2019

Parental Involvement and the Mental Health of Adolescents with Chronic Pain

Amanda Mikedis
Antioch University, New England

Parental Involvement and the Mental Health of Adolescents with Chronic Pain

by

Amanda M. Mikedis

B.A., University of Rochester, 2009
M.S., Antioch University New England, 2017

DISSERTATION

Submitted in partial fulfillment for the degree of
Doctor of Psychology in the Department of Clinical Psychology
at Antioch University New England, 2018

Keene, New Hampshire

Department of Clinical Psychology

DISSERTATION COMMITTEE PAGE

The undersigned have examined the dissertation entitled:

PARENTAL INVOLVEMENT AND THE MENTAL HEALTH OF ADOLESCENTS WITH CHRONIC PAIN

presented on January 10, 2018

by

Amanda M. Mikedis

Candidate for the degree of Doctor of Psychology
and hereby certify that it is accepted*.

Dissertation Committee Chairperson:
Kathi A. Borden, PhD

Dissertation Committee members:
Deirdre Brogan, PhD
Jaqueline Raftery-Helmer, PhD

Accepted by the
Department of Clinical Psychology Chairperson

George Tremblay, PhD
on **1/10/18**

***** Signatures are on file with the Registrar's Office at Antioch University New England.

Acknowledgements

I would like to acknowledge my committee members for continually guiding and encouraging me in the way I truly needed to complete this research project. And thank you to my family for providing unwavering support throughout this process. I could not have done it without you.

This research used data from Add Health, a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due to Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (http://www.cpc.unc.edu/addhealth). No direct support was received from grant P01-HD31921 for this analysis.

Table of Contents

Abstract 1
Literature Review 2
Increasing Rates of Adolescent Chronic Pain Problems 2
The Costs of Chronic Pain 3
Chronic Pain and Adolescent Mental Health 4
Parental Influences on Adolescents with Chronic Pain 6
Parental involvement. 7
Involvement and chronic pain. 9
Statement of Purpose 10
Method 11
Sample 11
Inclusion criteria 12
Measures 13
Chronic pain status 13
Parental involvement 14
Internalizing symptomatology 15
Demographics 16
Data Analysis 16
Results 17
Sample Description 17
Preliminary Analyses 19
Correlations among Parental Variables 20
Correlations among Anxiety, Depression, and Parental Involvement 22
Significant Differences between Correlations 24
Discussion 24
Clinical Implications 32
Limitations and Future Directions 33
Conclusion 37
References 39

Abstract

The present research examined the relationship between parental involvement and the internalizing symptomatology of adolescents with chronic pain. Parents play a significant role in the pain experience and the mental health of adolescents with chronic pain, but research on parental involvement and symptoms of anxiety and depression in adolescents with chronic pain is scarce. The aim of this study was to examine the benefits of parental involvement for the mental health of adolescents with chronic pain. Archival data from the National Longitudinal Study of Adolescent Health (Add Health) of 616 adolescents with chronic pain was used to address the research gap. Correlational analyses revealed that higher levels of both maternal and paternal involvement, particularly emotional closeness, were associated with better self-reported psychological functioning, especially with depression in adolescents with chronic pain. These findings have important clinical implications for identifying adolescents with chronic pain who are vulnerable to experiencing symptoms of anxiety and depression as well as suggesting that clinicians use effective family interventions to address these symptoms.

Keywords: chronic pain, adolescent mental health, parental involvement, Add Health

Parental Involvement and the Mental Health of Adolescents with Chronic Pain

Literature Review

Pain is a universal yet complex experience that is shaped by an array of cognitive, emotional, and genetic factors. Most individuals will experience multiple episodes of acute pain during their lifetime while others will experience pain chronically. Just as understanding pain is intricate, defining chronic pain is also complex and variable (Williams, 2011). The International Association for the Study of Pain defines *chronic pain* as pain lasting more than three months yet others define it as pain that is present at least six months in the past year (Clark, 2002; Eriksen, 2003; Merskey, 1986). The American Pain Society notes that chronic pain is pain that lasts longer than a typical tissue healing period of approximately three to six months (Palermo, Valrie, & Karlson, 2014). Pain may be due to an injury (e.g., car accident injury), an underlying disease (e.g., cancer), or a widespread or regional chronic pain condition with no known or identifiable cause (e.g., chronic back pain or complex regional pain syndrome; Palermo, Valrie, & Karlson, 2014).

Increasing Rates of Adolescent Chronic Pain Problems

Chronic pain problems have rapidly increased in recent years and have become a common concern for not only adults but adolescents as well (Fearon, McGrath, & Achat, 1996; Goodman & McGrath, 1991; King et al., 2011). Adolescents who experience chronic pain typically have either musculoskeletal, abdominal, or headache pain that can be mild to severe (Perquin et al., 2000). The percentage of adolescents who experience moderate to severe disability from chronic pain is estimated to vary from 5% to 8% (Huguet & Miró, 2008; King et al., 2011; Lewandowski & Palermo, 2009). When adolescents with milder forms of chronic pain are also included in these estimates, researchers have found adolescent chronic pain prevalence

rates of approximately 20% to 30% (Noel, Groenewald, Beals-Erickson, Gebert, & Palermo, 2016; Stanford, Chambers, Biesanz, & Chen, 2008). Some researchers argue for even higher rates of chronic pain. A meta-analysis of 41 studies on chronic pain in children and adolescents by King et al. found prevalence rates as high as 50% for chronic abdominal or musculoskeletal pain and 75% for chronic headaches. Adolescents accounted for the majority of these chronic pain cases as chronic pain difficulties are more common in adolescence than during earlier childhood due to physical, social, emotional, and cognitive developmental changes that occur during adolescence (King et al., 2011; Palermo et al., 2014; Roth-Isigkeit, Thyen, Stöven, Schwarzenberger, & Schmucker, 2005). No matter the exact rate of adolescent chronic pain, it is clear that chronic pain problems affect a large portion of the adolescent population and that the chronic pain epidemic is certainly no longer a health concern only for adults.

The Costs of Chronic Pain

Chronic pain is a key concern for health care systems because of its resulting costs and disability (Lewandowski & Palermo, 2009). Chronic pain contributes to approximately 20% of primary care office visits, and in Western societies, it is one of the most costly health conditions (Gureje, Von Korff, Simon, & Gater, 1998; Maniadakis & Gray, 2000). In fact, the United States' overall economic costs due to chronic pain is estimated to be between $50 and $70 billion per year and approximately $20 billion per year for the health care cost for adolescents with moderate to severe chronic pain (Brennan, Carr, & Cousins, 2007; Groenewald, Essner, Wright, Fesinmeyer, & Palermo, 2014). Because many adolescents require an interdisciplinary approach to deal with their pain, the average health care cost is about $12,000 per adolescent, and the high costs of treatment make receiving proper treatment difficult (Groenewald et al., 2014).

Even individuals who can afford and seek proper treatment often receive little relief from their chronic pain symptoms. Williams (2011) explains that even though pain medications make up the second most frequently prescribed class of drug, these medications do not sufficiently reduce pain, and in fact, only about a third of individuals receive relief from pain medications. Despite being used frequently, epidural injections provide limited continuous relief (Turk, 2002). Even surgery is often ineffective at relieving pain as up to 75% of pain-related surgery patients still experience pain (Williams, 2011). Therefore, many individuals with chronic pain must learn to bear the physical burden of their medical condition.

Living with unrelenting pain is unfortunately associated with significant psychosocial costs. For example, adolescents with chronic pain often experience significant disruptions in their daily lives, including frequent school absenteeism and withdrawal from peer relationships (King et al., 2011; Logan et al., 2012). Adolescents with pain have fewer friendships, are more isolated and prone to peer victimization, and are less liked by peers, and these peer difficulties can exacerbate pain symptoms (Palermo et al., 2014). They often do not feel well enough or physically cannot engage in the same activities that their peers can, which contributes to more peer difficulties. Adolescents with chronic pain must also deal with decreased independence compared to peers, despite the fact that adolescence is a time marked by a desire for increased emotional and physical independence from parents (Palermo et al., 2014). This loss of independence alone can contribute to added emotional distress and, in turn, heighten the pain experience (Williams, 2011).

Chronic Pain and Adolescent Mental Health

The persistent physical burden and resulting social effects often take a tremendous toll on adolescents' mental health. Psychiatric disorders, especially major depression and anxiety, occur

at a higher rate in adolescents with chronic pain than in the general population (Williams, 2011). Therefore, the high prevalence of adolescents with chronic pain is a significant area of concern for psychologists, as these adolescents are at increased risk for negative psychological outcomes, including higher levels of internalizing symptomatology.

More specifically, it is especially common for individuals with chronic pain to experience depressive symptoms, and approximately 25% of adolescents with chronic pain have been diagnosed with a depressive disorder (Kashikar-Zuck, Goldschneider, Powers, Vaught, & Hershey, 2001; Noel et al., 2016). Comorbidity of depression and chronic pain from headaches is especially common in female adolescents. Egger, Angold, and Costello (1998) found that 75% of female adolescents with depression experience headaches on a daily or weekly basis. Individuals with chronic pain are also prone to experiencing heightened levels of anxiety, as being in constant pain can be a stress-inducing experience in itself (Morey, Williams, & Black, 2002; Simons, Sieberg, & Claar, 2012). In fact, one in four adolescents with chronic pain may meet criteria for an anxiety disorder (Noel et al., 2016). Importantly, higher levels of pain have been associated with heightened levels of depression and anxiety (Gore et al., 2005).

When internalizing symptoms are not properly addressed during adolescence, adolescents likely continue experiencing these psychological difficulties into adulthood. Noel et al. (2016) found that adults who experienced chronic pain during adolescence were significantly more likely to have a depressive or anxiety disorder than adults who did not experience chronic pain during adolescence. It is especially common for young adults who developed chronic pain during childhood to experience post-traumatic stress disorder due to the pain experience (Shelby et al., 2013). Guidetti et al. (1998) found that adolescents with migraines and depressive symptoms are more likely to experience both pain-related and psychological symptoms almost a decade later.

At the same time, the relationship between pain and psychological functioning is bidirectional. Research clearly highlights the impact that chronic pain can have on mental health. Psychological symptoms, such as anxiety and depression, can intensify an individual's focus on pain sensations and in turn contribute to reports of heightened pain level (Bair, Robinson, Katon, & Kroenke, 2003; Lewandowski & Palermo, 2009). Depressive symptoms have also been linked to more frequent errors in recalling pain levels (Van den Brink, Bandell-Hoekstra, & Abu-Saad, 2001). Therefore, addressing the emotional difficulties of adolescents with chronic pain is crucial not only for adolescents' mental health, but also their pain experience.

Parental Influences on Adolescents with Chronic Pain

To properly address the internalizing symptomatology that many adolescents with chronic pain experience, it is important to understand what factors impact and maintain adolescents' pain experiences and the resulting physical and psychological difficulties. Researchers have stressed the importance of parental influences for the mental health and overall pain experience of adolescents with chronic pain (Logan et al., 2012). For example, family discord, including parental conflict and low family support, exacerbates chronic pain (William, 2011). Lewandowski and Palermo (2009) found that when parents argue more frequently and provide less autonomy, adolescents with chronic headaches and migraines are more likely to experience depressive symptoms and chronic pain impairment. Parental behaviors can also have positive effects on the pain-related behaviors of adolescents. For example, maternal modeling around pain management is associated with improved pain management engagement and choices in adolescents who have chronic pain due to sickle cell disease (Beyer & Simmons, 2004; Palermo et al., 2014). Overall, research on the influence of parental factors on adolescents with chronic pain is still fairly limited and, thus, needs to be expanded to include other parental

factors.

Parental involvement. Another important parental influence on adolescents' mental health is parental involvement, such as parents' communication with and responsiveness to their child (Alleyne-Green, Grinnell-Davis, Clark, Quinn, & Cryer-Coupet, 2016). Parental involvement has repeatedly been shown to be beneficial for a youth's healthy social and emotional development (Cone, Delawyer, & Wolfe, 1985; Shannon, Tamis-LeMonda, London, & Cabrera, 2002). Parental involvement is especially important during adolescence because a youth's development is marked by a desire for increased independence from parents both emotionally and physically (Palermo et al., 2014). Adolescents begin to spend less time at home and more time with friends and they desire to be seen as adults with regard to their decisions (Cripps & Zyromski, 2009). At the same time, adolescents still need their parents' support and guidance, and consequently, it is crucial that parents continue to remain involved. In fact, parental involvement may be especially important during adolescence as it is a stronger predictor of adolescents' well-being than it is of children's well-being (Wenk, Hardesty, Morgan, & Blair, 1994). Adolescents who perceive that their parents are more involved experience a greater sense of well-being, including increased self-esteem, self-worth, and self-efficacy, which are all factors that are especially important to adolescent development (Cripps & Zyromski, 2009).

Parental involvement is defined in various ways, including their communication with and responsiveness to their adolescent as well as the parents being interested in and in constant contact with, knowing about, and participating in the adolescent's life (Alleyne-Green et al., 2016). Because researchers tend to view the concept of involvement slightly differently and to focus on only one element of involvement, especially engagement, a multidimensional conceptualization of parental involvement is optimal (Cabrera, Tamis-LeMonda, Bradley,

Hofferth, & Lamb, 2000; Goncy & Van Dulmen, 2010; Schoppe-Sullivan, McBride, & Ho, 2004). A multidimensional perspective on involvement highlights three dimensions: (a) shared communication, (b) shared activity participation, and (c) emotional closeness (Alleyne-Green et al., 2016; Goncy & Van Dulmen, 2010). The benefits of each of these three dimensions of parental involvement on adolescents' well-being have been documented as each encourages positive adolescent emotional and behavioral outcomes.

Shared communication. Shared communication, which is one indicator of parental involvement, is characterized by frequent and open communication between parents and their adolescents. Open and less problematic communication between parents and adolescents is associated with fewer adolescent emotional difficulties, including lower levels of depression and anxiety symptoms (Landman-Peters et al., 2005). Houck, Rodrigue, and Lobato (2007) demonstrated that the more open the parent-adolescent communication is, the better adjusted adolescents who live with a chronically ill parent are. That is, these adolescents are less likely to experience depressive, post-traumatic, and anxiety symptoms. Shared communication between parents and adolescents in middle school is furthermore associated with improved adolescent behavioral outcomes, including fewer adolescent acts of delinquency (Clark & Shields, 1997; Griffin, Botvin, Scheier, Diaz, & Miller, 2000).

Shared activity participation. A second element of parental involvement, shared activity participation, refers to parents and adolescents engaging in activities together, such as playing sports or going shopping together. When parents engage in activities with their adolescents, adolescents tend to experience fewer depressive symptoms (Yuan & Hamilton, 2006). Adolescents who do activities with their parents, such as eating dinner, are furthermore less likely to be aggressive (Griffin et al., 2000). Shared activity participation clearly has positive

effects on behavioral and emotional outcomes and can also have a lasting influence on youth's emotional well-being for years to come. For example, a father's engagement in activities with his children, such as taking outings, can be a protective factor against future psychological maladjustment, including increased symptoms of irritability and anger, during adolescence (Flouri & Buchanan, 2003a).

Emotional closeness. A third important element of parental involvement is emotional closeness, or whether or not adolescents feel emotionally connected with their parents and feel as though they can trust them. Adolescents experience fewer emotional problems, including increased happiness and decreased depression, when they feel close to their parents (Flouri & Buchanan, 2003b). Amato (1994) found that adolescents who reported feeling emotionally close to their parents experienced higher levels of psychological well-being, including higher levels of happiness, self-esteem, and well-being, and lower levels of distress. Coley (2003) examined whether trust between father-daughter dyads was related to adolescent daughters' psychological functioning and results indicated that adolescents who felt more disengaged from and angry with their parents were more likely to experience depressive symptoms. Emotional closeness can also have positive behavioral effects on adolescents. For example, when parents are more emotionally close to their adolescents, their adolescents are less likely to engage in antisocial behaviors, such as bullying (Flouri & Buchanan, 2003b).

Involvement and chronic pain. Despite the clear benefits of parental involvement, research on the influence of parental involvement on adolescents with chronic pain has been extremely limited. To date, the only known study on parental involvement in chronic pain used a sample of youth between the ages of 6 and 18 who had sickle cell disease (Oliver-Carpenter et al., 2011). This study found that higher levels of parental involvement in pain management tasks,

such as making doctors' appointments, are related to lower levels of negative thinking in the youth sample (Oliver-Carpenter, Barach, Crosby, Valenzuela, & Mitchell, 2011). At the same time, it is important to note that involvement in this study was limited to parents' participation in their adolescents' pain experience and did not incorporate a multidimensional conceptualization of involvement. Therefore, despite this initial research, no known research has examined the influence of parental involvement on adolescents' internalizing symptomatology using a diverse chronic pain sample.

Statement of Purpose

Although researchers have begun to explore what parental factors may impact the psychological functioning of adolescents with chronic pain, past research is limited. Parental involvement has repeatedly been shown to play a crucial role in adolescents' well-being yet no known studies have specifically examined parental involvement and adolescents' internalizing symptomatology in a generalized adolescent chronic pain population. Identifying parental factors, such as parental involvement, that are associated with mental health outcomes is a crucial topic to examine because it can ultimately be used to improve these adolescents' internalizing symptomatology, which in turn can influence pain. These influences can furthermore be incorporated into developing more effective psychological interventions for these adolescents. Therefore, the present research aimed to better understand the relationship between parental involvement and adolescent self-reported symptoms of anxiety and depression using a chronic pain sample with an array of pain diagnoses.

The present research examined the following quantitative research question: What is the relationship between parental involvement (shared communication, shared activity participation, and emotional closeness) and self-reported psychological outcomes of anxiety and depression in

a diverse sample of adolescents with chronic pain? Consistent with previous research findings demonstrating an inverse relationship between parental involvement and adolescent psychological outcomes, it was hypothesized that there will be a negative relationship between parental level of involvement and adolescents' self-reported level of anxiety and depression (Cripps & Zyromski, 2009; Wenk, Hardesty, Morgan, & Blair, 1994).

Method

Sample

Data for this study was drawn from the National Longitudinal Study of Adolescent Health (Add Health; Harris et al., 2009). Add Health is a longitudinal study that involves four completed waves. A fifth wave of data collection is currently underway and expected to be completed in 2018. The study, which began in 1994, was aimed at understanding how family, friendships, peers, school, and other environmental factors influence adolescent health outcomes and how these factors vary across the lifespan. Archival data used to address the current research questions came from Wave I data of Add Health, which were collected from September 1994 to April 1995.

To determine a nationally representative sample, Harris et al. (2009) used systematic sampling methodology as well as implicit stratification. The first sampling frame was based on the Quality Education Database, which is viewed as the most thorough list of United States high schools (Tourangeau & Shin, 1998). The resulting stratified sample included 80 high schools and 52 middle schools, which varied in factors such as region, school size, school type (e.g., private, public), urbanization, and grade span (Harris et al., 2009; Tourangeau & Shin, 1998).

Ultimately, 90,000 individuals completed an in-school interview as the first part of Wave I data collection. These respondents were in 7^{th} to 12^{th} grade and between the ages of 11 and 21.

From this sample of 90,000, the Add Health researchers selected 20,745 students to complete the next portion of the study, the in-home survey. This sample consisted of both a core sample of 12,105 students who were selected based on grade and sex stratification and random selection, as well as an oversample of certain populations (e.g., disabled adolescents; adolescents who were Cuban, Puerto Rican, and Chinese; Harris et al., 2009). Data on demographics, adolescent chronic pain, depression, and anxiety, and parental involvement, which were collected through these in-home questionnaires, were used to address the current research questions. Only the Wave I in-home questionnaire data from 6,504 respondents was available for public use and thus used for the current study. According to Harris et al., only this small sample is available to the public to reduce the risk of deductive disclosure, or determining a "respondent's identity and responses through the use of known characteristics of that individual," as many Americans know someone who participated in the Add Health study.

Inclusion criteria. From these public use data of 6,504 respondents, only the data of adolescents experiencing chronic pain were included in the analysis for the current study. Furthermore, respondents who had not answered all questions on the measures that were used for the current analysis were excluded.

Consistent with the World Health Organization's definition of adolescence, an adolescent in the current study was defined as an individual between the ages of 10 and 19 years old (Sacks, 2003). From the original sample of 6,504 respondents, 33 respondents were excluded because they did not meet adolescent age requirements. Therefore, a total of 6,471 adolescents' data were available to use in the current study.

Based on the "chronic pain status" criteria described below, 5,462 of the 6,471 adolescents were classified as not experiencing chronic pain. One additional adolescent refused

to answer any questions regarding pain, and one adolescent responded "don't know" to all questions. Therefore, a total of 5,464 adolescents did not meet criteria to be classified as adolescents with chronic pain. The remaining 1,007 adolescents were classified as experiencing chronic pain.

Of those 1,007 adolescents with chronic pain, 391 adolescents did not complete at least one of the parental involvement questionnaires because, for example, they had a single parent or same-sex and gender diverse parents. As the present research questions centered on both mothers' and fathers' involvement, these adolescents' data could not be used to address the research questions and were excluded. Following the exclusion of these 391 adolescents' data, 616 adolescent respondents remained and made up the sample included in the final analyses to address central research questions.

Measures

Chronic pain status. As part of a self-report survey on adolescent general health, participants were asked how often they experienced each of the following during the past 12 months: (a) headache; (b) stomachache or upset stomach; and (c) aches, pain, or soreness in muscles or joints. Participants responded to items using a 5-point scale (never, just a few times, about once a week, almost every day, every day). For the current study, adolescents who responded to all items with "never," "just a few times," or "about once a week" were categorized as not experiencing chronic pain, and adolescents who reported experiencing pain "almost every day" or "every day" were categorized as adolescents with chronic pain. Many previous researchers' definitions of chronic pain using Add Health data have been less conservative and included responses of "about once a week" as meeting criteria for chronic pain (Rhee, 2000; Rhee, Miles, Halpern, & Holditch-Davis, 2005; Van Tilburg, Spence, Whitehead, Bangdiwala, & Goldston, 2011; Youssef, Atienza, Langseder, & Strauss, 2008). However, the current study

used a more conservative approach to define chronic pain, similar to more recent research using Add Health data (Noel et al., 2016; Wilner, Vranceanu, & Blashill, 2014). As described by Noel et al., this conservative approach made sure that rates of chronic pain are not overinflated as it incorporates only "high-frequency pain."

Parental involvement. Adolescents' perceptions of their mother's involvement and adolescents' perceptions of father's involvement were also measured during Add Health Wave I. The present study followed previous research using the Add Health dataset and examined maternal involvement and paternal involvement using the following three constructs: (a) emotional closeness, (b) shared communication, and (c) shared activity participation (Goncy & Van Dulmen, 2010; Jordan & Lewis, 2005). Maternal emotional closeness, shared communication, and shared activity participation were each individually examined in relation to adolescent anxiety and depression. Similarly, paternal emotional closeness, shared communication, and shared activity participation were each separately examined, as opposed to examining an overall involvement composite, in relation to adolescent anxiety and depression.

Emotional closeness. Adolescents' emotional closeness to their mother was measured using one item asking how close adolescents felt to their mother. Adolescents' emotional closeness to their fathers was measured with a similar item asking how close they felt to their father. Add Health participants responded to each item using a 5-point Likert scale (1 = not at all; 5 = very much).

Shared communication. Total maternal shared communication was calculated based on adolescents' responses on five items regarding mothers. Five similar items regarding fathers were used to calculate total paternal shared communication. These items asked if the adolescent and his or her parent discussed four life events (grades, school projects, personal problems, and

dating or going to a party) or if the adolescent had a serious argument about his or her behavior with the parent. Adolescents were asked to respond either “no” or “yes” to these items. The minimum possible total shared communication score was 0, and the maximum possible score was 5. Both positive and negative discussion topics were included in the shared communication composite to reflect a broad range of communication, as previous researchers have done (Goncy & Van Dulmen, 2010; Jordan & Lewis, 2005).

Shared activity participation. Total maternal shared activity participation was determined by summing adolescents’ responses on five items regarding mothers. Responses on five similar items regarding fathers were summed to calculate total paternal shared activity participation. Add Health respondents were asked whether they engaged in activities (sports, social outings, shopping, school projects, and religious services) with their mother or father over the past four weeks. Adolescents were given the response options of either “no” or “yes.” The minimum possible total shared activity participation score was 0, and the maximum possible score was 5.

Internalizing symptomatology. Adolescents’ internalizing mental health difficulties were also assessed during Wave I Add Health data collection. More specifically, adolescents’ symptoms of anxiety and depression were measured using the items described below.

Anxiety symptoms. Adolescents’ anxiety symptoms were measured using a 5-item questionnaire. Add Health participants rated how often they experienced the following symptoms over the past year: (a) cold sweats; (b) fearfulness; (c) felt hot all over suddenly for no reason; (d) chest pains; (e) trouble relaxing. They responded to these items on a 5-point scale ranging from “never” (scored as 0) to “every day” (scored as 4). Consistent with previous research, each adolescent’s total anxiety symptom score was calculated for the current study by summing adolescents’ responses on the five items (Noel et al., 2016). The minimum possible total anxiety

symptoms score was 0, and the maximum possible score was 20.

Depressive symptoms. Adolescents' depressive symptomatology was measured using 16 items derived from the Center for Epidemiologic Studies-Depression Scale (CES-D), an approach used in previous Add Health research (Van Tilburg et al., 2011; Youssef et al., 2008). Using a 4-point scale that ranged from "never/rarely" (scored as 0) to "most/all of the time" (scored as 3), adolescents responded to how frequently they experienced a depressive symptom, such as feeling lonely, during the past week. Consistent with CES-D scoring, four items were first reverse scored for the current study, and then total depressive symptoms scores were calculated by summing the responses on the 16 items. The minimum possible total depressive symptoms score was 0, and the maximum possible score was 48.

Demographics. Three sociodemographic variables were included in the analysis to better understand sample characteristics. The sex and age of respondents were examined. The third variable examined was adolescents' race (White; Black or African American; American Indian or Native American; Asian or Pacific Islander; Other).

Data Analysis

Data were analyzed using SPSS. First, the data of the 6,504 respondents were screened to determine which respondents were adolescents, and then the adolescents were categorized into "chronic pain" versus "not chronic pain" following the above described procedure. Incomplete records, which did not provide sufficient information regarding adolescents' pain, were not labeled as either chronic pain or not chronic pain. As previously mentioned, the final sample for this study only included adolescents who met the criteria for chronic pain and who answered all questionnaires. Descriptive statistics were used to find the sample demographic characteristics. Sample characteristics for the adolescent chronic pain sample as well as the full sample of

adolescent respondents and the sample of adolescents without chronic pain were used for the sole purpose of providing information regarding sample representativeness and not for further analyses regarding the relationship between parental involvement and adolescents' self-reported psychological functioning.

Correlations were then conducted to examine the relationship between parental involvement and adolescents' self-reported symptoms of anxiety and depression using data of only adolescents with chronic pain. More specifically, the relationship between adolescent self-reported depression and each of the three constructs of maternal involvement was examined. A similar correlational analysis was conducted to examine the relationship between adolescent self-reported depression and the three constructs of paternal involvement. Additionally, a correlational analysis was used to examine the relationship between adolescent self-reported anxiety and the three maternal-involvement constructs as well as the relationship between adolescent self-reported anxiety and the three paternal involvement constructs. Because of the well-documented benefits of parental involvement, it was expected that adolescents with chronic pain who reported higher levels of both maternal and paternal involvement would report lower levels of both anxiety and depression.

Results

Sample Description

As shown in Table 1, the final sample of 616 adolescents consisted of 357 females and 259 males. These adolescents' mean age in years was 15.5 (*SD* =1.65). With regard to the racial makeup of the sample, respondents were allowed to select more than one category. Four hundred seventy-three adolescents selected "White," and 93 adolescents selected "Black or African American." Thirty-five adolescents identified themselves as American Indian or Native

American. Twenty adolescents described themselves as Asian or Pacific Islander. An additional 39 adolescents selected “Other” to describe their race.

Along with these sample characteristics, characteristics for the full adolescent sample and “no chronic pain” sample are provided in Table 1. The average age of respondents (M = 15.5) was consistent across all three samples. The chronic pain sample consisted of more female adolescents (58%) than the full sample (51.6%) and sample without chronic pain (50.2%) ($t(6,078) = 5.56$, $p < .001$).

Although the majority of respondents in all three samples were White, the chronic pain sample was comprised of more White respondents than the full sample and the sample without chronic pain ($t(6,078) = 2.18$, $p < .05$). Specifically, 76.8% of adolescents with chronic pain described themselves as “White.” In comparison, 66.2% of the full sample and 65.8% of the sample without chronic pain was White.

Table 1
Sample Demographics

	Full Sample	Chronic Pain Sample	No Chronic Pain Sample
Sample Size (*N*)	6,471	616	5,462
Age (in years with range)	15.5 (11-19)	15.5 (12-19)	15.5 (11-19)
Sex (%)			
Female	51.6	58.0	50.2
Male	48.4	42.0	49.8
Race (%)*			
White	66.2	76.8	65.8
Black/African American	24.8	15.1	24.9
Native American	3.6	5.7	3.4
Asian/Pacific Islander	4.1	3.2	4.4
Other	6.5	6.3	6.6

*Respondents were allowed to select more than one category to describe their race and ethnicity.

Preliminary Analyses

Means, standard deviations, and ranges of the three parental involvement constructs in addition to adolescent self-reported symptoms of anxiety and depression were first examined (Table 2). On average, mothers were rated as more involved with their adolescents than fathers were. Specifically, adolescents reported that they felt significantly more emotionally close to their mothers ($M = 4.45$, $SD = .87$) than their fathers ($M = 4.10$, $SD = 1.06$) ($t(616) = 9.12$, $p < .001$). Adolescents additionally reported engaging in more shared activities with their mothers ($M = 1.52$, $SD = 1.05$) than their fathers ($M = 1.14$, $SD = 1.18$) ($t(616) = 9.01$, $p < .001$). Similarly, adolescents communicated more with their mothers ($M = 2.49$, $SD = 1.45$) than their fathers ($M = 1.70$, $SD = 1.34$) ($t(616) = 14.29$, $p < .001$).

Table 2

Means, Standard Deviations, and Ranges of All Measures

Measure	*M*	*SD*	Range
Maternal Involvement			
Emotional Closeness	4.45	.87	1-5
Shared Activity Participation	1.52	1.05	0-5
Shared Communication	2.49	1.45	0-5
Paternal Involvement			
Emotional Closeness	4.10	1.06	1-5
Shared Activity Participation	1.14	1.18	0-5
Shared Communication	1.70	1.34	0-5
Adolescent Mental Health			
Anxiety	3.47	2.74	0-19
Depression	15.33	9.11	1-47

Adolescents' average level of self-reported symptoms of anxiety was 3.47 (*SD* = 2.74). Their average level of self-reported symptoms of depression was 15.33 (*SD* = 9.11). These levels of anxiety and depressive symptoms were both relatively low given that adolescents could have scored anywhere from 0 to 48 on the anxiety measure and 0 to 48 on the depression scale.

Correlations among Parental Variables

As shown in Table 3, correlations among parental involvement variables and adolescent mental health outcomes revealed that the three constructs of maternal involvement were correlated with one another. With regard to mothers, emotional closeness was positively correlated with shared activity participation ($r = .16$, $p < .01$) and with shared communication ($r = .11$, $p < .01$). Adolescents who reported that they were emotionally close to their mothers tended to report engaging in both more shared activities and communication with their mothers.

For fathers, emotional closeness was also positively correlated with shared activity participation ($r = .31$, $p < .01$) and with shared communication ($r = .21$, $p < .01$). Therefore, adolescents who reported their fathers as emotionally close tended to report communicating and engaging in shared activities more with their fathers.

Maternal and paternal involvement constructs were correlated. Fathers' emotional closeness and mothers' emotional closeness were also positively correlated ($r = .51$, $p < .01$), indicating that adolescents who perceived they were emotionally close to their mothers tended to report being emotionally close to their fathers. Paternal engagement in shared activities was correlated with maternal engagement in shared activities ($r = .58$, $p < .01$). That is, respondents who reported engaging in shared activities with their mothers were more likely to report engaging in shared activities with their fathers. Similarly, mothers' shared communication was positively correlated with fathers' shared communication ($r = .52$, $p < .01$). Adolescents who communicated with their mothers tended to report communicating with their fathers.

Overall, each maternal involvement component was more strongly correlated with its corresponding paternal involvement factor than with the other maternal involvement components. For example, the relationship between maternal emotional closeness and paternal emotional closeness was strong, especially compared to the relationship between maternal emotional closeness and both maternal activity participation and maternal communication. Similarly, paternal emotional closeness, activity participation, and communication each had a stronger association with the corresponding maternal involvement component than with each other. For example, there was a stronger relationship between paternal activity participation and maternal activity participation than between paternal activity participation and both paternal emotional closeness and paternal communication.

Table 3

Correlations Among All Variables

	MEC	MAP	MC	PEC	PAP	PC	AA	AD
Maternal Emotional Closeness (MEC)	-	.16**	.11**	.51**	.15**	.08	-.10*	-.22**
Maternal Activity Participation (MAP)		-	.21**	.17**	.58**	.25**	-.01	-.16**
Maternal Communication (MC)			-	-.01	.13**	.52**	.04	.01
Paternal Emotional Closeness (PEC)				-	.31**	.21**	-.14**	-.30**
Paternal Activity Participation (PAP)					-	.31**	-.08*	-.27**
Paternal Communication (PC)						-	.05	-.09*
Adolescent Anxiety (AA)							-	.49**
Adolescent Depression (AD)								-

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

Correlations among Anxiety, Depression, and Parental Involvement

Adolescents' level of self-reported symptoms of depression and anxiety were positively correlated ($r = .49$, $p < .01$). All constructs of paternal involvement were negatively correlated with depression (emotional closeness, $r = -.30$, $p < .01$; shared activity participation, $r = -.27$, $p < .01$; shared communication, $r = -.09$, $p < .05$). In other words, adolescents who perceived that they were emotionally close, engaged in shared activities, and communicated with their fathers reported fewer depressive symptoms. Of the three paternal involvement components, adolescents' level of self-reported depressive symptoms had the strongest relationship with paternal emotional closeness, although both paternal emotional closeness and shared activity

participation had a moderate correlation with adolescents' symptoms.

Maternal emotional closeness (r = -.22, p < .01) and shared activity participation (r = -.16, p < .01) had a negative correlation with adolescent self-reported depressive symptoms whereas maternal shared communication (r = .01, p > .05) was not significantly correlated with depression. Therefore, adolescents who reported being emotionally close and engaging in shared activity participation with their mothers were less likely to report symptoms of depression. Overall, adolescents' level of depression had the strongest association with maternal emotional closeness in comparison to maternal shared communication and maternal shared activity participation.

Fathers' emotional closeness (r = -.14, p < .01) and shared activity participation (r = -.08, p < .05) were both correlated with adolescents' level of self-reported symptoms of anxiety; that is, adolescents who perceived that they were more emotionally close to their fathers and engaged in more shared activities reported less anxiety. Paternal shared communication was not significantly correlated with adolescents' anxiety (r = .05, p > .05). Therefore, adolescents' level of anxiety had the strongest association with paternal emotional closeness in comparison to paternal shared communication and paternal shared activity participation. The association between each of these paternal factors and adolescents' anxiety was weaker than the association between each of those factors and adolescents' depression.

Mothers' emotional closeness was additionally negatively correlated with adolescents' self-reported symptoms of anxiety (r = -.10, p < .05), indicating that respondents who reported feeling emotionally close to their mothers were less likely to report anxiety. Neither maternal shared activity participation (r = -.01, p > .05) nor maternal shared communication (r = .04, p > .05) was significantly correlated with adolescents' anxiety. As was the case with adolescents'

level of depression, mothers' emotional closeness was most strongly correlated with adolescents' level of anxiety when compared to maternal activity participation and shared communication. Additionally, the associations of maternal emotional closeness, activity participation, and communication with adolescents' anxiety were weaker compared to the correlations between maternal involvement components and adolescents' depression.

Significant Differences between Correlations

The Lee and Preacher (2013) *r*-to-*z* transformation was used to test for a significant difference between two significant correlation coefficients. More specifically, this test was used to examine significant differences between each maternal involvement component and the corresponding paternal involvement component and whether the maternal or paternal involvement component was more significantly correlated with adolescents' depression or anxiety.

There was a significant difference between the relationship between mothers' shared activity participation with adolescents' depression and the relationship between fathers' shared activity participation with adolescents' depression ($z = 2.00$, $p < .05$). That is, fathers' shared activity participation was significantly more correlated with adolescents' depression than mothers' shared activity participation with adolescents' depression. Therefore, adolescents were significantly less likely to report depressive symptoms when they perceived that their fathers engaged in activities with them in comparison to when they perceived that their mothers engaged in activities with them. There were no significant differences when considering parental involvement variables that were significantly correlated with adolescent anxiety.

Discussion

Using the Add Health dataset, which is a nationally representative dataset, the current

study examined the relationship between parental involvement and the internalizing symptomatology of adolescents with chronic pain. This study added to the limited research on parents' involvement and the psychological well-being of adolescents with chronic pain. The present research aimed to address the following central question: What is the relationship between both maternal and paternal involvement and self-reported psychological outcomes of anxiety and depression in a diverse sample of adolescents with chronic pain?

Findings indicated that, overall, adolescents with chronic pain feel a high level of emotional closeness to both their mothers and fathers. Adolescents also reported engaging in shared communication with both parents more than participating in shared activities. These adolescents furthermore reported greater emotional closeness, shared activity participation, and shared communication with their mothers in comparison to their fathers. This finding is expected given that, despite changing trends, mothers tend to be the primary caregivers in two-parent households, and therefore, mothers are on average more involved in their children's lives than fathers, who tend to be away from the household more frequently (Yogman, Garfield, & Committee on Psychosocial Aspects of Child and Family Health, 2016).

Findings furthermore highlighted that parental involvement was associated with adolescents' self-reported symptoms of anxiety and depression. Specifically, adolescents who perceived their fathers as being more emotionally close and engaging in more shared activities were more likely to report experiencing both fewer depressive symptoms and fewer anxiety symptoms. Adolescents who rated their fathers as more communicative were also less likely to report being depressed but not less anxious. Adolescents who perceived their mothers as emotionally close were less likely to report depressive and anxiety symptoms. Additionally, adolescents who engaged in more shared activity participation with their mothers reported fewer

depressive symptoms but not fewer symptoms of anxiety.

These findings add to the vast general literature on the benefits of parental involvement for the healthy social and emotional development of youth of all ages, especially adolescents (Cone et al., 1985; Shannon et al., 2002; Wenk et al., 1994). Emotional closeness, shared communication, and shared activity participation were found to be associated with improved psychological functioning for adolescents with chronic pain likely because these types of involvement can encourage improved self-esteem, self-worth, and self-efficacy in adolescents; improving adolescents' self-esteem, self-worth, and self-efficacy is a powerful way to protect against emotional difficulties, such as anxiety and depression (Cripps & Zyromski, 2009).

Paternal shared activity participation was significantly more correlated with adolescent depressive symptoms than maternal shared activity participation, indicating that paternal involvement may be especially important for adolescents who experience depression. This strong link between paternal involvement and youth's psychological adjustment is consistent with previous research. For example, Coley (2003) found female adolescents were more likely to have emotional and behavioral problems when they perceived their fathers to be distant, less communicative, unavailable, and angry. Amato and Rivera (1999) demonstrated that children experienced fewer behavioral problems when their fathers were involved even when controlling for maternal involvement. A study by Williams and Kelly (2005) had similar findings in that paternal involvement accounted for a unique and significant portion of the variance in adolescents' psychological functioning, including externalizing and behavioral difficulties. Thus, the current research finding that fathers' involvement is especially important for the psychological functioning of adolescents with chronic pain is consistent with past research findings.

The increasing importance of fathers' involvement is like a reflection that the *quality* of parental involvement is more central than the *amount* of parental involvement. Although mothers spend more time with youth on average, researchers have shown that the amount of parental involvement is not linked to positive outcomes for children and adolescents (Cabrera et al., 2000; Yeung, Sandberg, Davis-Kean, & Hofferth, 2001). Instead, type and quality of involvement are far more central to encouraging better youth outcomes. Therefore, it is not surprising that fathers' involvement, despite being less frequent, plays an especially important role in promoting healthy psychological functioning in their adolescents.

Overall, both maternal and paternal involvement are associated with improved psychological functioning in adolescents with chronic pain. However, the different components of parental involvement were more strongly associated with adolescent self-reported symptoms of depression than adolescent self-reported symptoms of anxiety. One possible explanation for this finding is the especially important bidirectional relationship between symptoms of depression and feeling socially connected and involved. Adolescents who feel more socially connected tend to be less depressed, and adolescents who are less depressed are more likely to seek out social connection and support (Newman, Newman, Griffen, O'Connor, & Spas, 2007). Although research has greatly stressed the importance of social connection for individuals with anxiety, especially social anxiety, individuals with depression are more likely to feel lonely and socially isolated (Kawachi & Berkman, 2001; Seabrook, Kern, & Rickard, 2016). Furthermore, a systematic review of approximately 180 articles demonstrated that parental involvement is linked to adolescents' depression more so than adolescents' anxiety (Yap, Pilkington, Ryan, & Jorn, 2014). Therefore, the current finding that parental involvement was more strongly associated

with adolescent depression than with adolescent anxiety is consistent with previous research findings.

Additionally, emotional closeness had the strongest relationship with both adolescent self-reported depression and anxiety, further supporting the idea that the quality of parental involvement is more important than the amount of time parents are involved. One reason why emotional closeness may be so strongly linked to adolescents' internalizing symptoms is that some researchers view perceived emotional closeness, or being able to connect and relate to others, more as a *product* of involvement than a *type* of involvement and, thus, as directly impacting individuals' well-being (Attar-Schwartz, Tan, Buchanan, Flouri, & Griggs, 2009; Brussoni & Boon, 1998; Coleman, Ganong, & Fine, 2000; Hodgson, 1992). Types of parental involvement, such as shared communication and activity participation, may be ways to foster emotional closeness that are not as directly linked to adolescent psychological functioning. That is, emotional closeness may mediate the relationship between parental communication and activity participation and psychological functioning. This hypothesis is further supported by current study findings that both maternal and paternal emotional closeness were significantly correlated with shared communication and activity participation as well as psychological outcomes.

Parental shared communication additionally had the weakest relationship with adolescent psychological outcomes compared to parental shared activity participation and emotional closeness. Previous research examining parental involvement and adolescent behavioral problems using Add Health data found a similar pattern for paternal and maternal shared communication (Goncy & Van Dulmen, 2010). This current research finding, coupled with the significant correlations between the parental involvement components, further supports the

previously described idea that shared communication may be a *type* of parental involvement that is more important for fostering emotion closeness, a potential *product* of parental involvement, than adolescent outcomes. Furthermore, there were no significant correlations between maternal shared communication and adolescent self-reported symptoms of anxiety and depression whereas paternal shared communication was correlated with adolescent symptoms of depression. This finding that paternal communication in particular is especially important for adolescent outcomes, which has also been demonstrated in previous research, further highlights the increasingly vital role fathers play in their adolescents' psychological functioning and the importance of the quality above and beyond amount of parental involvement (Coley, 2003; Karofsky, Zeng, & Kosorok, 2001).

Corresponding maternal and paternal factors (e.g., mothers' emotional closeness with fathers' emotional closeness) were more strongly linked than maternal involvement factors were with each other (e.g., mothers' emotional closeness with mothers' shared activity participation) and than paternal involvement components were with each other (e.g., fathers' emotional closeness with fathers' shared communication). This finding suggested that parents within one family are more likely to be involved in similar ways than to have one parent be extremely involved in multiple ways and have the other parent be very uninvolved.

Using an original sample that consisted of approximately an equal number of males and females, this study found that the majority of adolescents with chronic pain were females, which is consistent with previous research showing that women are at greater risk for developing various chronic pain disorders (Fayaz, Croft, Langford, Donaldson, & Jones, 2016; Fillingim, 2000; McBeth & Jones, 2007; Scher, Stewart, Liberman, & Lipton, 1998). As the causes of chronic pain are multilayered and complex, there are multiple explanations for this sex

difference. Some researchers point to biological factors, such as sex hormones, to explain this difference (De Kruijf et al., 2016). Psychosocial and cognitive factors also contribute to these sex differences. For example, internalizing symptoms of depression and anxiety are especially common in females, as females may be more open to recognizing and reporting symptoms of depression and anxiety than males; as previously mentioned, depression and anxiety exacerbate symptoms of chronic pain (Fillingim, 2000; Grigoriadis & Robinson, 2007; Halbreich & Kahn, 2007). Females additionally have different coping strategies around pain, including more catastrophizing, which can heighten both symptoms of anxiety and depression as well as chronic pain (Fillingim, 2000). Fillingim furthermore argued that female sex roles promote pain expression more than masculine sex roles such that females are more open to acknowledging their pain experience. Overall, because of all these biological, psychosocial, and cognitive factors, females generally experience more psychosomatic symptoms, which are central to chronic pain conditions that have no known or identifiable cause (Rauste-Von Wright & Von Wright, 1981).

The sample of adolescents with chronic pain was composed of significantly more "White" respondents than the original full sample, a racial difference also found in previous research. For example, McLaughlin et al. (2016) and Olsen et al. (1992) both found that White adolescents made up approximately 75% of their chronic pain samples. These racial differences are not as prevalent among adults with chronic pain though, as White and Black or African American adults tend to experience similar rates of chronic pain (Janevic, McLaughlin, Heapy, & Thacker, 2017; Meints, Miller, & Hirsh., 2016; Mossey, 2011; Portenoy, Ugarte, Fuller, & Haas, 2004). Therefore, White adolescents appear to have an earlier onset of chronic pain than adolescents of other races and, thus, make up the majority of researchers' adolescent chronic

pain samples, as was the case in this study. An additional area for future research would be to further explore the chronic pain experience of adolescents who are not only minorities but also biracial. Such research would be consistent with recent American Psychological Association (2017) Multicultural Guidelines whereby researchers consider the intersectionality of each individual's unique biosociocultural context and how contextual factors' bidirectional influences contribute to distinct outcomes for each individual.

At the same time, it is important to recognize that a variety of racial and cultural factors likely contributed to and are central to understanding these findings. First, the current study's sample consisted of only adolescents living in the United States. Americans and Europeans tend to report more physical symptoms of chronic pain than other cultures, such as Asian cultures (Edwards, Moric, Husfeldt, Buvanendran, & Ivankovich, 2005; Hobara, 2005; Sanders et al., 1992). As underreporting of chronic pain among non-American cultures is especially common, adolescents growing up in households that embrace non-American cultures may have higher rates of chronic pain than actually reflected by current findings. Furthermore, even though white adolescents may have higher rates of chronic pain, previous research has repeatedly demonstrated that whites tend to experience less severe and disabling pain, especially when compared to blacks (Ndao-Brumblay & Green, 2005; Reyes-Gibby, Aday, Todd, Cleeland, & Anderson, 2007). Thus, the higher prevalence among white adolescents is not necessarily a reflection of how greatly living with chronic pain impacts adolescents and their families. Similarly, Black families are especially likely to experience economic hardships in comparison to white families, and these added difficulties impact parents' ability to support the physical, social, and emotional needs of their children (McLoyd, 1990). Therefore, it is important to recognize that having an adolescent with chronic pain can be especially disruptive to these

families even though current findings indicate that white adolescents are more likely to report symptoms of chronic pain.

Clinical Implications

Findings from the current study have important clinical implications. With anxiety and depressive symptoms on the rise among adolescents with chronic pain, parents' level of involvement may be a useful way to identify adolescents living with chronic pain who are at risk of experiencing these internalizing symptoms (Fearon et al., 1996; Goodman & McGrath, 1991; King et al., 2011). Therefore, family factors such as parental involvement, especially emotional closeness, should be incorporated into screening strategies to identify adolescents with chronic pain who are vulnerable to experiencing symptoms of anxiety and depression.

Given the strong link between adolescent mental health outcomes and parental involvement, it is important to apply current research findings to further developing effective psychological interventions for adolescents with chronic pain that incorporate the family system. A number of interventions targeted towards adolescents with chronic pain involve elements of parent education and training (Eccleston, Morley, Williams, Yorke, & Mastroyannopoulou, 2002; Robins, Smith, Glutting, & Bishop, 2005). The effectiveness of these interventions centers on improving family communication and strengthening parent-adolescent relationships. As demonstrated by current findings, strong communication is an element of parental involvement that is associated with better psychological functioning for adolescents with chronic pain. Therefore, increasing parental communication and overall involvement is one example of how parent-adolescent relationships may be improved as adolescents cope with their chronic pain. Interventions can educate parents how to be properly involved with their youth who experience chronic pain. Family-level interventions should focus on optimizing parental involvement

through increased communication, participation in shared activities, and development of emotional closeness to ultimately encourage improved mental health outcomes around anxiety and depression in adolescents with chronic pain.

As indicated by current research findings, both maternal and paternal involvement are linked to fewer self-reported depressive symptoms in adolescents with chronic pain, and fathers' involvement may be an especially important protective factor against adolescents' depressive symptoms. Therefore, adolescent chronic pain interventions should stress the importance of involving not only mothers but also fathers due to the strong association between paternal involvement and mental health outcomes in adolescents with chronic pain. Incorporating both parents into interventions may serve as a buffer if, for example, the mother-adolescent relationship and involvement is less than optimal.

Focusing interventions on increasing emotional closeness between parents and adolescents may be especially important given the strong link between emotional closeness and adolescent psychological functioning. At the same time, these interventions may need to be tailored to focus on strengthening only one area of parental involvement. After all, adolescents who were emotionally close to their mothers also tended to be emotionally close to their fathers, and adolescents who engaged in activities and communication with their mothers also tended to do so with their fathers. It is not clear whether improving one of these areas will generalize to the others, or whether each area should be a focus of intervention. Varying the ways in which parents are involved with their adolescents might be key, as youth may especially benefit when both parents are involved but in different ways (Cabrera et al., 2000).

Limitations and Future Directions

The current study had several limitations that must be considered when interpreting

results. First, this study was correlational in nature; cause and effect is not clear. Specifically, whether parental involvement contributes to internalizing symptoms or whether internalizing symptoms affect level of parental involvement is unclear. Future research should therefore examine whether parental involvement predicts internalizing symptomatology of adolescents with chronic pain and additionally whether these internalizing symptoms predict level of parental involvement. Based on previous research, it is likely that the influence between parenting factors and adolescent mental health is bidirectional. For example, Hipwell et al. (2008) found that while parental warmth influenced daughters' depression, daughters' depression also influenced parental warmth. Boutelle, Eisenberg, Gregory, and Neumark-Sztainer (2009) similarly found that parental-adolescent connectedness and adolescents' depressive symptoms reciprocally influenced each other.

Another limitation of the current research is that the measure of chronic pain used by Add Health researchers is not a validated assessment of chronic pain. As described by Noel et al. (2016), an assessment of chronic pain ideally incorporates both self-report measures of frequency, impairment, and duration of the chronic pain and also reports from physicians of specific pain diagnoses. The use of specific pain diagnoses may be especially important in understanding how different chronic pain conditions may have unique influences on adolescent mental health.

Self-reports were additionally used to assess adolescents' symptoms of anxiety and depression. A significant limitation of using self-reports to assess psychopathology is that they tend to be less reliable and valid than using clinical interviews (Shelby et al., 2013; Walker, Sherman, Bruehl, Garber, & Smith, 2012). These self-reports also did not provide any information regarding whether adolescents met criteria for mental health diagnoses. It is

therefore important to recognize that results are not necessarily generalizable to adolescents with chronic pain who have been diagnosed with anxiety and depressive disorders.

Furthermore, the current study did not capture the vast array of psychological difficulties that individuals with chronic pain experience. Although internalizing disorders, especially anxiety, are most common in adolescents with chronic pain, these adolescents struggle with many other mental health difficulties, such as substance abuse and addiction as well as conduct disorders (Compton & Volkow, 2006; Knook et al., 2011). Whether parental involvement is linked to other mental health issues was not examined in this current study and remains another key research question to be examined in the future.

Chronic pain is a complex experience that is best understood by considering a variety of factors (i.e., biological, psychological, and social). The interaction among these factors contributes to chronic pain. Only a limited number of factors were assessed in this study with a specific focus on parental involvement. Even with regard to parental factors, there are many additional ways that parents can impact their adolescents' mental health above and beyond level of involvement. Future research should focus on examining other parental factors that may contribute to the chronic pain experience as well as examining non-familial factors.

Another caveat when interpreting the data is that level of involvement was based on adolescents' perceptions of parental involvement and may not be an accurate reflection of actual parental involvement. Some researchers have stressed using multiple reports of parental involvement to gain a more accurate picture of how involved parents actually are (Goncy & Van Dulmen, 2010). However, adolescents' perceptions of how involved their parents are may be the most important factor. Studies have shown that perception of parental behavior is a better predictor of adolescent outcomes than actual parental behavior because adolescents' perceptions

ultimately impact their behaviors (Alleyne-Green et al., 2014; Goncy & Van Dulmen, 2010).

The measurement of emotional closeness was an additional limitation of this study. Mother-adolescent emotional closeness and father-adolescent emotional closeness were each measured using only one item. The use of multiple questions to assess emotional closeness may have provided more information regarding the parent-adolescent closeness process (Goncy & Van Dulmen, 2010). However, emotional closeness was rated on a five-point scale in contrast to the two-point scale for shared activity participation and communication and, therefore, was a more sensitive measure of parental involvement. Parental involvement questions only measured whether parents were involved in various ways and did not assess other important dimensions, such as frequency of parental involvement.

Only a limited scope of involvement was examined as part of the study given that data were archival. Researchers have suggested that parental involvement is composed of not only paternal engagement, or direct ways of being involved, but also parental accessibility, or indirect types of involvement (Yeung et al., 2001). Parental accessibility may, for example, involve parents setting up a college fund for their child when their child is at school (Yeung et al., 2001). This present study primarily focused on direct ways mothers and fathers are involved, and future research should incorporate the diverse parental involvement constructs.

School-based sampling was used to collect Add Health adolescent data. As a result, data from absent students and dropouts were not included (Rushton, Forcier, & Schectman, 2002). Michaud, Delbos-Piot, and Narring (1998) note that those adolescents may have distinct characteristics, including mental and physical health status, from the adolescents included in this study, which impacts the generalizability of results.

Even with compelling results regarding the association between parental involvement and

adolescent mental health, it is important to note that findings from this study are based on data collected over two decades ago. As chronic pain has become more common over the years, it is possible that current adolescents' pain experience is distinct from that of previous generations. Additionally, family systems have tremendously transformed over the past few decades, which has likely shaped both parents' and adolescents' expectations of how parents will be involved in their adolescents' lives. In the present day, households composed of single parents and same-sex and gender diverse parents are especially common. The present research only examined families consisting of both a mother and father. Therefore, future research should examine possible discrepancies between current and past parent-adolescent relationships by using a more contemporary dataset and incorporating greater parental diversity.

Conclusion

Rates of chronic pain among adolescents have significantly risen over the past few decades. Struggling with chronic pain puts these adolescents at risk for mental health difficulties, especially anxiety and depression. Although parental involvement has been shown to be important for adolescents' psychological well-being, no prior research has examined the relationship between parental involvement and the internalizing symptomatology of adolescents with chronic pain. Therefore, the present research provides a new and necessary glimpse into the relationship between parental involvement and self-reported symptoms of anxiety and depression in adolescents across the United States with chronic pain. Findings indicate that adolescents with chronic pain whose mothers and fathers are more involved in their lives are less likely to report symptoms of anxiety and depression than those with less parental involvement. Future research should expand these results and address limitations of the current research findings by, for example, examining directionality between the variables as well as building on research on

family interventions to improve relationships and the pain experience of adolescents struggling with chronic pain.

References

Alleyne-Green, B., Grinnell-Davis, C., Clark, T. T., Quinn, C. R., & Cryer-Coupet, Q. R. (2016). Father involvement, dating violence, and sexual risk behaviors among a national sample of adolescent females. *Journal of Interpersonal Violence, 31,* 810-830.

Amato, P. R. (1994). Father-child relations, mother-child relations, and offspring psychological well-being in early adulthood. *Journal of Marriage and the Family, 56,* 1031-1042.

Amato, P. R., & Rivera, F. (1999). Paternal involvement and children's behavior problems. *Journal of Marriage and the Family, 61,* 375-384.

American Psychological Association. (2017). *Multicultural Guidelines: An Ecological Approach to Context, Identity, and Intersectionality*. Retrieved from: http://www.apa.org/about/policy/multicultural-guildelines.pdf

Attar-Schwartz, S., Tan, J. P., Buchanan, A., Flouri, E., & Griggs, J. (2009). Grandparenting and adolescent adjustment in two-parent biological, lone-parent, and step-families. *Journal of Family Psychology, 23,* 67-75.

Bair, M. J., Robinson, R. L., Katon, W., & Kroenke, K. (2003). Depression and pain comorbidity: A literature review. *Archives of Internal Medicine, 163,* 2433-2445.

Beyer, J. E., & Simmons, L. E. (2004). Home treatment of pain for children and adolescents with sickle cell disease. *Pain Management Nursing, 5,* 126-135.

Boutelle, K., Eisenberg, M. E., Gregory, M. L., & Neumark-Sztainer, D. (2009). The reciprocal relationship between parent–child connectedness and adolescent emotional functioning over 5 years. *Journal of Psychosomatic Research, 66,* 309-316.

Brennan, F., Carr, D. B., & Cousins, M. (2007). Pain management: A fundamental human right. *Anesthesia and Analgesia, 105,* 205-221.

Brussoni, M. J., & Boon, S. D. (1998). Grandparental impact in young adults' relationships with their closest grandparents: The role of relationship strength and emotional closeness. *The International Journal of Aging and Human Development, 46,* 267-286.

Cabrera, N. J., Tamis-LeMonda, C. S., Bradley, R. H., Hofferth, S., & Lamb, M. E. (2000). Fatherhood in the twenty-first century. *Child Development, 71,* 127-136.

Clark, J.D. (2002). Chronic pain prevalence and analgesic prescribing in a general medical population. *Journal of Pain Symptom Management, 23,* 131-137.

Clark, R. D., & Shields, G. (1997). Family communication and delinquency. *Adolescence, 32,* 81-92.

Coleman, M., Ganong, L., & Fine, M. (2000). Reinvestigating remarriage: Another decade of

progress. *Journal of Marriage and the Family, 62,* 1288-1307.

Coley, R. L. (2003). Daughter-father relationship and adolescent psychosocial functioning in low-income African Americans. *Families, 65,* 867-875.

Compton, W. M., & Volkow, N. D. (2006). Major increases in opioid analgesic abuse in the United States: Concerns and strategies. *Drug and Alcohol Dependence, 81,* 103-107.

Cone, J. D., Delawyer, D. D., & Wolfe, V. V. (1985). Assessing parent participation: The parent/family involvement index. *Exceptional Children, 51,* 417-424.

Cripps, K., & Zyromski, B. (2009). Adolescents' psychological well-being and perceived parental involvement: Implications for parental involvement in middle schools. *Research in Middle Level Education Online, 33*(4), 1-13.

De Kruijf, M., Stolk, L., Sillikens, M. C., De Rijke, Y. B., Bierma-Zeinstra, S. M., Hofman, A., Huygen, F. J. P. M., Uitterlinden, A. G., & Van Meurs, J. B. (2016). Lower sex hormone levels are associated with more chronic musculoskeletal pain in community-dwelling elderly women. *Pain, 157,* 1425-1431.

Eccleston, C., Morley, S., Williams, A., Yorke, L., & Mastroyannopoulou, K. (2002). Systematic review of randomised controlled trials of psychological therapy for chronic pain in children and adolescents, with a subset meta-analysis of pain relief. *Pain, 99,* 157-165.

Edwards, R. R., Moric, M., Husfeldt, B., Buvanendran, A., & Ivankovich, O. (2005). Ethnic similarities and differences in the chronic pain experience: A comparison of African American, Hispanic, and white patients. *Pain Medicine, 6,* 88-98.

Egger, H. L., Angold, A., & Costello, E. J. (1998). Headaches and psychopathology in children and adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 37,* 951-958.

Eriksen, J. (2003). Epidemiology of chronic non-malignant pain in Denmark. *Pain, 106,* 221-228.

Fayaz, A., Croft, P., Langford, R. M., Donaldson, L. J. & Jones, G. T. (2016). Prevalence of chronic pain in the UK: A systematic review and meta-analysis of population studies. *BMJ Open, 6*(6), 1-12.

Fearon, I., McGrath, P. J., & Achat, H. (1996). 'Booboos': the study of everyday pain among young children. *Pain, 68,* 55-62.

Fillingim, R. B. (2000). Sex, gender, and pain: Women and men really are different. *Current Pain and Headache Reports, 4,* 24-30.

Flouri, E., & Buchanan, A. (2003). The role of father involvement in children's later mental

health. *Journal of Adolescence, 26,* 63-78.

Flouri, E., & Buchanan, A. (2003). The role of father involvement and mother involvement in adolescents' psychological well-being . *British Journal of Social Work, 33,* 399-406.

Goncy, E. A. & Van Dulmen, M. H. M. (2010). Fathers do make a difference: Parental involvement and adolescent alcohol use. *Fathering, 8,* 93-108.

Goodman, J. E., & McGrath, P. J. (1991). The epidemiology of pain in children and adolescents: A review. *Pain, 46,* 247-264.

Gore, M., Brandenburg, N. A., Dukes, E., Hoffman, D. L., Tai, K. S., & Stacey, B. (2005). Pain severity in diabetic peripheral neuropathy is associated with patient functioning, symptom levels of anxiety and depression, and sleep. *Journal of Pain and Symptom Management, 30,* 374-385.

Griffin, K. W., Botvin, G. J., Scheier, L. M., Diaz, T., & Miller, N. L. (2000). Parenting practices as predictors of substance use, delinquency, and aggression among urban minority youth: moderating effects of family structure and gender. *Psychology of Addictive Behaviors, 14,* 174-184.

Grigoriadis, S. & Robinson, G. E. (2007). Gender Issues in Depression. *Annals of Clinical Psychology, 19,* 24-255.

Groenewald, C. B., Essner, B. S., Wright, D., Fesinmeyer, M. D., & Palermo, T. M. (2014). The economic costs of chronic pain among a cohort of treatment-seeking adolescents in the United States. *The Journal of Pain, 15,* 925-933.

Gureje, O., Von Korff, M., Simon, G. E., & Gater, R. (1998). Persistent pain and well-being: A World Health Organization study in primary care. *The Journal of the American Medical Association, 280,* 147-151.

Guidetti, V., Galli, F., Fabrizi, P., Giannantoni, A. S., Napoli, L., Bruni, O., & Trillo, S. (1998). Headache and psychiatric comorbidity: Clinical aspects and outcome in an 8-year follow-up study. *Cephalalgia, 18,* 455-462.

Halbreich, U., & Kahn, L. S. (2007). Atypical depression, somatic depression and anxious depression in women: Are they gender-preferred phenotypes? *Journal of Affective Disorders, 102,* 245-258.

Harris, K.M., C.T. Halpern, E. Whitsel, J. Hussey, J. Tabor, P. Entzel, and J.R. Udry. 2009. The National Longitudinal Study of Adolescent to Adult Health: Research Design [WWW document]. URL: http://www.cpc.unc.edu/projects/addhealth/design.

Hipwell, A., Keenan, K., Kasza, K., Loeber, R., Stouthamer-Loeber, M., & Bean, T. (2008). Reciprocal influences between girls' conduct problems and depression, and parental

punishment and warmth: A six year prospective analysis. *Journal of Abnormal Child Psychology*, *36*(5), 663-677.

Hobara, M. (2005). Beliefs about appropriate pain behavior: cross-cultural and sex differences between Japanese and Euro-Americans. *European Journal of Pain*, *9*, 389-389.

Hodgson, L. G. (1992). Adult grandchildren and their grandparents: The enduring bond. *International Journal of Aging and Human Development, 34,* 209-225.

Houck, C. D., Rodrigue, J. R., & Lobato, D. (2007). Parent–adolescent communication and psychological symptoms among adolescents with chronically ill parents. *Journal of Pediatric Psychology, 32,* 596-604.

Huguet, A., & Miró, J. (2008). The severity of chronic pediatric pain: an epidemiological study. *The Journal of Pain*, *9*, 226-236.

Janevic, M. R., McLaughlin, S. J., Heapy, A. A., Thacker, C., & Piette, J. D. (2017). Racial and Socioeconomic Disparities in Disabling Chronic Pain: Findings from the Health and Retirement Study. *The Journal of Pain*. Advance online publication. doi:10.1016/j.jpain.2017.07.005

Jordan, L.C., & Lewis, M.L. (2005). Paternal relationship quality as a protective factor: Preventing alcohol use among African American adolescents. *Journal of Black Psychology, 31,* 152-171.

Karofsky, P.S., Zeng, L., & Kosorok, M. R. (2001). Relationship between adolescent–parental communication and initiation of first intercourse by adolescents. *Journal of Adolescent Health*, *28*, 41-45.

Kashikar-Zuck S., Goldschneider K. R., Powers S. W., Vaught M. H., & Hershey, A. D. (2001). Depression and functional disability in chronic pediatric pain. *Clinical Journal of Pain, 17,* 341–349.

Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban Health*, *78*, 458-467.

Keogh, E., McCracken, L. M., & Eccleston, C. (2005). Do men and women differ in their response to interdisciplinary chronic pain management?. *Pain*, *114*, 37-46.

King, S., Chambers, C. T., Huguet, A., MacNevin, R. C., McGrath, P. J., Parker, L., & MacDonald, A. (2011). The epidemiology of chronic pain in children and adolescents revisited: A systematic review. *Pain*, *152*, 2729-2738.

Knook, L. M., Konijnenberg, A. Y., Van der Hoeven, J., Kimpen, J. L., Buitelaar, J. K., Van

Engeland, H., & de Graeff-Meeder, E. R. (2011). Psychiatric disorders in children and adolescents presenting with unexplained chronic pain: What is the prevalence and clinical relevancy? *European Child and Adolescent Psychiatry, 20,* 39-48.

Landman-Peeters, K. M., Hartman, C. A., Van der Pompe, G., den Boer, J. A., Minderaa, R. B., & Ormel, J. (2005). Gender differences in the relation between social support, problems in parent-offspring communication, and depression and anxiety. *Social Science and Medicine, 60,* 2549-2559.

Lee, I. A., & Preacher, K. J. (2013, September). Calculation for the test of the difference between two dependent correlations with one variable in common [Computer software]. Available from http://quantpsy.org.

Lewandowski, A. S., & Palermo, T. M. (2009). Parent–teen interactions as predictors of depressive symptoms in adolescents with headache. *Journal of Clinical Psychology in Medical Settings, 16,* 331-338.

Logan, D. E., Engle, L., Feinstein, A. B., Sieberg, C. B., Sparling, P., Cohen, L. L., Conroy, C., Driesman, D., & Masuda, A. (2012). Ecological system influences in the treatment of pediatric chronic pain. *Pain Research and Management, 17,* 407-411.

Maniadakis, N., & Gray A. (2000). The economic burden of back pain in the UK. *Pain, 84,* 95-103.

McBeth, J., & Jones, K. (2007). Epidemiology of chronic musculoskeletal pain. *Best Practice and Research Clinical Rheumatology, 21,* 403-425.

McLaughlin, J. M., Lambing, A., Witkop, M. L., Anderson, T. L., Munn, J., & Tortella, B. (2016). Racial Differences in Chronic Pain and Quality of Life among Adolescents and Young Adults with Moderate or Severe Hemophilia. *Journal of Racial and Ethnic Health Disparities, 3,* 11-20.

McLoyd, V. C. (1990). The impact of economic hardship on Black families and children: Psychological distress, parenting, and socioemotional development. *Child Development, 61,* 311-346.

Meints, S. M., Miller, M. M., & Hirsh, A. T. (2016). Differences in pain coping between Black and White Americans: A meta-analysis. *The Journal of Pain, 17,* 642-653.

Merskey, H. E. (1986). Classification of chronic pain: Descriptions of chronic pain syndromes and definitions of pain terms. *Pain,* 3, 226-236.

Michaud, P. A., Delbos-Piot, I., & Narring, F. (1998). Silent dropouts in health surveys: Are nonrespondent absent teenagers different from those who participate in school-based health surveys? *Journal of Adolescent Health, 22,* 326-333.

Morey, S., Williams, A. C., & Black, S. A. (2002). A confirmatory factor analysis of the Beck Depression Inventory in chronic pain. *Pain, 99,* 289-298.

Mossey, J. M. (2011). Defining racial and ethnic disparities in pain management. *Clinical Orthopaedics and Related Research, 469,* 1859-1870.

Ndao-Brumblay, S. K., & Green, C. R. (2005). Racial differences in the physical and psychosocial health among black and white women with chronic pain. *Journal of the National Medical Association, 97,* 1369-1377.

Newman, B. M., Newman, P. R., Griffen, S., O'Connor, K., & Spas, J. (2007). The relationship of social support to depressive symptoms during the transition to high school. *Adolescence, 42,* 575-588.

Noel, M., Groenewald, C. B., Beals-Erickson, S. E., Gebert, J. T., & Palermo, T. M. (2016). Chronic pain in adolescence and internalizing mental health disorders: A nationally representative study. *Pain, 157,* 1333-1338.

Oliver-Carpenter, G., Barach, I., Crosby, L. E., Valenzuela, J., & Mitchell, M. J. (2011). Disease management, coping, and functional disability in pediatric sickle cell disease. *Journal of the National Medical Association, 103,* 131-137.

Olsen, T. L., Anderson, R. L., Dearwater, S. R., Kriska, A. M., Cauley, J. A., Aaron, D. J., & LaPorte, R. E. (1992). The epidemiology of low back pain in an adolescent population. *American Journal of Public health, 82,* 606-608.

Palermo, T. M., Valrie, C. R., & Karlson, C. W. (2014). Family and parent influences on pediatric chronic pain: A developmental perspective. *American Psychologist, 69,* 142-152.

Perquin, C. W., Hazebroek-Kampschreur, A. A., Hunfeld, J. A., Van Suijlekom-Smit, L. W., Passchier, J., & Van der Wouden, J. C. (2000). Chronic pain among children and adolescents: Physician consultation and medication use. *The Clinical Journal of Pain, 16,* 229-235.

Portenoy, R. K., Ugarte, C., Fuller, I., & Haas, G. (2004). Population-based survey of pain in the United States: Differences among white, African American, and Hispanic subjects. *The Journal of Pain, 5,* 317-328.

Rauste-Von Wright, M., & Von Wright, J. (1981). A longitudinal study of psychosomatic symptoms in healthy 11–18 year old girls and boys. *Journal of Psychosomatic Research, 25,* 525-534.

Reyes-Gibby, C. C., Aday, L. A., Todd, K. H., Cleeland, C. S., & Anderson, K. O. (2007). Pain in aging community-dwelling adults in the United States: Non-Hispanic whites, non-Hispanic blacks, and Hispanics. *The Journal of Pain, 8,* 75-84.

Rhee, H. (2000). Prevalence and predictors of headaches in US adolescents. *Headache, 40,* 528-538.

Rhee, H., Miles, M. S., Halpern, C. T., & Holditch-Davis, D. (2005). Prevalence of recurrent physical symptoms in U.S. adolescents. *Pediatric Nursing, 21,* 314-319.

Robins, P. M., Smith, S. M., Glutting, J. J., & Bishop, C. T. (2005). A randomized controlled trial of a cognitive-behavioral family intervention for pediatric recurrent abdominal pain. *Journal of Pediatric Psychology, 30,* 397-408.

Roth-Isigkeit, A., Thyen, U., Stöven, H., Schwarzenberger, J., & Schmucker, P. (2005). Pain among children and adolescents: Restrictions in daily living and triggering factors. *Pediatrics, 115,* 152-162.

Rushton, J. L., Forcier, M., & Schectman, R. M. (2002). Epidemiology of depressive symptoms in the National Longitudinal Study of Adolescent Health. *Journal of the American Academy of Child & Adolescent Psychiatry, 41,* 199-205.

Sacks, D. (2003). Age limits and adolescents. *Pediatric Child Health, 8,* 577-578.

Sanders, S. H., Brena, S. F., Spier, C. J., Beltrutti, D., McConnell, H., & Quintero, O. (1992). Chronic low back pain patients around the world: Cross-cultural similarities and differences. *The Clinical Journal of Pain, 8,* 317-323.

Scher, A. I., Stewart, W. F., Liberman, J., & Lipton, R. B. (1998). Prevalence of frequent headache in a population sample. *Headache: The Journal of Head and Face Pain, 28,* 497-506.

Schoppe-Sullivan, S. J., McBride, B. A., & Ho, M. H. R. (2004). Unidimensional versus multidimensional perspectives on father involvement. *Fathering, 2,* 147-163.

Seabrook, E. M., Kern, M. L., & Rickard, N. S. (2016). Social networking sites, depression, and anxiety: A systematic review. *Journal of Medical Internet Research Mental Health, 3,* 50-57.

Shannon, J. D., Tamis-LeMonda, C. S., London, K., & Cabrera, N. (2002). Beyond rough and tumble: Low-income fathers' interactions and children's cognitive development at 24 months. *Parenting: Science and Practice, 2,* 77-104.

Shelby, G. D., Shirkey, K. C., Sherman, A. L., Beck, J. E., Haman, K., Shears, A. R., Horst, S. N., Smith, C. A., Garber, J., & Walker, L. S. (2013). Functional abdominal pain in childhood and long-term vulnerability to anxiety disorders. *Pediatrics, 132,* 475–82.

Simons, L. E., Sieberg, C. B., & Claar, R. L. (2012). Anxiety and functional disability in a large

sample of children and adolescents with chronic pain. *Pain Research & Management, 17*, 93–97.

Stanford, E. A., Chambers, C. T., Biesanz, J. C., & Chen, E. (2008). The frequency, trajectories and predictors of adolescent recurrent pain: A population-based approach. *Pain, 138*, 11-21.

Tourangeau, R., & Shin, H. (1998). National longitudinal study of adolescent health grand sample weight. *Carolina Population Center, University of North Carolina at Chapel Hill*.

Turk, D. C. (2002). Clinical effectiveness and cost-effectiveness of treatments for patients with chronic pain. *Clinical Journal of Pain, 18*, 355-365.

Van den Brink, M., Bandell-Hoekstra, E. N. G., & Abu-Saad, H. H. (2001). The occurrence of recall bias in pediatric headache: A comparison of questionnaire and diary data. *Headache: The Journal of Head and Face Pain, 41*, 11-20.

Van Tilburg, M. A., Spence, N. J., Whitehead, W. E., Bangdiwala, S., & Goldston, D. B. (2011). Chronic pain in adolescents is associated with suicidal thoughts and behaviors. *The Journal of Pain, 12*, 1032-1039.

Walker L. S., Sherman A. L., Bruehl S., Garber J., & Smith C. A. (2012). Functional abdominal pain patient subtypes in childhood predict functional gastrointestinal disorders with chronic pain and psychiatric comorbidities in adolescence and adulthood. *Pain, 153*, 1798-1806.

Wenk, D., Hardesty, C. L., Morgan, C. S., & Blair, S. L. (1994). The influence of parental involvement on the well-being of sons and daughters. *Journal of Marriage and the Family, 56*, 229-234.

Williams, D. A. (2011). Pain and painful syndromes (Including rheumatoid arthritis and fibromyalgia). In J. M. Suls, K. W. Davidson, & R. M. Kaplan (Eds.), *Handbook of Health Psychology and Behavioral Medicine* (476-507). New York: The Guilford Press.

Williams, S. K., & Kelly, F. D. (2005). Relationships among involvement, attachment, and behavioral problems in adolescence: Examining father's influence. *The Journal of Early Adolescence, 25*, 168-196.

Wilner, J. G., Vranceanu, A. M., Blashill, A. J. (2014). Neuroticism prospectively predicts pain among adolescents: Results from a nationally representative sample. *Journal of Psychosomatic Research, 77*, 474-476.

Yap, M. B. H., Pilkington, P. D., Ryan, S. M., & Jorm, A. F. (2014). Parental factors associated with depression and anxiety in young people: A systematic review and meta-analysis. *Journal of Affective Disorders, 156*, 8-23.

Yeung, W. J., Sandberg, J. F., Davis-Kean, P. E., & Hofferth, S. L. (2001). Children's time with fathers in intact families. *Journal of Marriage and Family, 63,* 136-154.

Yogman, M., Garfield, C. F., & Committee on Psychosocial Aspects of Child and Family Health. (2016). Fathers' role in the care and development of their children: The role of pediatricians. *Pediatrics, 138,* 1-17.

Youssef, N. N., Atienza, K. Langseder, A. L., & Strauss, R. S. (2008). Chronic abdominal pain and depressive symptoms: Analysis of the national longitudinal study of adolescent health. *Clinical Gastroenterology and Hepatology, 6,* 329-332.

Yuan, A. S. V., & Hamilton, H. A. (2006). Stepfather involvement and adolescent well-being: Do mothers and nonresidential fathers matter? *Journal of Family Issues, 27,* 1191-1213.