.

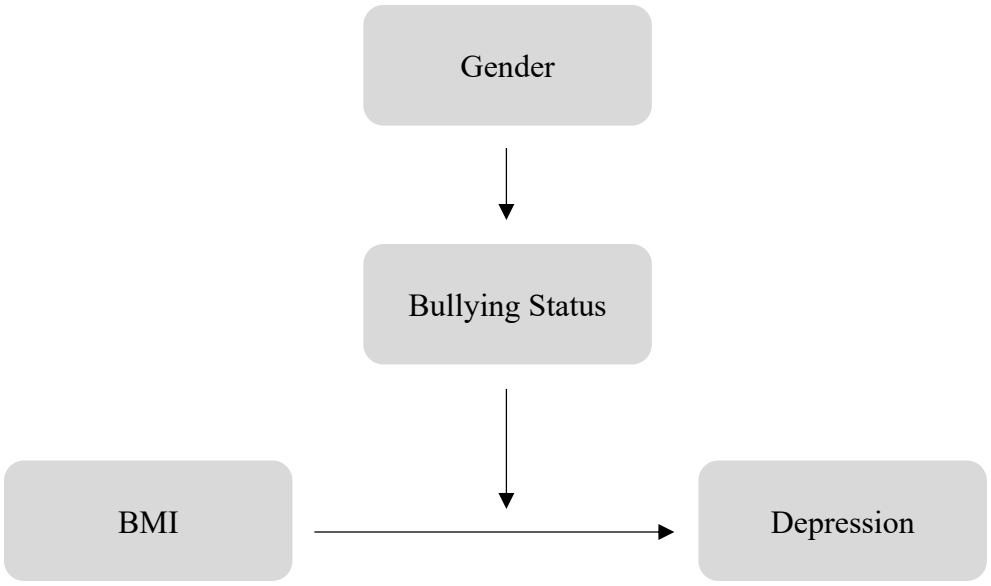

Figure 3. Model for research questions eight through ten in which a hierarchical regression analysis was conducted and an independent samples t-test was conducted to determine gender differences.

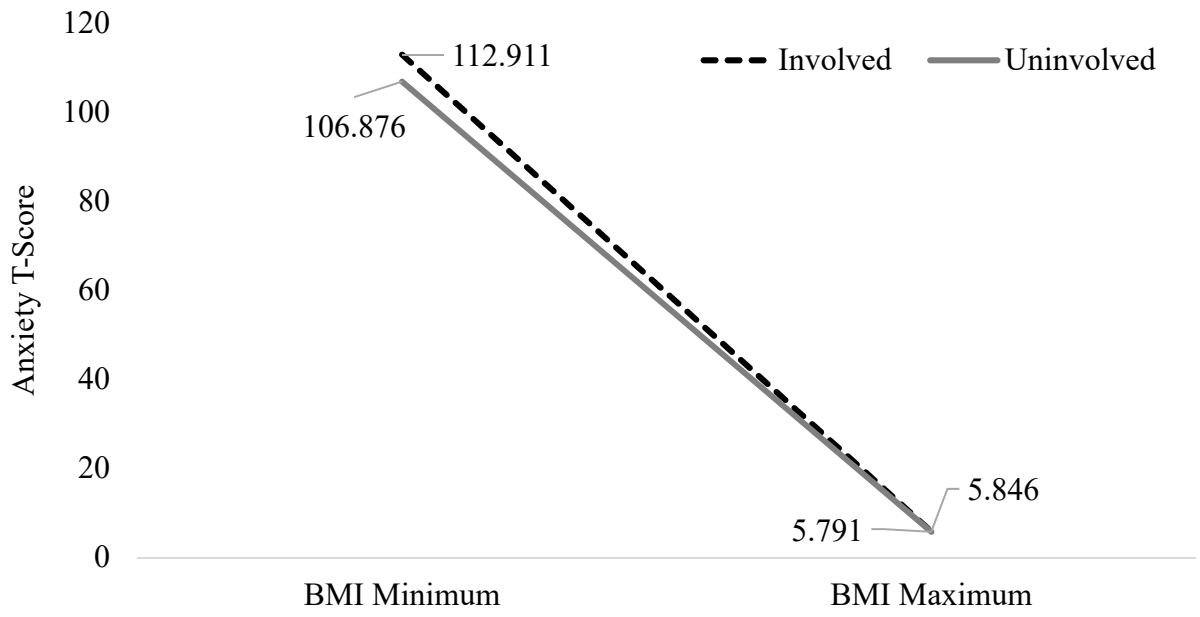

Figure 4. For females, a significant interaction effect between the participants' involvement in bullying and their weight status on anxious symptomology was found. More specifically, within participants with lower BMIs, anxious symptomology was higher for those who were involved in bullying than those who were uninvolved.

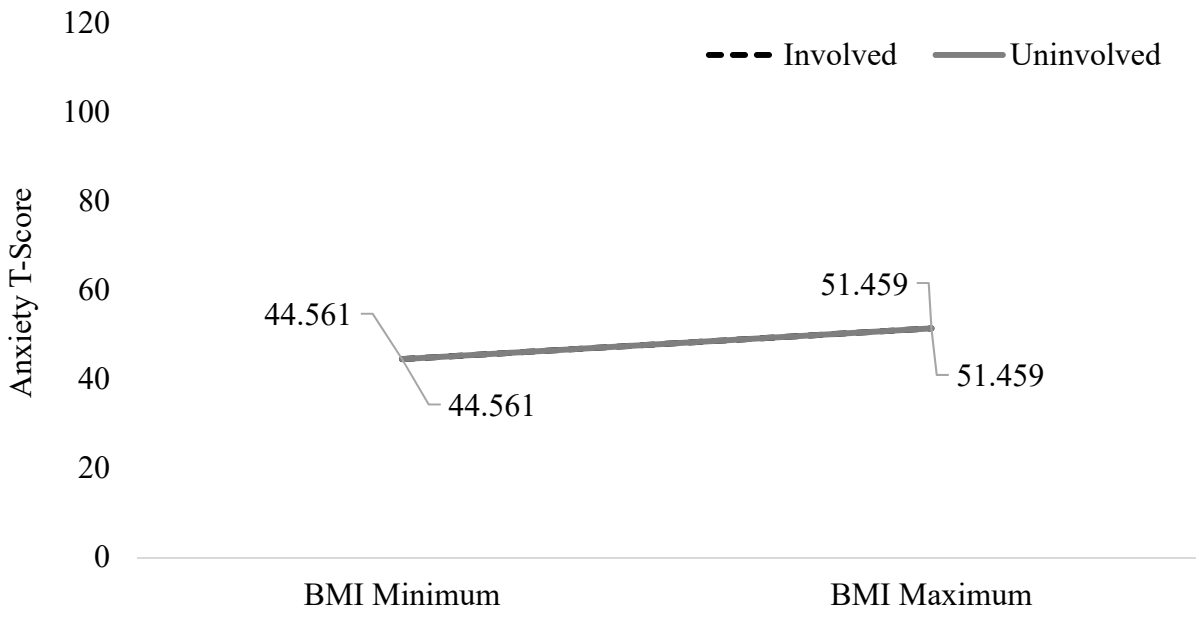

Figure 5. For males, a nonsignificant interaction effect of bullying involvement on weight status and anxious symptomology was found.

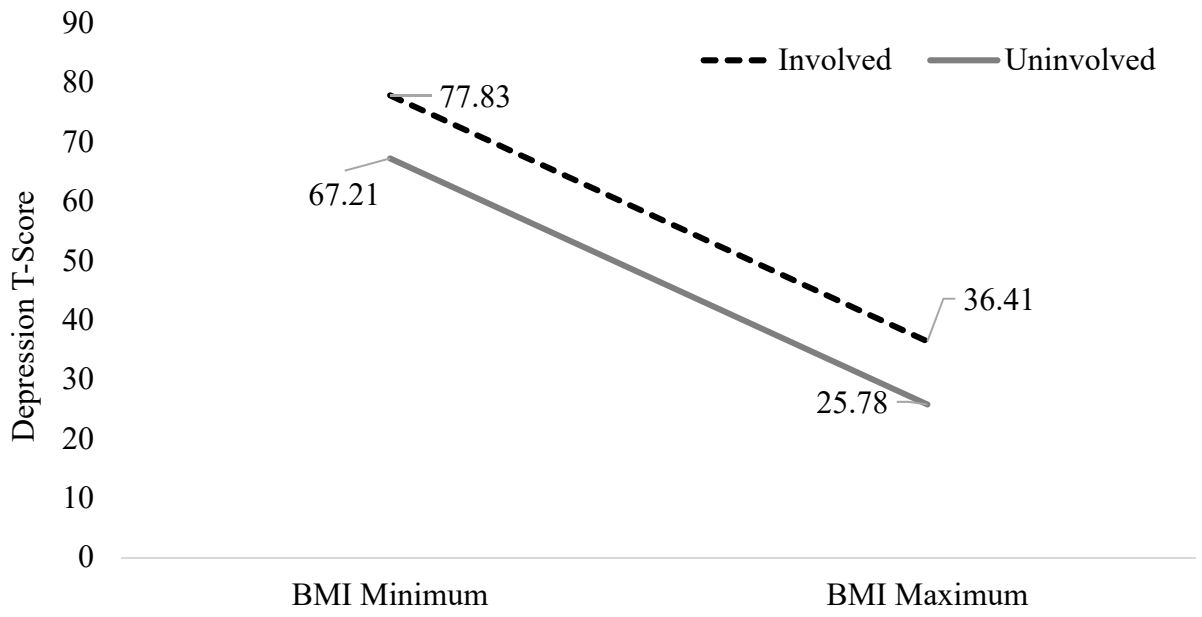

Figure 6. For females, a nonsignificant interaction effect of bullying involvement on weight status and depressive symptomology was found.

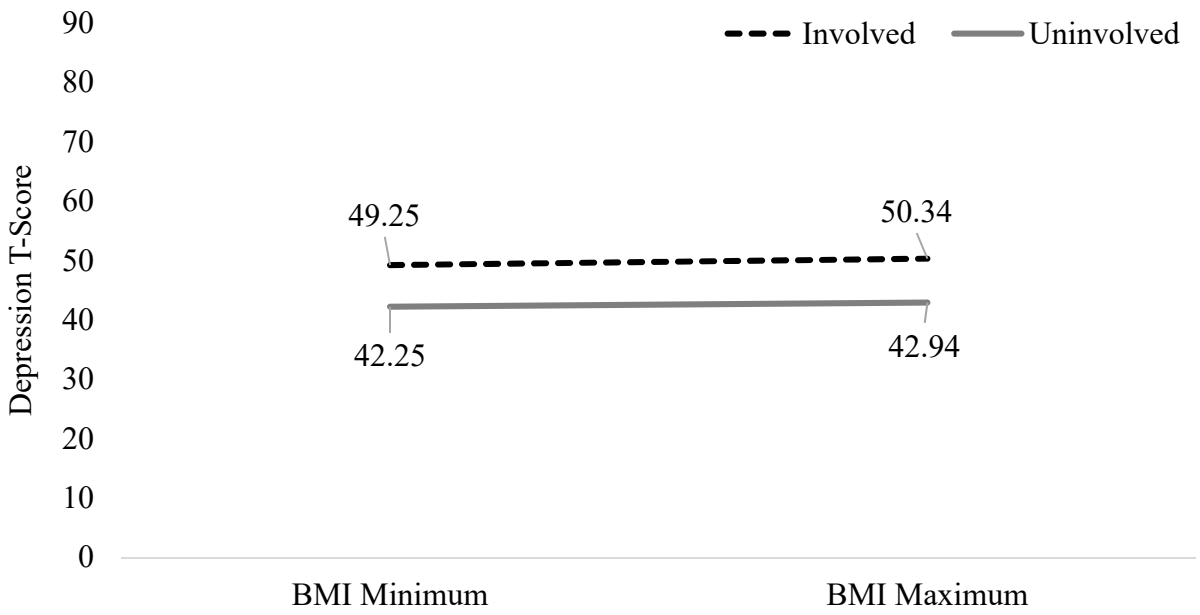

Figure 7. For males, a nonsignificant interaction effect of bullying involvement on weight status and depressive symptomology was found.

APPENDIX A

ORIGINAL IRB APPROVAL

August 20, 2011

Susan Swearer Napolitano
Department of Educational Psychology
40 TEAC, UNL, 68588-0345

Paige Lembeck
Department of Educational Psychology
3522 McLaughlin Dr, Lincoln, NE 68516-7744

IRB Number: 20110811846FB
Project ID: 11846
Project Title: Target Bullying Prevention and Intervention Project: An Examination of Health Correlates

Dear Susan:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study based on the information provided. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

Date of Full Board review: July 21, 2011

You are authorized to implement this study as of the Date of Final Approval: 08/20/2011. This approval is Valid Until: 07/20/2012.

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:
* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;

* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

For projects which continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report form and returning it to the Institutional Review Board.

If you have any questions, please contact the IRB office at 472-6965.

Sincerely,

William Thomas, Ph.D.
Chair for the IRB

APPENDIX B

CURRENT STUDY IRB APPROVAL

University of Nebraska Lincoln

October 10, 2017

Susan M Swearer
Department of Educational Psychology
40 TEAC, UNL, 685880345

Ana Damme
Department of Educational Psychology
3011 S 48th Ave Omaha, NE 68106

IRB Number: 20171017346 EX
Project ID: 17346
Project Title: Weight Status, Bullying Involvement, and Internalizing Symptomology in Adolescents: Examining a Diathesis-Stress Model

Dear Susan:

This letter is to officially notify you of the approval of your project by the Institutional Review Board (IRB) for the Protection of Human Subjects. It is the Board's opinion that you have provided adequate safeguards for the rights and welfare of the participants in this study based on the information provided. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects (45 CFR 46).

You are authorized to implement this study as of the Date of Final Approval: 10/10/2017. This approval is Valid Until: 10/09/2018.

o Review conducted using expedited review category 7 at 45 CFR 46.110
o Date of Approval: 10/10/2017
o Date of Expedited review: 9/26/2017
o Date of Acceptance of Revisions: 10/10/2017
o Funding (Grant congruency, OSP Project/Form ID and Funding Sponsor Award Number, if applicable): N/A
o Consent waiver: N/A
o Review of specific regulatory criteria (contingent on funding source): 45 CFR 46
o Subpart B, C or D review: N/A

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

For projects which continue beyond one year from the starting date, the IRB will request continuing review and update of the research project. Your study will be due for continuing review as indicated above. The investigator must also advise the Board when this study is finished or discontinued by completing the enclosed Protocol Final Report form and returning it to the Institutional Review Board.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,

Becky R. Freeman

Becky R. Freeman, CIP
for the IRB

APPENDIX C

Bully Survey—Student Version (BYS-S)

Measure is copyrighted and was used for this current study with permission from the author.

Children's Depression Inventory—Short (CDI-S)

Measure is copyrighted and was used for this study with permission from the publisher.

The Multidimensional Anxiety Scale for Children—10 (MASC-10)

Measure is copyrighted and was used for this current study with permission from the publisher.