

1-1-2012

## The Relationship Between Religion and Attention Deficit Hyperactivity Disorder

Philip B. Mason

Follow this and additional works at: <https://scholarsjunction.msstate.edu/td>

---

### Recommended Citation

Mason, Philip B., "The Relationship Between Religion and Attention Deficit Hyperactivity Disorder" (2012).  
*Theses and Dissertations*. 4613.  
<https://scholarsjunction.msstate.edu/td/4613>

This Dissertation - Open Access is brought to you for free and open access by the Theses and Dissertations at Scholars Junction. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of Scholars Junction. For more information, please contact [scholcomm@msstate.libanswers.com](mailto:scholcomm@msstate.libanswers.com).

The relationship between religion and attention deficit hyperactivity disorder

By

Philip B Mason

A Dissertation  
Submitted to the Faculty of  
Mississippi State University  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy  
in Sociology  
in the Department of Sociology

Mississippi State, Mississippi

December 2012

Copyright 2012

By

Philip B Mason

The relationship between religion and attention deficit hyperactivity disorder

By

Philip B Mason

Approved:

---

Jeralynn S. Cossman  
Professor and Head of Sociology  
(Director of Dissertation )

---

Sarah Brauner-Otto  
Assistant Professor of Sociology  
(Committee Member)

---

Lindsey Peterson  
Assistant Professor of Sociology  
(Committee Member)

---

Guangqing Chi  
Assistant Professor of Sociology  
(Committee Member)

---

Amy M. Burdette  
Assistant Professor of Sociology  
Florida State University  
(Committee Member)

---

Nicole E. Rader  
Associate Professor of Sociology  
Graduate Coordinator

---

R. Gregory Dunaway  
Professor & Interim Dean  
College of Arts & Science

Name: Philip B Mason

Date of Degree: December 15, 2012

Institution: Mississippi State University

Major Field: Sociology

Major Professor: Jeralynn S. Cossman

Title of Study: The relationship between religion and attention deficit hyperactivity disorder

Pages in Study: 151

Candidate for Degree of Doctor of Philosophy

Research shows that religious people have higher levels of self-control. Scientists also hypothesize that individuals with Attention Deficit Hyperactivity Disorder (ADHD) are less likely to participate in religious services which require long periods of attention and self discipline. However, little research has investigated the potential relationship between ADHD and religious participation. Using the National Longitudinal Study of Adolescent Health (Add Health), this study finds (1) mothers' prayer frequency is marginally related to children's ADHD symptoms and diagnosis although other religious indicators are not significantly related, (2) childhood religious involvement and affiliation are not significantly related to ADHD symptoms and diagnosis, and (3) childhood ADHD is not significantly related to adult religious involvement and affiliation.

## DEDICATION

I dedicate this dissertation to my parents who sacrificed so much for me to be here. Thank you for believing in me when I did not even believe in myself.

## ACKNOWLEDGEMENTS

I would like to first acknowledge my major professor Dr. Jeralynn Cossman for her tireless efforts in guiding this research and mentoring me through this process. Her endeavors have not only assisted me academically, but her sage advice has also helped me become a better person. I am sincerely grateful for all of her help, patience, and support.

Also, I would like to thank my committee members, Dr. Sarah Brauner-Otto, Dr. Amy Burdette, Dr. Guangqing Chi, and Dr. Lindsey Peterson. Their insights and thoughtful comments have enriched this study; thank you.

I am also thankful for the comments and help from others. Dr. Kimberly Kelly and Dr. Harald Weiss provided insight in the early stages of this study. Ashlee Bennett assisted in creating the figures for this project; many thanks. Jonelle Husain has been a dear friend and confidant who provided thoughtful support and direction that has helped me complete this research.

Finally, I would like to express my sincere gratitude to my loving wife and children. I know that this process has been taxing on all of you—there are not many pre-schoolers who talk about how they had a hard day working on their dissertation at the dinner table. Thank you for your love and patience. Without your support, this dissertation would not have been completed.

## TABLE OF CONTENTS

	Page
DEDICATION .....	ii
ACKNOWLEDGEMENTS .....	iii
LIST OF TABLES .....	vii
LIST OF FIGURES .....	x
CHAPTER	
I. INTRODUCTION .....	1
Background .....	2
Theoretical framework .....	4
The effects of religion on ADHD .....	5
Religion and self-control .....	5
Organization of the dissertation .....	10
II. REVIEW OF THE LITERATURE .....	12
Introduction .....	12
Prevalence of ADHD .....	13
Historical explanations of ADHD .....	14
ADHD and culture .....	17
Religion and health .....	20
Religion and self-control .....	25
Religious culture and ADHD .....	27
Theoretical framework .....	31
Hypotheses .....	36
III. METHODOLOGY AND DATA .....	44
Source of data .....	44
Variable construction .....	45
Dependent variables .....	47
Children's ADHD symptoms and diagnosis .....	47
Children's religious involvement as adults .....	49



Primary respondents' independent variables .....	51
Mothers' independent variables .....	54
Father figures' core variables.....	57
Sample attrition.....	58
Methods of analysis .....	59
IV. RESULTS .....	61
Descriptive analysis .....	61
Dependent variables.....	61
Independent variables .....	67
Children's independent variables.....	67
Mothers' independent variables.....	72
Analyses examining the relationship between mothers' religious involvement and children's ADHD symptoms.....	77
Children's religious involvement and ADHD symptoms.....	79
Mothers' religious involvement and children's ADHD diagnosis .....	81
Children's religious involvement and ADHD diagnosis .....	83
Childhood ADHD symptoms/diagnosis and adult religious involvement.....	86
Childhood ADHD symptoms/diagnosis and adult religious affiliation.....	92
Support for hypotheses .....	94
V. DISCUSSION AND CONCLUSION .....	98
Discussion .....	98
Limitations .....	104
Implications.....	106
Theoretical implications.....	106
Societal implications.....	107
Methodological implications .....	108
Future research.....	111
REFERENCES .....	113
APPENDIX	
A ANCILLARY REGRESSION ANALYSES.....	130
Mothers' religious involvement and children's ADHD symptoms .....	131
Children's religious involvement and ADHD symptoms.....	136
Mothers' religious involvement and children's ADHD diagnosis .....	141
Children's religious involvement and ADHD diagnosis .....	144
Childhood ADHD symptoms/diagnosis and adult religious involvement.....	147
Childhood ADHD symptoms/diagnosis and adult religious affiliation.....	149

B REGULATORY COMPLIANCE DOCUMENTATION .....150

## LIST OF TABLES

TABLE	Page
1	Correlation Between Mothers' and Respondents' Affiliation (weighted) .....55
2	Analytical Wave IV Sample Attrition by ADHD Symptom Severity .....59
3	Dependent Variable Descriptive Statistics by ADHD Symptoms .....62
4	Dependent Variable Descriptive Statistics by ADHD Diagnosis .....66
5	Children's Independent Variable Descriptive Statistics by ADHD Symptoms (unweighted) .....68
6	Children's Independent Variable Descriptive Statistics by ADHD Diagnosis (unweighted).....71
7	Mothers' Independent Variable Descriptive Statistics by Children's ADHD Symptoms (unweighted).....74
8	Mothers' Independent Variable Descriptive Statistics by Children's ADHD Diagnosis (unweighted) .....76
9	Children's Odds Ratios of Severe Symptoms by Mothers' Religious Participation and Children's Controls (weighted).....78
10	Children's Odds Ratios of Severe Symptoms by Children's and Mothers' Religious Participation and Controls (weighted).....80
11	Children's Odds Ratios of ADHD Diagnosis by Mothers' Religious Participation and Controls (weighted).....82
12	Children's Odds Ratios of ADHD Diagnosis by Children's and Mother's Religious Participation and Controls (weighted).....84
13	OLS Coefficients Predicting Sons' and Daughters' Adult Religious Involvement by Childhood ADHD Symptoms and Diagnosis and Controls (weighted).....90

14	Odds Ratios of Being an Adult (Wave IV) Conservative Protestant by Childhood ADHD Severe Symptoms and Diagnosis and Controls.....	93
15	Summary of Results Testing Hypotheses 1 and 2.....	94
16	Summary of Results Testing Hypotheses 3 and 4.....	95
17	Summary of Results Testing Hypotheses 5 and 6.....	96
18	Summary of Results Testing Hypotheses 7 and 8.....	96
19	Summary of Results Testing Hypotheses 9 and 10.....	97
20	Summary of Results Testing Hypotheses 11 and 12.....	97
21	Children’s Odds Ratios of Severe Symptoms by Mothers’ Religious Participation Without Affiliation and Controls (weighted).....	131
22	Children’s Ordinary Least Square Coefficients of Inattentive Symptoms by Mothers’ Religious Participation and Controls (weighted).....	132
23	Ordinary Least Square Coefficients of Inattentive Symptoms by Mothers’ Religious Participation Without Affiliation and Controls (weighted).....	133
24	Ordinary Least Square Coefficients of Hyperactive Symptoms by Mothers’ Religious Participation and Controls (weighted).....	134
25	Ordinary Least Square Coefficients of Hyperactive Symptoms by Mothers’ Religious Participation Without Affiliation Controls (weighted).....	135
26	Children’s Odds Ratios of Severe Symptoms by Children’s and Mothers’ Religious Participation and Controls (weighted).....	136
27	Ordinary Least Square Coefficients of Inattentive Symptoms by Children’s and Mothers’ Religious Participation and Controls (weighted).....	137
28	Ordinary Least Square Coefficients of Inattentive Symptoms by Children’s and Mothers’ Religious Participation Without Mother’s Affiliation and Controls (weighted) .....	138
29	Ordinary Least Square Coefficients of Hyperactive Symptoms by Children’s and Mothers’ Religious Participation and Controls (weighted).....	139

30	Ordinary Least Square Coefficients of Hyperactive Symptoms by Children’s and Mothers’ Religious Participation Without Mothers’ Affiliation and Controls (weighted) .....	140
31	Children’s Odds Ratios of ADHD Diagnosis by Mothers’ Religious Participation Without Mothers’ Affiliation and Controls (weighted).....	141
32	Odds Ratios of ADHD Diagnosis by Children’s Symptom Types and Mothers’ Wave I Religious Participation and Controls (weighted).....	142
33	Odds Ratios of Children’s ADHD Diagnosis by Children’s Symptom Types and Mothers’ Religious Participation Without Mothers’ Affiliation and Controls (weighted) .....	143
34	Odds Ratios of Children’s ADHD Diagnosis by Children’s and Mothers’ Religious Participation Without Mothers’ Affiliation and Controls (weighted) .....	144
35	Odds Ratios of Children’s ADHD Diagnosis by Symptoms Types and Children’s and Mothers’ Religious Participation and Controls (weighted).....	145
36	Odds Ratios of Children’s ADHD Diagnosis by Symptoms Types and Children’s and Mothers’ Religious Participation Without Mothers’ Affiliation and Controls (weighted) .....	146
37	OLS Coefficients Predicting Adult Sons’ and Daughters’ Religious Involvement by Childhood ADHD Symptom Types and Diagnosis and Controls (weighted) .....	147
38	Odds Ratios of Being an Adult Conservative Protestant by Childhood ADHD Inattention and Hyperactive Symptoms and Diagnosis and Controls. ....	149

## LIST OF FIGURES

FIGURE		Page
1	Theoretical framework .....	40
2	The affects of mothers' religious affiliation and involvement on children's ADHD analytical models .....	41
3	The affects of mothers' and children's religious affiliation and involvement on children's ADHD analytical models .....	42
4	The effects of respondents' childhood ADHD on one's adult religious affiliation and involvement analytical models .....	43

## CHAPTER I

### INTRODUCTION

Researchers began describing Attention Deficit Hyperactivity Disorder (ADHD) symptoms in patients in the mid 1800s, but the disorder was not seriously explored until nearly a century later (Barkley 1997). Today, ADHD is a commonly diagnosed mental disorder among children, and symptoms (e.g., lack of self-control, inattention, hyperactivity, or impulsiveness) often persist into adulthood (Barkley 2006). ADHD is also found across many cultures (Canino and Alegría 2008; Prudent et al. 2005).

ADHD literature has been largely rooted in biological factors, although it is thought that the disorder is highly affected by environmental and cultural influences (Barkley 1997; Kewley 2001). Yet, relatively little ADHD research has investigated the environmental and cultural dimensions and few studies have specifically examined the relationship between ADHD and religion. If scientists have a better understanding of how religious involvement is associated with ADHD, a more clear understanding of how social and environmental influences affect ADHD might result.

Research has shown that religion has beneficial effects on health (Hummer et al. 1999; Koenig 2009; Koenig, McCullough, and Larson 2001); however, the nature of the relationship between religion and health—*how* religion affects health—is not well understood. Psychologists have studied the relationship between self-control and religion, but have yet to bring forth a systematic theoretical structure to understand how self-control and religion might be related in a meaningful way (Hathaway and Barkley

2003). Aside from a few studies, scientists have generally failed to answer questions concerning the relationship ADHD may have with religion and whether religious involvement can give ADHD individuals a means to self-treat their symptoms. This dissertation investigates how religion and ADHD are associated across the life-course.

### **Background**

Beginning in the mid 1970s, and to a much greater extent in the 1980s, diagnoses of ADHD became common (Barkley 2006; Conrad 1975; Eaton 2001). This surge in diagnosis was associated with both the technological advances (e.g., brain imaging technology) that provided richer evidence of ADHD being biologically influenced, as well as the cultural environment of the 1970s and 1980s, which helped foster awareness and acceptance for the disorder (Conrad 1975; Eaton 2001). During this time, the American Psychiatric Association (APA) recognized sub-disorders of ADHD; so not just hyperactive children were diagnosed (Barkley 2006). Pediatricians began diagnosing based on the new criteria and pharmaceutical companies began to encourage physicians to prescribe stimulants (Conrad 1975; Eaton 2001). Lay support organizations also developed, creating public awareness and generating momentum to qualify individuals with ADHD for disability services (Barkley 2006; Eaton 2001). Perhaps, one great change resulting in more ADHD diagnoses was the recognition that ADHD was not a disorder adolescents would simply “outgrow;” rather, in many cases, symptoms persist into adulthood and some began to be diagnosed in their adult years (Barkley 2006; Conrad and Potter 2000; Eaton 2001).

ADHD is a medicalized social problem (Conrad 1975; Conrad 1992). Medicalization affects perceptions about patient responsibility for their actions.



Individuals who display ADHD symptoms (e.g., disorganization and impulsive behavior) may be able to at least *partially* remove responsibility for their actions once the actions are viewed by society as biological in nature (Conrad 1975; Conrad and Potter 2000). Therefore, behaviors among people diagnosed with ADHD may be tolerated by others more so than in people with similar actions but without the same diagnosis.

Although ADHD has been medicalized, consistent cross-cultural symptoms of inattentiveness, impulsivity, and hyperactivity continue to persist, in spite of variation in prevalence rates (e.g., Canino and Alegría 2008; Gingerich et al. 1998; Mah and Johnston 2007; Norvilitis et al. 2008; Sandberg 1996; Swanson et al. 1998a; Swanson 1997; Wolraich et al. 2003). Some differences in prevalence rates are attributed to language barriers in interpreting appropriate thresholds, or differences in social control/parental expectations (Norvilitis et al. 2008), which are often influenced by cultural and religious beliefs.

Ross and Ross (1982) suggest that cultural factors are responsible for the inconsistencies in ADHD prevalence. In particular, Ross and Ross suggest that *consistent cultures* with high group cohesiveness, which minimize individuality and require conformity, produce lower reports of hyperactivity, while *inconsistent cultures*, which emphasize individual achievements, segregate on social characteristics (e.g., SES) and have overall greater othering elements, have higher reports of hyperactivity (Ross and Ross 1982). Ross and Ross find preliminary evidence from Mormon and Chinese cultures; however, empirical tests of their cultural consistency theory using generalizable samples are necessary (see also Barkley 2006).

## Theoretical framework

Religious beliefs and participation are cultural factors that contribute to one's standards of acceptable behavior and tolerance (Hathaway and Barkley 2003), but *how* religious participation and beliefs affect the likelihood of formal ADHD diagnosis has not been explored. Perhaps some religious denominations are more likely to produce cohesive group ideals or require different expectations than others and, therefore, have lower thresholds of tolerance for behavior that deviates from the proscribed norm (see Ross and Ross 1982). According to this logic, individuals who belong to more strict sectarian religious groups with high cohesiveness that place high moral values on submitting their bodily desires to god's will (e.g., conservative Protestants) are more likely to have less tolerance for impulsive behavior than those who have theological beliefs that embrace individuality more openly (e.g., Unitarians).

According to Ross and Ross (1982), childhood members of a strong cohesive group (e.g., religious) have greater expectations and need to conform to group expectations and would therefore have lower rates of ADHD than others who did not participate in strict groups which promote a culture of cohesiveness. The consistency demanded by the group requires children with ADHD to learn to behave in ways that are not distracting to the consistency of the group. In other words, due to the high group expectations, and a moral emphasis that is often placed on the culture's norms, individuals are consistently exercising or "practicing" self-control; and, like a muscle being exercised, self-regulatory strength will become stronger (Muraven and Baumeister 2000; Muraven, Baumeister, and Tice 1999). Conversely, those who belong to more individualistic faiths are in an environment which emphasizes individual achievement over group cohesiveness, accepting a wider margin of tolerance for appropriate

behaviors. A greater threshold of tolerance (i.e., lack of consistency) gives people with ADHD the opportunity to follow their impulsive desires that could mature into more severe ADHD (Ross and Ross 1982). Similarly, some religious groups will be less likely to seek professional healthcare and more likely to reject a physician's diagnosis of ADHD, potentially stigmatizing individuals who express ADHD symptoms because they may be viewed as being less committed to the faith's norms (Hathaway and Barkley 2003).

### **The effects of religion on ADHD**

Religion has been associated with a variety of positive outcomes among adolescents (Smith and Denton 2005). Christian Smith (2003) explains that positive effects attributed to religion operate through social influences by (1) reinforcing beneficial normative moral orders, (2) increasing opportunities to gain positive coping skills, community leadership skills, and cultural capital, and (3) creating wider social organizational ties and social capital. Social influence advantages associated with religious involvement may provide adolescents with resources to develop self-control and wide networks of support which help them achieve their goals and may similarly help mediate ADHD symptoms.

### **Religion and self-control**

A strong association exists between religion and self-control, however, this relationship is not well understood (McCullough and Willoughby 2009). One proposed explanation for the relationship between religion and self-control is that religious norms and values may advocate pursuing goals of conformity, which indirectly result in greater self-control (McCullough and Willoughby 2009; Saroglou, Delpierre, and Dernelle

2004). Moreover, religious motivations might sanctify the goals, make the behaviors to achieve goals meaningful, provide encouragement/motivation (e.g., Mahoney et al. 2003; Tix and Frazier 2005), and reduce goal conflict (Emmons, Cheung, and Tehrani 1998; McCullough and Willoughby 2009; Tix and Frazier 2005).

The association between self-control and religion may also stem from increased self-monitoring (i.e., introspection) (McCullough and Willoughby 2009). Religion may increase self-monitoring by adherents evaluating if their behaviors conform to the expectations of deity (Carver and Scheier 1998; McCullough and Willoughby 2009) and/or the religious community's expectations (McCullough and Willoughby 2009). Religious participation also encourages self-monitoring via religious rites or traditions which prescribe reflection on one's behaviors (e.g., confession, Lent, Yom Kippur) (McCullough and Willoughby 2009).

Participating in some religious traditions requires self-control (e.g., fasting) which might directly exercise and strengthen one's self-control (McCullough and Willoughby 2009; see also Muraven and Baumeister 2000; Muraven et al. 1999). Conversely, for religious adherents, meditation, prayer, scriptural readings, or religious imagery exercises may serve as coping mechanisms that alleviate stress (Pargament, Koenig, and Perez 2000) and promote self-control and self-mastery (McCullough and Willoughby 2009).

People who lack the ability to exercise self-control and have deficient behavioral skills—traits associated with ADHD—are less likely to be active participants in religious services (Hathaway and Barkley 2003; McCullough and Willoughby 2009). Three studies (Dew, Daniel, and Koenig 2007; Filip 2005; Hathaway, Douglas, and Grabowski 2003) directly examine the relationship that ADHD might have on one's religious involvement. Hathaway and colleagues (2003) found that parents who have children

with ADHD report having more disturbances and inappropriate behavior in religious settings than those whose children are not diagnosed with the disorder. Findings from Filip's (2005) doctoral research reveal that children with ADHD are more likely to report having "religious impairments" –that is, symptoms of the disorder negatively affect religious behaviors—especially those who are being clinically treated (see also Hathaway 2003). The most recent study, however, found no significant relationship between the diagnosis of the disorder and religiousness (Dew et al. 2007). Existing studies on religion and ADHD are limited in their generalizability since they are based on clinical populations (Dew et al. 2007) and small sample sizes (Filip 2005; Hathaway et al. 2003) or samples unrepresentative of the dominant religious population in the U.S. (Bathicic 2007, Prudent et al. 2005).

Studies on the relationship of ADHD and religion acknowledge that religious values are a social factor contributing to parental management, (e.g., Bussing et al. 2006; Feldman 2004; Prudent et al. 2005; Rothe 2005; Wilcox, Washburn, and Patel 2007), use religion as a measure of quality of life (e.g., Lee et al. 2008), or imply that religiosity may be a protective factor against prescription stimulants abuse often used in treating the disorder (e.g., Haas 2007; Herman-Stahl et al. 2006; Herman-Stahl et al. 2007). In sum, the existing studies have focused on one aspect at a time, but have not included a systemic test of the larger relationship between religion and ADHD using nationally representative data.

Hathaway and Barkley (2003) set forth an eloquent theory concerning religion and ADHD so that treatment options can better facilitate children's spiritual and religious functioning. The basic premise of Hathaway and Barkley's theory (2003) is that individuals with ADHD have multiple disadvantages that affect both their secular and

religious lives (e.g., behavioral and time inhibitions, nonverbal and verbal working memory disadvantages, difficulties internalizing and self-regulation of emotion, and impediments in performing mental play/reconstitution). As such, individuals with ADHD may have problems related to: religious socialization, religious focus, internalizing faith, religious stability and growth, and religious alienation, ultimately resulting in a general spiritual disconnectedness (Hathaway and Barkley 2003).

As in all aspects of social life, individuals must learn the appropriate social rites, folkways, and mores upheld by members of the group to be accepted into the fold; religion is no exception. Participation in “meaningful” religious services requires knowledge of religious culture. For example, church members are expected to sit, rise or kneel at specific times, to sit reverently without creating distractions (Hathaway and Barkley 2003: 108) and express situationally-appropriate emotions (Emmons 2005). While the socialization process of worship is taxing upon any child, Hathaway and Barkley (2003) propose that it is more demanding for an ADHD child because ADHD symptoms that affect behavioral inhibitions and memory disadvantages. In fact, clinical discussions with parents reveal that some parents no longer attend services because their child is a distraction to others and the weekly ritual of struggling to maintain reverence is not practical anymore (Hathaway and Barkley 2003).

ADHD patients are more likely to endure difficulties in focusing on secular activities and in maintaining sufficient focusing capabilities, being restless and fidgety compared to others (Hathaway and Barkley 2003). Consequently, ADHD children who are frequently reprimanded in church services for misbehaving may lose interest in church programs, associate church with conflict, or be less likely to attend as adults compared to their counterparts (Hathaway and Barkley 2003). Alternatively, ADHD

church members may develop self-control and learn to repress their ADHD tendencies to conform to the church's social pressures, more so than individuals with ADHD who do not participate in organized religion (see McCullough and Willoughby 2009) due to the restrictive norms of appropriate behaviors (Price and Bouffard 1974).

Individuals with ADHD are also more likely to have problems internalizing the faith and maintaining a spiritually disciplined life (Hathaway and Barkley 2003). This internalization challenge stems from their difficulty acting in ways that are guided by rules and internalizing speech, skills required to have meaningful prayer and reconcile religious doubts and inconsistencies (Hathaway and Barkley 2003). Importantly, if religious doubts are not reconciled, emotional health may suffer (Krause and Wulff 2004) and it proves difficult to experience religious stability (Exline 2002). Therefore, ADHD individuals may be less likely to participate in religion than those who do not have the disorder, or hold lower opinions about the importance of religion.

An important dimension of religious experiences focuses on how participants are perceived by others in the group (Hathaway and Barkley 2003; McCullough and Willoughby 2009). Because ADHD creates challenges in maintaining reverence and focus, others in the congregation often see those with the disorder as being less faithful and spiritually immature, resulting in social alienation if inappropriate ADHD behaviors persist (Hathaway and Barkley 2003). Without deep connections to congregation members, individuals, including those with ADHD, may feel alienated from the religious community and be less apt to continue participating in the religious services as adults.

ADHD individuals tend to be very sensitive to environmental influences that can result in greater spiritual "highs" from services and some corresponding spiritual "lows" (Hathaway and Barkley 2003). Polarized worship experiences may lead church members

with ADHD to continually search out religious experiences where collective effervescence is abundant (e.g., church hopping). Thus, people with ADHD are more likely to attend active role participating worship services (Hathaway and Barkley 2003), which are more likely to maintain their attention and, therefore, invoke feelings of spiritual enlightenment (e.g., Ellison et al. 2010; Ellison, Musick, and Henderson 2008), rather than more formal and passive services (Hathaway and Barkley 2003). In other words, those who have ADHD who choose to be religiously involved may be more likely to participate in more theologically conservative groups.

Little research has investigated the relationship between religion and ADHD, and there is room for theoretical development on the topic. This study identifies (1) whether mothers' or (2) children's religious participation is associated with children's ADHD symptoms, (3) how mothers' and (4) children's religious participation affects children's likelihood of diagnosis with the disorder and (5) how t ADHD (or its manifestation of symptoms) affects children's future adult religious participation. Stated more simply, I examine mothers' and children's religious involvement as independent variables affecting children's ADHD symptoms and/or diagnosis before assessing how ADHD symptoms and diagnosis affect respondent's adult religious involvement.

### **Organization of the dissertation**

Chapter II includes a review of the ADHD literature broadly. Using literature on religion and self-control, religion and health, and religion and ADHD; the theoretical framework and hypotheses are also discussed. Chapter III provides details about the National Longitudinal Study of Adolescent Health (Add Health) data, and explicates how they are operationalized to investigate the religion-ADHD relationship. Chapter III also



details how descriptive statistics, bivariate analyses, weighted logistic regressions and weighted ordinary least squares (OLS) are used to test the hypotheses stated in Chapter II.

Chapter IV consists of a detailed account of the data analyses. It first discusses the affects of mothers' religious affiliation and involvement on children's risk of ADHD. Next, it reports the results examining childhood religious involvement and its relationship with ADHD. Then it depicts the results investigating the relationship childhood ADHD has with one's adult religious involvement.

Chapter V is the concluding chapter of this study. Chapter V includes a summary of the research, how it relates to the literature as a whole, limitations of the research, and directions for future work.

## CHAPTER II

### REVIEW OF THE LITERATURE

#### **Introduction**

Religious people tend to have high levels of self-control (i.e., self-regulation) (McCullough and Willoughby 2009), an internal system that guides one's behaviors (see also Carver and Scheier 1998: 1-2), but individuals with Attention Deficit Hyperactivity Disorder (ADHD) are less likely to participate in religious services which require long periods of attention and self discipline (Hathaway and Barkley 2003). Limited studies, however, have investigated the relationship that might exist between ADHD and religious participation. Having ADHD may decrease a person's religious involvement in other ways besides reduced worship service attendance. This project studies the relationship between childhood ADHD and religious involvement and affiliation as both children and adults. Although there are few studies on the subject, the literature suggests childhood religious involvement may affect whether individuals are diagnosed with ADHD and that diagnosis may affect how individuals with ADHD participate in religion as adults.

In Chapter I, the theoretical framework was outlined. Here, the literature directing the theoretical framework and hypotheses are outlined. The literature review begins with a discussion about the prevalence of ADHD and a brief history of the disorder, including explanatory paradigms of ADHD. Next, I examine the importance of religion in many American's daily lives and how being religiously involved affects personal lives. I specifically focus on the associations between (1) religion and health

and (2) religion and self-control. Finally, connections are drawn in the religion-health and religion-self-control relationships to ADHD. Chapter II concludes with the development of hypotheses by drawing the links between important concepts.

### **Prevalence of ADHD**

Core ADHD symptoms surround issues of impulse control, inattention and hyperactivity (Barkley 2006; Goldstein and Goldstein 1998). There are other behaviors associated with ADHD including a failure to follow through, difficulty organizing tasks or activities, sensitivity to criticism, and low thresholds for frustration (Barkley 2006; Goldstein and Goldstein 1998). ADHD is also associated with disruptive (e.g., acting out, being mildly defiant) and non-disruptive disorders (e.g., prone to depression, anxiety), which can significantly impair individuals well-being (Goldstein and Goldstein 1998).

Estimating ADHD prevalence can be difficult due to differences in definitions and measurements. The largest cross-study difference in definitions concerns whether scientists are reporting ADHD *symptoms* or *diagnosis*. Data from the National Health Interview Survey (2006) indicate that 7.4 percent of all children (ages 3-17) report having been told by a health professional that they have ADHD; however, boys (10.7%) are more than twice as likely as girls (4.0%) to be diagnosed (Bloom and Cohen 2007). Sex differences in diagnosis cannot easily be explained, but its roots seem to be in socially-defined gender roles and medically-defined biological factors. Social and medical roots of the gender difference in ADHD are associated with the idea that girls exhibit less impulsive behaviors (socially) and are consequently less likely to be clinically referred (medically) than boys (Biederman et al. 2002).

Racial/ethnic differences in ADHD prevalence are also found: compared to non-Hispanic whites (8.4%) and non-Hispanic blacks (7.2%), Hispanics (5.0%) are far less likely to be diagnosed (Bloom and Cohen 2007). Experts surmise that variations may be due to language barriers, cultural behavioral norms (Marin, Escobar, and Vega 2006; Rothe 2005), inadequate knowledge about the disorder, and/or a lack of access to healthcare services (Marin et al. 2006). Consequently, prevalence differences are largely thought to be an artifact of the data and represent the prevalence of those who have been diagnosed, but fail to account for people who have the disorder yet have not been diagnosed.

Gender and racial/ethnic differences in diagnoses are compounded by differences associated with economic well-being. Being a child of mother who is single, poorly educated or a Medicaid recipient are all factors associated with ADHD risk (e.g., Bloom and Cohen 2007; Pastor and Reuben 2008). Essentially, children from families with a disadvantaged economic position and less knowledge about health issues in general are more likely to have an ADHD diagnosis.

### **Historical explanations of ADHD**

Symptoms now correlated with ADHD were described in a physician's poem describing a character named "Fidgety Phil" in 1865; nevertheless, a century would lapse until the disorder was better understood (as cited in Barkley 2006). Since ADHD symptoms were described in "Fidgety Phil," the disorder has undergone numerous name changes and explanations of its etiology. This disorder has been termed Still's syndrome, minimal brain dysfunction, hyperkinetic impulse syndrome, hyperactivity syndrome, and Attention Deficit Disorder (Maddock 2004). Proposed ADHD etiology has ranged (in

temporal order) from a lack of moral consciousness (Still 1902; Still 2006), intellectual deficits or partial brain damage/trauma (e.g., Blau 1936; Childers 2009; Kahn and Cohen 1934; Levin 1938), environmental influences (Block 1977), cultural factors (Block 1977; Ross and Ross 1982; Timimi et al. 2004), diet (Conners 1980), and neuropsychological causes (e.g., Barkley 2006; Hynd et al. 1990; Hynd et al. 1991; Nigel et al. 2010; Swanson et al. 1998b).

In the 1970s, two major advances were made in ADHD research. The list of primary attributes connected to ADHD was broadened to include inattention and immediate gratification, as fundamental components (Barkley 1997; Barkley 2006; Ross and Ross 1982) and prescription drug treatment became a key treatment option (Barkley 2006; Goldstein and Goldstein 1998; Kean 2009; Timimi and Maitra 2009).

As the use of behavioral modifying drugs became a common ADHD treatment and the diagnostic criteria were broadened, the media began to escalate fears that children were excessively and wrongly being diagnosed and medicated (e.g., Maynard 1970). In particular, one report (Maynard 1970) grossly exaggerated drug treatment by tenfold due to typos (Barkley 2006). Incidentally, in the long-run, this report acted as catalyst for the media to influence the social disposition of the public understanding that ADHD symptoms are not simply misbehaviors or the result of poor parenting, but instead are symptoms of a psychological disorder (Goldstein and Goldstein 1998). Since the 1970s, ADHD has continued to receive media attention but has largely centered on the position that it is a valid disorder and is not simply a result of parenting or laziness.

During the 1980s, the American Psychiatric Association recognized categories of Attention Deficit Disorder: hyperactivity, inattention without hyperactivity, and a residual type which contained both elements of inattention and hyperactivity (Barkley

2006). In fact, in the mid 1980s, the term Attention Deficit Disorder was later changed to ADHD to emphasize that although hyperactivity is one component of the disorder, it is not a prerequisite (Barkley 2006). Public awareness for the disorder was so great during this period that more than 100 support groups were founded for children and parents of children with ADHD (Barkley 2006) thus, arguably marking the 1980s as the tipping point for medicalization of the disorder.

Since the 1990s, ADHD research has largely focused on examining the disorder through neuroimaging and genetics. Brain size and volume (Hynd et al. 1990; Hynd et al. 1991) and structural differences in physiology (Castellanos et al. 1996; Hynd et al. 1991) are seen between people with and without ADHD. Genetic studies have also become much more common, resulting in possible gene candidates for the disorder (Barkley 2006; Nigel et al. 2010; Swanson et al. 1998b). And to date, most ADHD research continues to focus on biological explanations.

Other events besides research findings occurred since the 1990s that affected not only individuals with ADHD, but also how the general population generally viewed the disorder. One of the most dramatic was that in the early 1990s, public lawsuits were settled making ADHD children eligible to receive disability services and resources in schools through the Individuals with Disability Education Act (Mayes, Bagwell, and Erkulwater 2009). In part because of the rising attention from ADHD support groups and popular media, ADHD was recognized as being an adult disorder as well (Barkley 2006; Hallowell and Ratey 1995). Since the 1990s, several new prescription stimulant (e.g., Adderal®, Dexedrine®, Concerta®) and nonstimulant (e.g., Strattera®, Intuniv®) medications have been developed and released in the U.S. to treat ADHD, many of which have been advertised on television. With all of the advancements that had taken place in

ADHD, some began to question the pharmacological industry's and school districts' interests in the presence of the disorder (Mayes et al. 2009). Pharmaceutical companies were obviously seeing an increase in profits and some feared that children were being over-diagnosed and over-medicated. Less obvious, however, due to funding in schools associated with children with disabilities, was whether educators' recommendations for children to be tested for the disorder were motivated by fiscal interests, rather than motivations about the well-being of children (Mayes et al. 2009). Overall, ADHD continued to receive a great deal of attention and suddenly everyday Americans were likely to hold an opinion about ADHD as they have witnessed its medicalization, whereas only a decade or so before, few had heard of the disorder.

Because recent research provides strong evidence that ADHD is a physiological disorder stemming from organic sources, scientists have largely neglected the role that culture has on ADHD (Mayes et al. 2009). Individuals who have ADHD do not live in a vacuum free of culture, however, and like most illnesses and disorders, cultural components likely affect the manifestation, treatment, and diagnosis of ADHD; therefore research should investigate how social components affect ADHD.

### **ADHD and culture**

Experts widely agree ADHD has biological roots which are affected by cultural and environmental influences (Barkley et al. 2002; Kewley 2001), but some perceive ADHD as a culturally constructed label (e.g., Baldwin and Cooper 2000; Timimi et al. 2004) and an ideal type of medicalization (Conrad 1975; Conrad 2007; Conrad and Potter 2000; Conrad and Potter 2003; Searight and McLaren 1998). The culturalist perspective emphasizes cross-cultural variations in ADHD prevalence, and suggests that variations in

the prevalence indicate the disorder is culturally determined. Culturalists point to the broad range of symptom classifications included in ADHD as being so vague that ADHD is a “dumping ground” for misbehavior (Radcliffe and Timimi 2004: 10). Even after using broad diagnostic criteria for ADHD, the persistence of comorbid psychological disorders among those with ADHD (e.g., Hurtig et al. 2007; Kessler et al. 2006; Kutcher et al. 2004; Spencer 2006) is seen as further evidence that the true underlying disorder has not been successfully identified (Timimi et al. 2004; van Praag 1996). Culturalists also argue that findings from neuroimaging and genetic research tend to be based upon small samples and fail to be generalizable to the larger population (Leo and Cohen 2003; Timimi et al. 2004). The culturalist perspective views the diagnosis cautiously at best and—at worst—proponents of the culturalist perspective fear parents and physicians are chemically abusing children by treating a nonexistent medicalized disorder, ignoring the real issues (e.g., lack of parental involvement) behind the behaviors (not symptoms) (Breggin and Breggin 1994).

While the debate on whether psychiatric disorders are universal or culturally relative continues between scientists and lay people alike (e.g., Watters 2010), in a recent literature review, ADHD was one of the best examples validating the universalistic perspective (Canino and Alegria 2008). This suggests that key elements of a psychological disorder are exhibited across a variety of cultural landscapes, but the threshold of acceptance of a given symptom of ADHD (or any other disorder) might vary across cultures (e.g., Canino and Alegria 2008; Gingerich et al. 1998; Mah and Johnston 2007; Norvilitis et al. 2008; Sandberg 1996; Swanson et al. 1998a; Swanson 1997; Wolraich et al. 2003).



Ross and Ross (1982) suggest that variations in the disorder's prevalence are consequential to whether people with ADHD tendencies were raised in a consistent or inconsistent culture. Consistent cultures emphasize group welfare and require conformity with a low threshold of tolerance that minimizes differences between members. Conversely, inconsistent cultures have exclusionary subgroups that segregate on social characteristics, values, and individual achievements, fostering competition. Since ADHD children have difficulty following conversational norms (e.g., speaking out of turn) or are generally disruptive, inconsistent cultures are more likely to distinguish differences between ADHD and non-ADHD, resulting in ADHD children being more likely to be labeled as different at young ages which exacerbates ADHD behaviors (Ross and Ross 1982) and likely increases the odds of being diagnosed. However, because inconsistent cultures also emphasize individuality and individual achievements, being labeled with ADHD may not marginalize those with the disorder from the group; instead, it may merely label them as being different because of their ADHD and even provide a subgroup for those who have the disorder. On the other hand, those who are raised in consistent cultures—which reinforce norms and group membership—may learn to repress ADHD tendencies to support the larger group and not be marginalized from it due to the cultural emphasis—and perhaps moral emphasis—of placed on the larger group membership and the group's low threshold of tolerance.

Supporting evidence for Ross and Ross' (1982) consistent culture hypothesis are largely based on unpublished reports. For example, Ross and Ross suggest that values deeply embedded in Utah's culture reinforce meanings of group membership and conformity while simultaneously discouraging individualistic behaviors—including ADHD symptoms—which threaten the solidity of the group and culture. The consistent

messages of group identity are so strong that ADHD symptoms were said to not exist in Salt Lake City, Utah. That is, the pervasiveness of the Church of Jesus Christ of Latter-day Saints (i.e., Mormons or LDS) culture/norms are broadcasted across secular and spiritual institutions and are forcefully acting as agents of social control that prevent peoples' predispositions for ADHD of expressing themselves. While Ross and Ross' evidence of the absence of ADHD in Salt Lake City is based upon personal communication and their hypothesis has not yet been tested, it provides a unique perspective to examine the ADHD-religion relationship. Following the logic of the Ross and Ross hypothesis, I suspect that those who belong to strict conservative religions (e.g. conservative Protestants) are raised in a consistent culture and report less ADHD.

### **Religion and health**

Religious traditions and values have fundamentally contributed to cultural norms and continue to be an important aspect of most people's lives in the United States today. A recent poll shows that 84 percent of U.S. residents identify themselves as having some sort of religious affiliation and more than three-quarters of those reporting religious affiliations recognized themselves as a Christian (The Pew Forum on Religion and Public Life 2008). Given that the U.S. is one of the most religious countries in the world and that the vast majority of religious Americans are Christian (Prothero 2007), social scientists continue to examine religion to better understand how Christian values seep into cultural mores, traditions, and how religious involvement affects outcomes across an individual's life course.

Scientific research indicates that religion generally provides significant social, cultural and medical advantages. Among youth, religious participation extends social

networks, increases volunteerism, and improves educational achievement and attainment (Glanville et al. 2008). Religious involvement has also been associated with strong familial relationships (Loser et al. 2008; Mahoney et al. 2003; Marks 2006) and decreased risk of divorce (Mahoney et al. 2001). Religion is also positively associated with physical health (Idler and Kasl 1997; Koch 2008; Koenig et al. 2001), and lower mortality rates (Hummer et al. 2010; Hummer et al. 1999; Strawbridge et al. 2001; Strawbridge et al. 1997). Among religious participants, those who have fewer doubts are more satisfied with their health status (Krause and Wulff 2004).

Religion is also correlated with mental health (Cotton et al. 2006; Ellison and Levin 1998; Koenig 2009; Koenig et al. 2001). Religious involvement is also associated with lower anxiety levels (Davis, Kerr, and Kurpius 2003; Kendler et al. 2003), risk of substance abuse (Kendler et al. 2003) and increased perceptions of well-being (Ellison 1993; Krause 2003; Schieman, Pudrovskaya, and Milkie 2005), particularly among blacks (Ellison 1993; Ellison et al. 2010; Schieman et al. 2005).

While religion is generally found to be associated with advantageous mental health (e.g., Dew et al. 2008; Ellison and Levin 1998; Harrison et al. 2001), not all religious affiliations appear to have the same protective association. For example, Pentecostals have a higher risk of depression than non-Pentecostals (e.g., Koenig, et al. 1994). Another study among institutionalized patients in New York found that a greater percentage of Catholics had personality disorders than others, while the greatest percentage of schizophrenics was Protestant (Flics and Herron 1991). Similarly, Protestant patients at the University of Cincinnati Medical Center experienced more delusions than Catholics and those with no affiliation (Getz, Fleck, and Strakowski 2001). Anxiety disorders have been found to be more common among fundamentalist

Pentecostals young adults and young adults with no affiliation compared to mainline Protestants and those who identify as being born again (Koenig et al. 1993). After controlling for other factors, among middle-age and older adults, however, no associations are observed between religion and anxiety disorder (Koenig et al. 1993). Interestingly, the literature fails to provide strong evidence that Obsessive Compulsive Disorder (OCD)—a type of anxiety disorder—is related to religious affiliation (Himle, Chatters, Taylor, and Nguyen 2011). Although there is evidence that those who are highly devout in their faith exhibit more religious obsessions and compulsions than those who are less devout (Abramowitz, Eacon, Woods, and Tolin 2004; Himle et al. 2011), there is limited support that this might be especially true among highly religious Protestants (Abramowitz et al. 2004). In summary, religious affiliation appears to be associated with some types of mental disorders, but not others and more research is needed to understand how religious-mental health relationship.

The generally beneficial association between religion and health (e.g., Ellison and Levin 1998; Harrison et al. 2001) is proposed to occur through four main pathways: promoting healthful practices, enlarging social support, increasing psychosocial resources, and providing a sense of meaning (George, Ellison, and Larson 2002). Religious teachings often explicitly (e.g., Church of Jesus Christ of Latter-day Saints, Muslims, Seventh Day Adventists) or implicitly (e.g., Catholic, mainline Protestants) emphasize the importance of the body and liken it to a temple (George et al. 2002). Moral values are consequently associated with everyday lifestyle behaviors and those which adversely affect health (e.g., smoking or drinking) are discouraged, while healthful behaviors are promoted through the religious values and prescriptive behaviors (e.g., vegetarian diet or church sponsored athletic events). In short, the religious order helps

reinforce healthful norms (e.g., George et al. 2002; Hill et al. 2007; Merrill, Hilton, and Daniels 2003)

People who regularly attend religious services also have a broad hierarchy of social support which is known to have healthful effects (George et al. 2002; House, Landis, and Umberson 1988). Social support is increased through worshiping and interacting with homogeneous people with similar beliefs and perspectives on life –which strengthen one’s commitment and promote optimism (Ellison 1991; Ellison 1993; Ellison et al. 2001; Smith 2003). Social support enhances organizational ties, social capital, and cultural capital (Smith 2003), often providing alternative resources for those who cannot afford traditional services or goods. Those who are poor may use clergy as a free (or inexpensive) counselor (Ellison et al. 2010; Taylor et al. 2000); black church goers (Ellison et al. 2010; Taylor et al. 2000) and older adults (Pickard and Guo 2008) are particularly likely to use mental health services provided by clergy or receive discounted counseling from a congregational affiliate.

Psychosocial support is the third way for which the association between mental health and religious involvement is thought to be accounted. Religious involvement is associated with higher perceptions of self-worth and self-efficacy (Ellison 1991; Ellison 1993; George et al. 2002) and less risk of clinical depression or feelings of hopelessness (Murphy et al. 2000).

Among those who are mentally ill, religious involvement has been found as a common psychosocial support. For example, 80 percent of patients in Los Angeles County mental health units report using religion as a coping mechanism and a majority of patients report that half of the time they spend coping, do so using religious activities (e.g., prayer, reading scriptures) (Tepper, Rogers, Coleman, and Malony 2001; see also

Hefti 2011). Importantly, many patients also reported that the worse their symptoms became, the more important religion became as a coping tool and was what “kept them going” (Teppers et al 2001: 662), thereby indicating that religion may be one of the most important coping mechanism for many and unlike some coping resources, religious participation is usually free and readily available (Koenig 2009).

The final mechanism through which religion is associated with better health outcomes is the provision of a sense of meaning (Antonovsky 1980; George et al. 2002). For example, religious individuals, particularly religious fundamentalists, see challenges through the lens of the deity who loves them and their troubles are only meant to help them grow, or are part of a larger divine purpose raising levels of self-perception and well-being (Ellison 1993; Ellison et al. 2010). The effect of the god role on mental health is thought to occur by (1) providing believers with a perspective that guides their behaviors by having them seek to act in ways that they think god would want them to act and (2) offering comfort through seeing themselves as an important person who is loved by deity (Ellison 1993; Ellison et al. 2010). For many blacks battling a “dual diagnosis” (i.e., mental disorder *and* substance abuse addiction) their relationship to god is reported to be the most important thing in keeping them on their path to recovery, not the social supports and networks connected to the churches (Whitley: 2012). Moreover, there is clear evidence that turning to god for guidance in difficult times is associated with having fewer symptoms of depression (Pargament 1997) and accelerated recovery (Koenig 2007; Webb, Charbonneau, McCann, and Gayle 2011) .

Religion, however, is not a panacea—nor does religious involvement always influence health advantageously. In some instances, religion fosters unhealthy dietary lifestyles (Cline and Ferraro 2006; Ferraro 1998; Mason 2007), isolates individuals from

larger ethnic and familial social networks (Mason, Toney, and Cho 2011), creates guilt (Hartz and Everett 1989), fosters depression (Sorenson, Grindstaff, and Turner 1995), and may delay medical treatment (Mitchell et al. 2002), rejecting some medical treatments in total (e.g., blood transfusions, childhood immunizations). In addition, if religious doubts are not reconciled, emotional health may suffer (Krause and Wulff 2004). Despite the deleterious effects that religion has on health, the relationship between religion and health is largely beneficial for physical and mental health (Ellison and Levin 1998; Harrison et al. 2001) among adolescents (Dew et al. 2008).

### **Religion and self-control**

McCullough and Willoughby (2009) suggest that some of the relationship between religion and health may result from religious norms and values developing higher levels of self-control. Drawing heavily upon McCullough and Willoughby's review of the literature (see also Carver and Scheier 1998), the theoretical propositions by which religion is thought to be associated with self-control are summarized here.

Religion influences self-control by affecting how one selects and pursues goals using their values, scriptural doctrine, worship practices, and programs in which members of the faith participate (McCullough and Willoughby 2009). For example, Christians, Jews, and Muslims are all less likely to seek "hedonistic and to a lesser extent values that promote self-enhancement" compared to those who are not religious, while simultaneously endorsing values of conformity and tradition (Saroglou et al. 2004: 721), which, in turn, increases self-control.

Religion also sanctifies moralizing the goals themselves as well as the behaviors involved to achieve them (McCullough and Willoughby 2009). Sanctifying goals makes

the goals and the means to achieve those goals meaningful, giving motivation (e.g., Mahoney et al. 2003; Tix and Frazier 2005) and reducing goal conflict (Emmons et al. 1998; McCullough and Willoughby 2009; Tix and Frazier 2005). For example, studies show that Christians place an emphasis on controlling their thoughts because they are likely to view thinking about committing sinful behavior as a sin in and of itself, whereas Jews are less likely to view thoughts as sinful (Cohen 2003; Cohen and Rozin 2001), suggesting that Christians are more likely than Jews to place an emphasis on learning how to control their thoughts to avoid sin (McCullough and Willoughby 2009; see also Himle et al. 2011).

The association between increased self-control and religious involvement might stem from beliefs which foster self-monitoring (i.e., self-introspection) (McCullough and Willoughby 2009). Religion is suspected to increase self-monitoring three ways: (1) via beliefs that deity is observing people's actions thereby making believers strive to conform to the deity's expectations and evaluating the congruency of their behaviors/thoughts (Carver and Scheier 1998; McCullough and Willoughby 2009), (2) via adherent evaluation (or being evaluated) of how their behaviors compare to the religious community expectations (McCullough and Willoughby 2009), and (3) via religious rites or traditions which proscribe reflection of one's behaviors (e.g., confession, Lent, Yom Kippur) (McCullough and Willoughby 2009). Moreover, participation in holy rituals which require self-control (Spilka 2005) (e.g., Ramadan, Lent) may also develop self-control strength (McCullough and Willoughby 2009), just as physical exercise results in stronger muscles (Muraven and Baumeister 2000; Muraven et al. 1999).

Lastly, meditation, prayer, scriptural readings, or religious imagery are used to distract attention from one stressor toward an acceptable topic, exercising self-control



(McCullough and Willoughby 2009). Just as religious exercises serve as coping mechanisms to alleviate stress (Pargament et al. 2000), religious activities may promote self-control by disseminating self-mastery; however, very few studies have specifically investigated this subject (McCullough and Willoughby 2009).

Given the breadth of U.S. religious participation and the associated health benefits and relationship with self-control, more research needs to purposefully examine how the health-religion relationship operates with ADHD, because symptoms associated with this disorder are largely based around issues of self-control and attention. The healthful advantages associated with religious involvement may derive indirectly from social aspects related to religious participation (George et al. 2002); therefore, understanding how the religion and health/self-control relationships works may provide insight on how to achieve healthful outcomes in other dimensions of social life (George et al. 2002).

Although the relationships between religion and health have been studied across many denominations and diagnoses, little generalizable research has been completed concerning the relationship between religion and ADHD (Dew et al. 2007). People with ADHD have multiple disadvantages that make it difficult to socialize in secular activities or to participate in religious activities, maintain religious focus, and internalize their faith (Hathaway and Barkley 2003). The current study specifically examines the ADHD-religion relationship, providing insight on the relationships between religion and health/self-control, particularly as it relates to ADHD.

### **Religious culture and ADHD**

Some religious denominations stress group identity and cohesiveness, with lower levels of tolerance for deviation from the norms; other religious groups have social

environments and ideologies which foster independence and accept “truth” from all sources, advancing greater tolerance for individuality. Ross and Ross (1982) suggest that strict religious denominations that promote group cohesiveness and limit impulsivity and individuality can be viewed as having a culture of consistency. Children raised in strong cohesive religious groups would have more pressure to conform to the expectations of the group compared to those raised in more liberal individualistic faiths. The resulting increased pressure of conformity necessitates that children learn to exercise more self-control (compared to children raised in faiths which extend more tolerance and individuality), which may consequently result in lower ADHD prevalence among consistent religious groups. Moreover, by consistently attending religious services which require high amounts of self-control, frequent attendees of conservative religious services may gain greater self-control (see Muraven and Baumeister 2000; Muraven et al. 1999). On the other hand, children who are unable to conform to the strict norms may feel marginalized and depressed and feel that their medical condition is being discounted or viewed as personal failure which results in them not attending religious services or attending worship services of more tolerant individualistic faiths.

Fundamentalists and other conservative Protestants believe that children are born possessing desires and tendencies that are self-indulgent and contrary to God’s will; and parents are responsible for teaching their children to submit to God’s commandments so their children can inherit eternal salvation (Ellison 1996). Fundamentalists and conservative Protestants also commonly believe that the Bible is the literal inerrant Word of god and provides clear instruction that parents should be swift to discipline their children by corporal punishment if necessary (Ellison, Bartkowski, and Segal 1996; Ellison and Sherkat 1993; Wilcox 1998). While conservative Protestants are more apt to

enforce strict behaviors using corporal punishment than more liberal Christians, conservative Protestants are also more likely to show generous amounts of love and affection towards their children than those of other faiths (Bartkowski, Wilcox, and Ellison 2000; Ellison et al. 1996; Wilcox 1998). The paradox of increased affection and punishment results from conservative Protestants' sanctified perception of parenting and how conservative Protestant parents believe that they are helping their child leave sinful desires behind to accept Christ. Conservative Protestant parents ultimately view the consequences of misbehavior as a lesson to the child that god has punishments for sin, but god is also a loving being. In other words, conservative Protestants sanctify strict parenting and discipline which might increase self-control and decrease the prevalence of expressed ADHD symptoms and thus also diagnosis.

Consistent with Ross and Ross' (1982) perspective, more tolerant individualistic faiths have broader definitions of acceptable social behavior and less strict norms. The broader levels of acceptance and tolerance would not necessitate ADHD children to manage their symptoms as tightly in order to be accepted within the group—although they would likely be identified as being different—and, therefore, would require less strenuous self-control, and possibly be less likely to attenuate religious involvement. It is also possible, however, that because individualistic faiths do not require ADHD children to learn to repress their symptoms, ADHD children become less involved with religion because they have the inability to maintain attention through the services (see Hathaway and Barkley 2003).

Some religious groups even reject a physician's ADHD diagnosis. A well-known, albeit extreme, case is the Church of Scientology, which created a nationally televised public campaign in 1988 that rejected the existence of ADHD and used scare

tactics to exaggerate the frequency of isolated cases of adverse reactions to ADHD drugs (e.g., violence, seizures, brain damage) (Barkley 2006: 30). Recognizing that the Church of Scientology's campaign is an acute case, it does provide evidence that supports Ross and Ross' (1982) hypothesis that the prevalence (and acceptance) of ADHD varies by the consistency of the cultural group to which one belongs.

Using a less radical example, in a qualitative study among Asian Indian parents who had children diagnosed with ADHD, some religious leaders purposefully steered respondents away from seeking medical attention (Wilcox et al. 2007). Several parents did not believe their child had ADHD despite having been diagnosed. When lay public were asked for suggestions on how to treat the problematic symptoms of the disorder, little advice was provided to the parents, leaving the ADHD child without treatment and perhaps, with stigma.

One case study effectively illustrates how tightly knit religious cultures have influenced perceptions by showing that ADHD does not even exist in the Haitian-Creole language (Prudent et al. 2005). The absence of terminology is a lucid symbol of the *culture's disbelief* in ADHD, instead viewing its "symptoms" as being behavioral problems. Disbelief in ADHD does not necessarily indicate that the disorder is absent from the society. Many Haitians and Haitian Americans practice voodoo which explicitly emphasizes that ADHD-like symptoms arise from "unnatural" forces and are a consequence of bad spirits; as such, treatment should be administered by a voodoo priest rather than Western oriented physicians and medication (Prudent et al. 2005). Other Haitians and Haitian Americans believe that ADHD symptoms result from poor parenting and should be treated using more stern discipline methods, neglecting to acknowledge the biological origins of ADHD (Prudent et al. 2005). If Ross and Ross' (1982) hypothesis is

correct, that under the right circumstances ADHD will not manifest itself, failure to acknowledge ADHD “symptoms” having biological origins is not necessarily a problem. If the origins of the disorder are indeed biological, however, and ADHD symptoms in an individual continue to persist, but the culture fails to recognize the organic influence of the symptoms, ADHD children and their families are stigmatized and left without adequate treatment, as seen among Haitians in Prudent et al.’s (2005) research.

While Prudent et al.’s (2005) study provides insights into the ADHD-religion relationship and how it affects the likelihood of diagnosis and treatment, Vodouisants’ religious beliefs are different from the normative U.S. Christian perspective; thus, more research using nationally representative data to understand the ADHD-religion relationship is needed.

### **Theoretical framework**

Hathaway (2003: 114) proposes that some individuals suffer from a “significant religious impairment,” and have “a reduced ability to perform religious activities, achieve religious goals, or to experience religious states, due to a psychological disorder.” Hathaway’s construction of religious impairment acknowledges that religious participation is important for many, including some who have ADHD and may not be participating to their desired extent, but it does not suggest that people who are not religious suffer from a psychological disorder and need treatment (Hathaway 2003; Hathaway and Barkley 2003).

ADHD also results in several behavioral impairments that contribute to high risks for several behavioral outcomes including dropping out of high school or college (Cimera 2002), adjusting to college expectations (Shaw-Zirt et al. 2005), having few close friends,

failing to reach expectations, using tobacco, alcohol, or other drugs, experiencing teen pregnancy and/or sexually transmitted infections, and having multiple car accidents (Barkley et al. 2002). Given the risks associated with ADHD, people with the disorder must be able to use all available resources—including religious involvement if they choose—for symptom management to reduce potential negative behaviors or outcomes.

As previously mentioned, the relationship between religious involvement results in advantageous mental health outcomes by indirectly reinforcing healthful norms, widening social networks, and teaching positive coping skills (George et al. 2002). However, people who have little self control—like those who have ADHD—are less likely to be involved in religious organizations (Hathaway and Barkley 2003; McCullough and Willoughby 2009) and consequently may be less likely to gain the healthful benefits and self-control skills associated with religious participation.

The most important contribution to the religion and ADHD literature is Hathaway and Barkley's (2003) theory, which suggests that the multiple disadvantages associated with ADHD (e.g., behavioral and time inhibitions, nonverbal and verbal working memory disadvantages, difficulties internalizing and self-regulation of emotion, and impediments in performing mental play/reconstitution) affect ADHD individuals' ability to maintain attention in secular and religious activities. Hathaway and Barkley also postulate that ADHD symptoms significantly affect one's ability to properly engage in religious socialization, maintain a religious focus, and internalize the faith. Consequent to their inattentive religious involvement, Hathaway and Barkley speculate it is difficult for people with ADHD to experience religious stability or growth. Furthermore, Hathaway and Barkley reason that difficulties associated with ADHD ultimately increase ADHD individuals' risk of religious alienation.

Like all other social groups, religious groups require members to learn and uphold the distinguishing normative standards of the culture (Smith 1998), but religious settings tend to be highly-constraining in terms of acceptable behaviors (Price and Bouffard 1974). Religious organizations have normative behaviors dictating proper dress and actions (e.g., stand, kneel, praise) (Hathaway and Barkley 2003). Normative behavior requirements have been described as being *input* components for religious human capital (Iannaccone 1990). Exercising appropriate religious behaviors and knowledge builds religious social networks and additional religious capital. As a worshiper becomes more familiar with the doctrine and its rites and norms, her or his religious participation becomes more meaningful (Krause 2010) and her or his religious capital increases (Iannaccone 1990). But individuals with ADHD exhibit symptoms that may make it difficult to integrate with congregation members or undermine the processes of gaining or exhibiting religious capital.

ADHD individuals who are unable to meet the high expectations of self-control and focus required by the religious culture may feel disconnected from other congregants (Feldman 2004; Hathaway and Barkley 2003), who may view and stigmatize the ADHD participant as uncommitted to the faith or spiritually immature if they are unable to maintain focus during worship meetings or are frequently late or absent (Hathaway and Barkley 2003). In other words, individuals with ADHD symptoms may be stereotyped as being less devoted and may experience discrimination by congregants because of their inability to follow the group's cultural folkways and mores (see Link and Phelan 2001). As the ADHD individual becomes more alienated because of her or his symptoms, she or he may retain less religious capital, which may further decrease the chances that she or he will participate in religion as an adult (Hathaway and Barkley 2003).

ADHD symptoms related to inattention, impulsivity, and memory disadvantages may hinder socialization efforts and may make focusing on religious events challenging, for both the ADHD child and her or his parents. A child with ADHD may lose concentration and more quickly become disinterested (perhaps resulting in a reprimand) during worship services, than children without the disorder. If ADHD children regularly exhibit symptoms, then they may be more likely to associate religion with discomfort and punishment (Filip 2005; Hathaway and Barkley 2003) than with expressive instruction and religious capital. On the other hand, frequent religious participation may also help reduce the severity of a child's ADHD symptoms by teaching children how to exercise self-control, thus resulting in fewer displays of the disorder's symptoms (compared to children with ADHD who do not regularly attend religious services); although the ADHD individual may still associate religion with discomfort.

According to Hathaway and Barkley (2003), people with ADHD are also more likely to have problems internalizing their faith. In fact, Filip (2005) finds that children with the disorder are more likely to report religious impairments. On face value, Hathaway and Barkley's theorem appears to be returning to the earliest explanations of ADHD resulting from a poor moral disposition (Still 1902; Still 2006), but they explicitly state that this is not the case. Attributes characterized by difficulties internalizing the faith are consequences of physiological processes and are not effects of low intelligence or an irresolute dedication to god (Hathaway and Barkley 2003).

Doubt is a fundamental element of the religious experience as believers perpetually encounter ideas that may conflict with their religious beliefs and values (O'Dea 1966). Individuals with ADHD have difficulty internalizing speech and with nonverbal working memory, making it an arduous task to connect a series of seemingly



unrelated, complex, and at times contradictory ideas; thus, it has been hypothesized that individuals with ADHD are more likely to quit analyzing the perceived contradiction for resolution than others (Hathaway and Barkley 2003). Without the ability to confront issues that challenge one's beliefs, it is difficult to possess a mature understanding of one's faith and decreases the likelihood of living a religiously stable life (Exline 2002). However, to the best of my knowledge, studies have not investigated whether ADHD individuals do have more religious doubts than those without the disorder.

Individuals with ADHD are more affected by environmental influences than people without the disorder (Barkley 2006; Cimera 2002). In particular, people with ADHD tend to do well in environments which allow for movement, self-expression, and participation. Some Protestant churches, and black churches in particular, commonly have services which allow for enthusiastic worship that includes singing and dancing (Ellison et al. 2010). While most research on the possibility of jubilant services being a therapeutic self-treatment have focused primarily on black churches (e.g., Ellison et al. 2010; Ellison et al. 2008; Gilkes 1980), cathartic experiences that result from energetic worship services are likely experienced among others—including those with ADHD—who also participate in enthusiastic worship.

ADHD individuals exhibit emotions more extremely than others (Barkley 2006; Cimera 2002). When ADHD individuals are happy, they may be told that they need to relax; when frustrated, they may be told not to be dramatic. Given emotional sensitivities that ADHD individuals have, they may also be more likely to experience religion in a polarized way: feeling very close to god only in environments which help them maintain attention and are engaging, and distant at other times (Hathaway and Barkley 2003). Such a dichotomous religious experience may result in people with the disorder being

unhappy with their religious experiences that do not provide them with constant enlightenment. Discontent with their religious experiences, ADHD individuals are likely to move from church to church hoping to re-experience the “highs” of new worship experiences (Hathaway and Barkley 2003).

### **Hypotheses**

Religious values often provide a spiritual perspective where the family takes on a central role to “God’s plan” and mundane familial responsibilities are elevated in importance and are “sanctified” (Mahoney et al. 2003). A sanctified familial perspective suggests that religious ideals and doctrines provide guidelines in how to handle everyday family life conflicts, like parenting practices.

Because conservative Protestants’ parenting style is deeply embedded with religious values which emphasize elements of love and punishment—with less emphasis on individuality—conservative Protestants are a prime example of members of what Ross and Ross’ (1982) refer to as a consistent culture. Consistent cultures reduce ADHD tendencies by emphasizing group conformity and cohesiveness (Ross and Ross 1982). Following the logic of Ross and Ross’ consistent culture theory, I suspect that conservative Protestant children with ADHD learn to suppress their ADHD tendencies and exhibit significantly fewer symptoms than other children in order to conform to the strict normative standards of conservative Protestantism. Moreover, I also suspect that conservative Protestants may be more likely to see ADHD symptoms as a function of unbridled passions to be disciplined and, thus, conservative Protestants are less likely to recognize the physiological explanations for the disorder.

Religious participation typically requires worshipers to adhere to a narrow set of appropriate behaviors which require self-control (McCullough and Willoughby 2009; Price and Bouffard 1974). Mothers who attend religious services or are otherwise religiously involved may have greater expectations for their children in term of self-control because they have a high degree of it themselves. Children who frequent worship services and regularly participate in religion, may indirectly be learning skills in how to develop self-control (e.g., Bartkowski, Xu, and Levin 2008; Brody and Flor 1998; Brody, Stoneman, and Flor 1996; McCullough and Willoughby 2009) and repress their ADHD tendencies, thereby exhibiting fewer symptoms (Hathaway and Barkley 2003). If religious participation is associated with greater self-control and fewer ADHD symptoms, then it is logical that religious participation is negatively associated with ADHD diagnosis due to religious attendance reducing experiences of ADHD symptoms. These strands of theory suggest that mothers' and children's religious participation is inversely related to children's likelihood of displaying ADHD symptoms and diagnosis of the disorder.

ADHD symptoms related to inattention, impulsivity, and memory disadvantages may make focusing on religious events challenging and thus may be more likely to lose concentration more quickly and become disinterested in the worship service than others without the disorder (Hathaway and Barkley 2003). Individuals with ADHD also have difficulty in reconciling opposing ideas and, consequently, may be less likely to participate in religious service than others (Hathaway and Barkley, 2003). ADHD individuals who do not learn how to repress their symptoms appear to be inattentive and disinterested to others; consequently, individuals with the disorder who are unable to manage their symptoms/behaviors to fit within their proscribed affiliation's norms may

be marginalized at an early age and “will often experience the harsh judgments, punishments, moral denigration, and social rejection and ostracism reserved for those society views as reckless, impulsive, lazy, unmotivated, selfish, thoughtless, immature, and irresponsible” (Barkley 1997: 2) and spiritually immature (Hathaway and Barkley 2003). Negative descriptions of the *symptoms* become part of the ADHD individual’s self-concept and negatively affect her or his self-esteem (Pope, McHale, and Craighead 1988) and the likelihood that they are religiously involved as an adult (Hathaway and Barkley 2003). To summarize, because individuals with ADHD have difficulties related to inattention and manifest symptoms, which are often interpreted as being indicators of spiritual immaturity, I suspect that those who have ADHD symptoms and/or been diagnosed with the disorder will be less religiously involved as adults than others.

As previously stated, individuals with ADHD are more affected by environmental influences than people without ADHD (Barkley 2006; Cimera 2002). In particular, people with ADHD tend to do well in environments which allow for movement, self-expression, and participation. Many conservative Protestant churches, allow for enthusiastic singing and dancing, and other types of active worship that would help individuals with ADHD maintain attention. Therefore, it is possible that among those who choose to be religiously involved and have ADHD, they may be more likely to affiliate with conservative Protestants than they are of another faith.

Based on the literature 12 hypotheses have been developed—numbered in the order in which they are tested—that will guide this study. They are:

Hypothesis 1: Children of conservative Protestant mothers’ are less likely to report ADHD symptoms compared to others.

Hypothesis 2: Mothers' religious participation is negatively related to children's ADHD symptoms.

Hypothesis 3: Conservative Protestant children are less likely to report ADHD symptoms compared to others.

Hypothesis 4: Respondents' childhood religious participation is negatively related to ADHD symptoms.

Hypothesis 5: Children of conservative Protestant mothers' are less likely to be diagnosed with ADHD compared to others.

Hypothesis 6: Mothers' religious participation is negatively related to children's odds of ADHD diagnosis.

Hypothesis 7: Conservative Protestant children are less likely to be diagnosed with ADHD compared to others.

Hypothesis 8: Respondents' childhood religious participation is negatively related to odds of ADHD diagnosis.

Hypothesis 9: Respondents who displayed childhood ADHD symptoms are less likely to be religiously involved as adults than others without the disorder.

Hypothesis 10: Respondents diagnosed with ADHD are less likely to be religiously involved as adults than others without the disorder.

Hypothesis 11: Respondents who displayed childhood ADHD symptoms and are religiously involved as adults are more likely to attend conservative Protestant services than they are of another affiliation.

Hypothesis 12: Respondents diagnosed with ADHD and who are religiously involved as adults are more likely to attend conservative Protestant services than they are if they belong to another affiliation.

Figure 1 illustrates the theoretical framework used to develop these hypotheses. Figures 2 through 4 illustrate the models used to test the hypotheses.

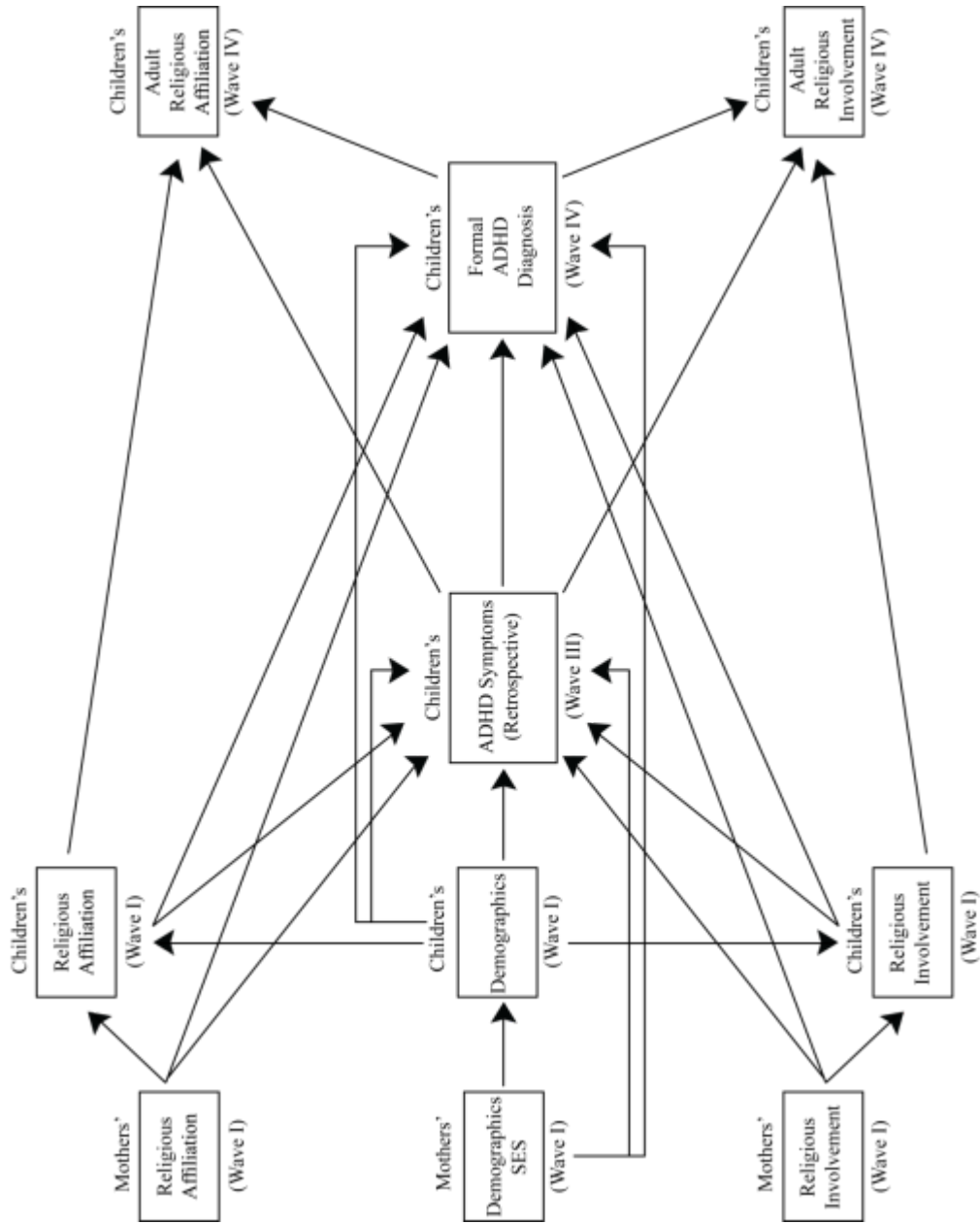


Figure 1 Theoretical framework

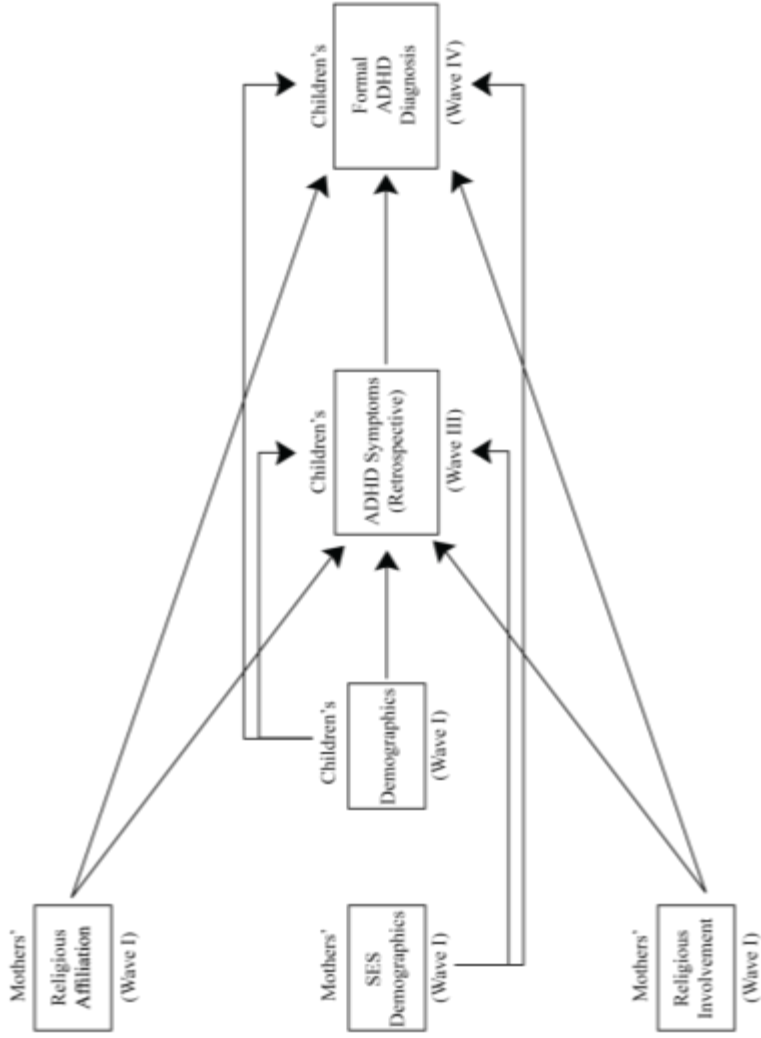


Figure 2 The affects of mothers' religious affiliation and involvement on children's ADHD analytical models

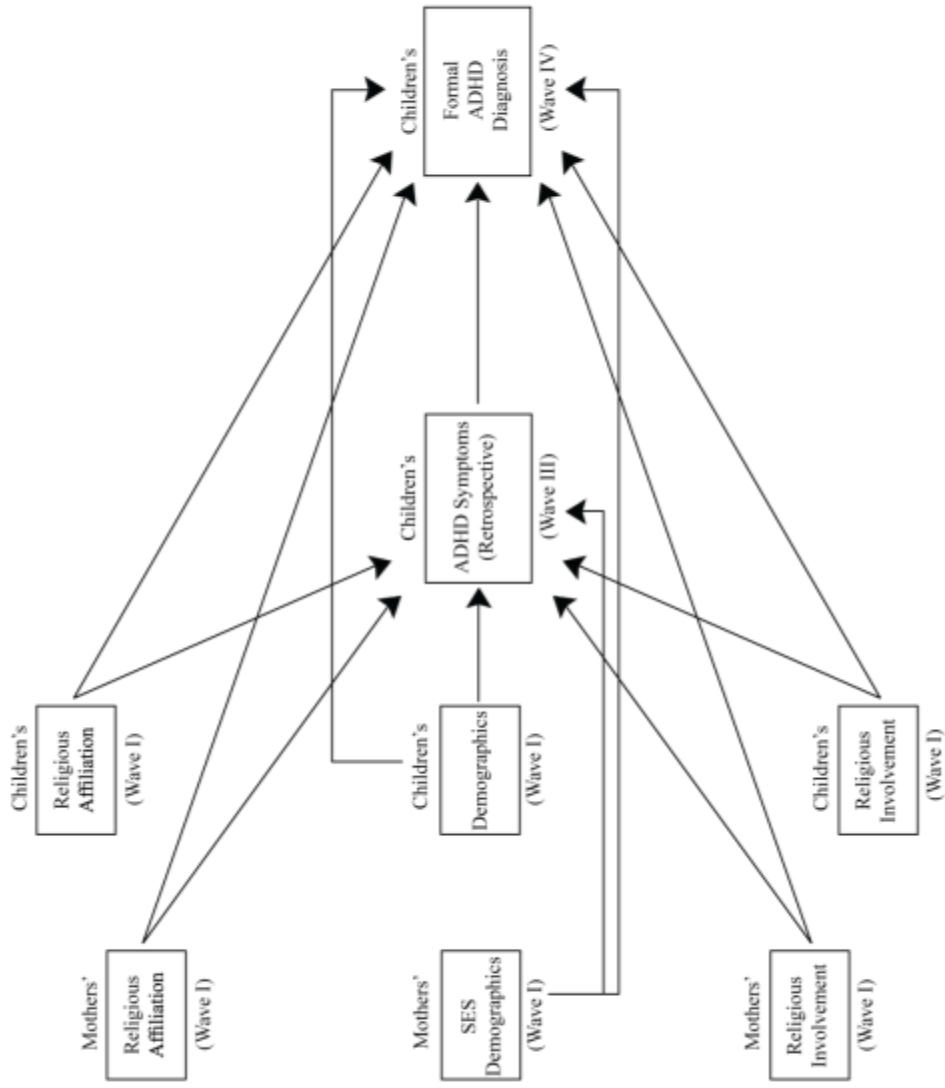


Figure 3 The affects of mothers' and children's religious affiliation and involvement on children's ADHD analytical models



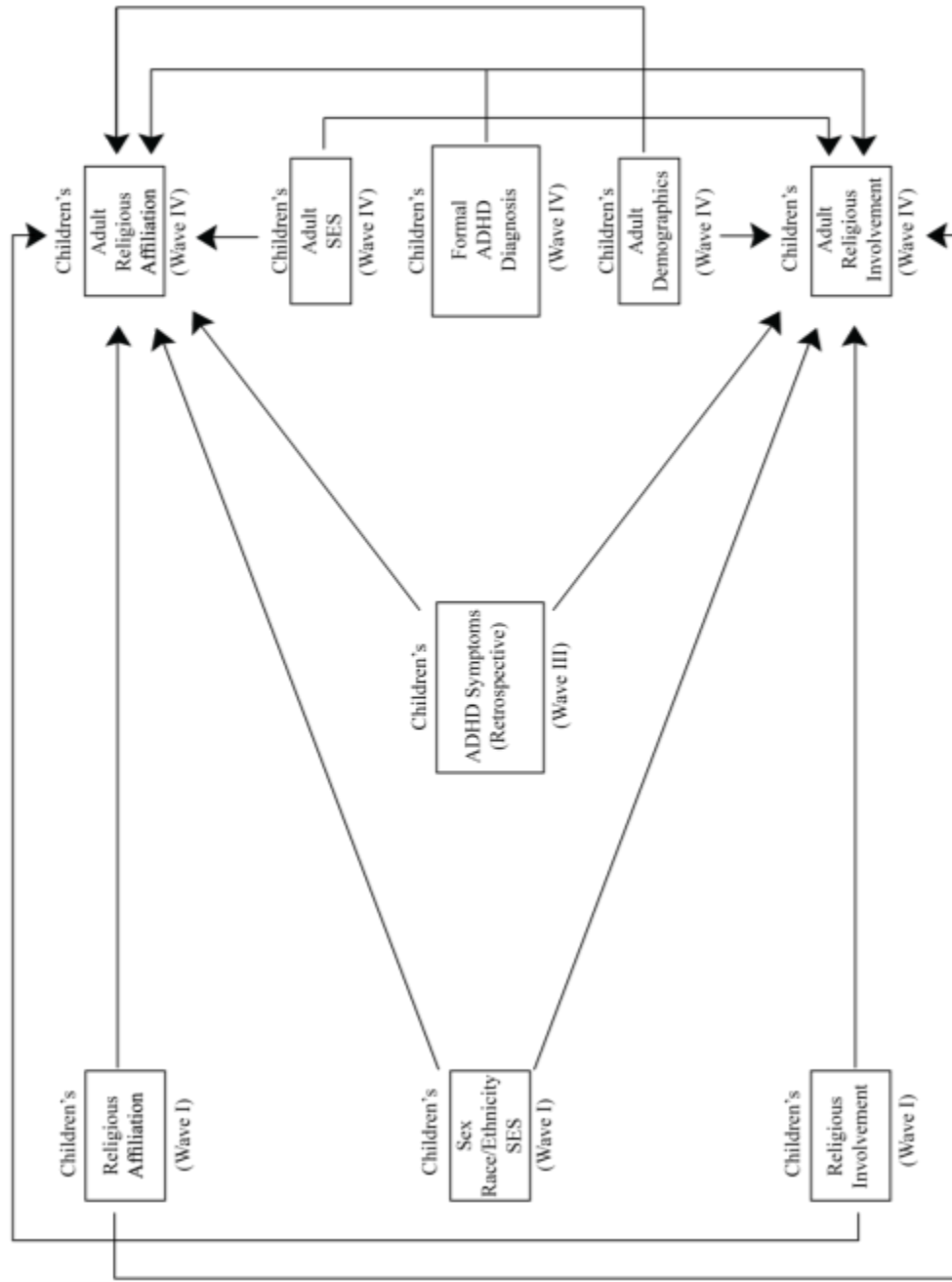


Figure 4 The effects of respondents' childhood ADHD on one's adult religious affiliation and involvement analytical models

## CHAPTER III

### METHODOLOGY AND DATA

Chapter III explains the research methodology examining the relationships between religious involvement and ADHD. First, the data used in the analysis are described. Second, variable construction and operationalization is explained. Third, a brief description of the statistical techniques is outlined.

#### **Source of data**

The National Longitudinal Study of Adolescent Health (Add Health) is used to test the hypotheses described in Chapter II. Add Health is a nationally representative panel data set, tracking individuals in grades 7-12 since 1994 (aged 12 to 18 at time of last data collection) across four waves of data collection (Harris et al. 2009). Researchers designing the Add Health used a clustered, unequal probability sampling design in Wave I from 132 schools (80 high schools; 52 middle schools) to provide a nationally representative, yet diverse, population by oversampling racial/ethnic minorities (Harris et al. 2009). Wave I included an in-school questionnaire and an in-home survey; key variables of importance to this study include mother figures' and children's (hereafter referred to as primary respondents, sons, or daughters) religious affiliation and involvement. In 1996, Wave II was administered and follow-up in-home interviews were performed, but these data are not applicable to this study as these interviews excluded primary respondents who were seniors in high school at Wave I. Wave III data were gathered between 2001 and 2002 among the original primary respondents (aged 18 to 26)

using in-home interviews. Pertinent Wave III questions cover self-reported retrospective ADHD *symptoms*. Wave IV is derived from in-home interviews among primary respondents (in 2007-2008) with a particular emphasis on life course health trajectories and a collection of biological markers. Similar to the previous waves, Wave IV data include children's—now adults—religious affiliation, involvement and beliefs, as well as a measure of whether respondents had ever been formally *diagnosed* with ADHD.

Add Health is one of the most reputable sources of data for social scientists to study health among young adults (e.g., Morris et al. 2006; Ornelas, Perreira, and Ayala 2007; Primack et al. 2009; Shin, Edwards, and Heeren 2009; Videon and Manning 2003) and is funded by 24 federal agencies and foundations (Harris et al. 2009). Increasingly, it has become a respected resource to investigate the role that religion plays in various outcomes (e.g., Nonnemaker, McNeely, and Blum 2003; Regnerus and Smith 2005;; Uecker, Regnerus, and Vaaler 2007). A key advantage of using longitudinal data—like Add Health—is that it allows for consequences of early life behaviors, such as religious involvement, to manifest themselves; these effects might otherwise be missed using cross-sectional data since effects may take years to develop (George et al. 2002). Add Health data provides more than a simplistic snapshot of the relationship of ADHD and religion by also allowing for changes in contextual factors which vary across the life-course.

### **Variable construction**

This study investigates the relationships between religious involvement and ADHD. The key variables of this study are constructed to operationalize the concepts of religious affiliation, religious involvement, ADHD symptoms and diagnosis—both

predictors as well as dependent variables depending on which analysis is being performed. Construction of these core variables is discussed below. A thorough description of the remaining independent variables is delineated later.

ADHD is diagnosed in only 8.4 percent of children between 6-17 years (Pastor and Reuben 2008); therefore, without purposeful oversampling, ADHD individuals constitute only a small percentage of any population—Add Health data are no exception. To be certain there is sufficient variation within and between various groups, several variables are collapsed (e.g., religious affiliation, race) to ensure sufficient variation as well as to reduce many degrees of freedom.

An obstacle when using panel data is measurement variation across data collection points. One limitation of using Add Health data to investigate the effects of religious participation on various outcomes is that the core questions measuring religion vary between data collection waves as well as between respondents (i.e., children; mother figure); thus, construction of the religion variables varies slightly between data collection points and respondents.

Survey data are obtained from the children's mother figures only in Wave I. In these data, mother figures are defined as the female head of the household or mother, if present. If the mother or other female head of the household did not reside in the residence, then the father, stepfather, or other male guardian was asked to participate in the survey. Because the vast majority (93.1%) of mother figures are the children's biological, stepmother, foster mother, or grandmother are the children's mother figure, in this study, they are referred to as the child's "mother" regardless of his or her sex.

## Dependent variables

### *Children's ADHD symptoms and diagnosis*

There are several dependent variables in this study. The first set of analyses in this study predicts the children's ADHD symptoms and diagnosis. Four variables measure ADHD symptoms. All four ADHD symptom variables are constructed using 16 questions in the Wave III survey questionnaire based on DSM-IV's partial diagnostic criteria for the disorder. These 16 questions are reflective questions that ask primary respondents to report the presence of behaviors and characteristics when they were between five and 12 years of age. Due to the nature of the questions used to self-report ADHD symptoms, all people experience some of the behaviors some of the time; however, very few people experience most of the behaviors most of the time, thereby qualifying them as possible candidates of ADHD. A symptom is considered to be present if the respondent says that it occurred "often" or "very often." The sum of eight questions coded as described are used to measure *inattentive type* ADHD symptoms.

They are: "When you were between 5 and 12:

- You failed to pay close attention to details or made careless mistakes in your work.
- You had difficulty sustaining your attention in tasks or fun activities.
- You didn't listen when spoken to directly.
- You didn't follow through on instructions and failed to finish work.
- You had difficulty organizing tasks and activities.
- You avoided, disliked, or were reluctant to engage in work requiring sustained mental effort.
- You lost things that were necessary for tasks or activities.

- You were easily distracted.”

The sum of eight questions measure *hyperactive type symptoms*. They are:

“When you were between five and 12:

- You fidgeted with your hands or feet or squirmed in your seat.
- You left your seat in the classroom or in other situations when being seated was expected.
- You felt restless.
- You had difficulty doing fun things quietly.
- You felt ‘on the go’ or ‘driven by a motor.’
- You talked too much.
- You blurted out answers before the questions had been completed.
- You had difficulty awaiting your turn.”

The sum total of hyperactive and inattention type symptoms variables are used to create dichotomous variable *severe symptoms*. In the variable symptoms, cases with five or fewer symptoms are coded as “few symptoms” (=0), while those with more than six are categorized as having “severe symptoms” (=1). These operationalization techniques are based off of other ADHD research which also uses Add Health data (Kollins, McClernon, and Fuemmeler 2005).

The dependent variable measuring ADHD diagnosis (yes=1, no=0) is created using the Wave IV survey question asking “Has a doctor, nurse or other health care provider ever told you that you have or had: attention problems or ADD or ADHD?”

### *Children's religious involvement as adults*

The second set of analyses in this study predicts the children's religious involvement (i.e., affiliation, prayer frequency, importance of religion, service attendance, and religious activity attendance) as adults using their ADHD symptoms and diagnosis.

The construction of children's religious affiliation as an adult (i.e., Wave IV) variable is categorized as "Catholic," "conservative Protestant" (=reference), "Protestant," and "none, atheist, or agnostic" based off of the Steensland et al. (2000) typology without specifically distinguishing black Protestant churches. Conservative Protestants are distinguished from mainline Protestants in Wave IV using the follow-up question: "Are you fundamentalist, evangelical, mainline, liberal, Pentecostal, or none of these?" Those who consider themselves a Fundamentalist, Evangelical, or Pentecostal are identified as a conservative Protestant in this research. To maintain as much consistency as possible between religious affiliation variables across data waves, Protestants are broadly defined as all Christians who are not Catholic or conservative Protestant. Due to the wide variation of non-Christian faiths, but the small proportion of non-Christian believers in the study, it is difficult to ascertain what relationship a non-Christian belief system might have with ADHD when compared to other religious values; moreover, only a fraction of U.S. residents identify with a non-Christian faith. For these reasons, those who report a non-Christian faith—at any data collection point—are excluded from this study (n=544).

The question used to measure children's prayer frequency as adults reads: "How often do you pray privately, that is, when you're alone in places other than a church, synagogue, temple, mosque, or religious assembly?" Potential responses are: "never,"

“less than once a month,” “a few times a month,” “once a week,” “a few times a week,” “once a day,” and “more than once a day.” The variable measuring one’s prayer *frequency* as an adult is categorized and coded to the categorical midpoints based on the shortest month only having 28 days (i.e., “never”=0, “less than once a month”=.5, “a few times a month”=2.5, “a few times a week”=15, and “once a day or more”=42).

The survey questionnaire in Wave IV asks: “How important (if at all) is your religious faith to you?” Possible responses include “not important,” “somewhat important,” “very important,” and “more important than anything else.” One’s adult views of the importance of religion is operationalized to match children’s (described below): “Very important” (=2, combines “very important and “more important than anything else”), “somewhat important” (=1) and “not important” (=0).

Children’s service attendance as adults is calculated from the question “How often have you attended church, synagogue, temple, mosque, ore religious services in the past 12 months?” Possible responses are “never,” “a few times,” “once a month,” “2 or 3 times a month,” “once a week,” and “more than once a week.” Responses “once a week” and “more than once a week” are combined into the category “once a week or more” (=5.5) to match childhood service attendance coding (described below). Other responses are changed to the categorical midpoint of times per month (i.e., 0, .5, 2.5).

Children’s religious activity attendance as adults is operationalized using the survey question: “Many churches, synagogues, and other places of worship have special activities outside of regular worship services—such as classes, retreats, small groups, or choir. In the past 12 months, how often have you taken part in such activities?” Valid responses include “never,” “a few times,” “once a month,” “2 or 3 times a month,” “once a week,” and “more than once a week.” In order to maintain consistency between



respondents' childhood and adult religious activity attendance, these categories are changed to reflect each other (i.e., "never," "less than once a month," "once a month or more, but less than once a week," and "once a week or more"). These categories are then coded to the categorical midpoint of times per month (i.e., "never"=0, "less than once a month"=.5, "once a month or more, but less than once a week"=2.5) and "once a week or more"=5.5).

### **Primary respondents' independent variables**

Primary respondents' independent variables include religious, demographic or socioeconomic. The calculation for children's religious affiliation is similar to respondents' adult affiliation where denominational responses are recoded into four new variables: "Catholic," "conservative Protestant" (including Evangelical because of sample size issues and data limitations; = reference), "Protestant" (broadly defined as all other Christian groups), and "none." Those who chose "other religion" are dropped as it is impossible to tell if they identify with another Christian religion or another non-Christian affiliation. Steensland et al.'s (2000) typology guided the determination of conservative Protestant denominations. Given constricted denominational options in the original Wave I survey question, however, it is not possible to distinguish whether some respondents are conservative or mainline Protestants (e.g., Baptists, Lutherans). Therefore, I also replicate the operationalization techniques of Burdette et al. (2009) who identified Add Health respondents as Evangelicals (i.e., conservative Protestants) if respondents viewed themselves as being born-again. (Note that this question was not asked in Wave IV.) There are few ADHD minorities in these data; so, respondents who are affiliated with black Protestant churches are coded as conservative Protestants

(including Evangelicals) rather than separating them into their own religious affiliation categorization as does Steensland et al.'s (2000) typology.

The children's prayer frequency question reads: "How often do you pray?" Potential responses are: "never," "less than once a month," "at least once a month," "at least once a week," and "at least once a day." Respondents' childhood prayer frequency variable is categorized to match that of when they are adults and coded to the categorical midpoints based on the shortest month only having 28 days (i.e., "never"=0, "less than once a month"=.5, "a few times a month"=2.5, "a few times a week"=15, and "once a day or more"=42).

The survey questionnaire in Wave I asks: "How important (if at all) is your religious faith to you?" Possible responses include "not important," "fairly unimportant," "fairly important," and "very important." Respondents' childhood views of the importance of religion are operationalized to match that when they are adults (described previously): "Very important" (=2), "somewhat important" (=1; "fairly important") and "not important" (=0; combines "not important" and "fairly unimportant"). Respondents with no childhood affiliation skipped this question and are coded as "not important."

Respondents' childhood service attendance is calculated from the question "In the past 12 months, how often did you attend religious services?" Possible responses are "never" (=0), "less than once a month" (=0.5) "once a month or more, but less than once a week" (=2.5) and "once a week or more" (=5.5). Responses are changed to the categorical midpoint of times per month. Respondents with no childhood affiliation skipped this question and are coded as "never."

Respondents' childhood religious activity attendance variable is operationalized using the survey question: "Many churches, synagogues, and other places of worship

have special activities for teenagers—such as youth groups, Bible classes, or choir. In the past 12 months, how often have you attended such youth activities?” Valid responses include “never,” “less than once a month” “once a month or more, but less than once a week” and “once a week or more.” In order to maintain consistency between childhood religious activity attendance and one’s adult religious activity attendance, these categories are coded to reflect each other (i.e., “never,” “less than once a month,” “once a month or more, but less than once a week,” and “once a week or more”). Categories are then coded to the categorical midpoint of times per month (i.e., “never”=0, “less than once a month”=.5, “once a month or more, but less than once a week”=2.5) and “once a week or more”=5.5). Respondents with no childhood affiliation skipped this question and are coded as “never.”

Demographic variables for primary respondents include: sex, age, race, adult marital status, and how many of their children—if any—are living at home with them. Sex is identified from Wave III collection data due to minor errors being found in Wave I (male=1). Age is entered as a continuous variable, while race is treated as a series of dummy variables; that is, black, Hispanic, “other,” and white (=reference). Adult marital status is entered as a dichotomous variable with married entered as the referent. The number of primary respondents’ (i.e., children who are now adults) children who are living at home at Wave IV is entered as a continuous variable.

Sociodemographic variables for the primary respondent as adults include: education attainment in years, student status (1=yes, 0=no). Adult education is entered as a ratio variable coded as “some high school or less” (=10), “high school graduate or general diploma equivalent” (=12), “some college” (=14), “college graduate” (=16), “professional training beyond four year degree” (=18).

Respondents' adult household income is operationalized using categorical midpoints (i.e., \$2,500, \$7,499.50, \$12,499.50, \$17,499.50, \$22,499.50, \$27,499.50, \$34,999.50, \$44,999.50, \$62,499.50, \$87,499.50, \$124,999.50, \$174,999.50). After listwise deletion on all other variables included in the model besides respondents' adult household income weighted Ordinary Least Squares (OLS) regression is used to predict missing household income. Variables entered into the model include education, race, marital status, sex, and the calculated occupational prestige score using the 1998 Standard Occupational Classification (SOC) and Carl Frederick's (2010) crosswalk schematic. This resulted in 362 imputed cases out of the 6578 cases in the analytical sample.

### **Mothers' independent variables**

Independent variables used in these analyses are grouped into three categories for mother figure—religious, demographics, and socioeconomic status. Mothers' religious involvement is operationalized by four religious measures: affiliation, prayer frequency, importance of religion, and service attendance. Mothers' affiliation is calculated by recoding a survey question with 26 categorical denominational responses into one of four new categories: "Catholic," "conservative Protestant" (including Evangelicals; = reference), "Protestant" (broadly defined as all other Christian groups), and "none." Participants in non-Christian religions are omitted from this analysis due to sample size limitations. Steensland et al.'s (2000) typology guided the determination of conservative Protestant/Evangelical denominations. Given constricted denominational options in the survey question, it is not possible to distinguish whether respondents are conservative or mainline Protestants (e.g., Baptists, Lutherans). Moreover, unlike the children's questionnaire, mothers' questionnaires do not ask if they consider themselves as being

born again and I am unable to replicate operationalization techniques among children in Wave I where respondents are identified as Evangelicals (i.e., conservative Protestants) if they viewed themselves as being born-again (see Burdette et al. 2009).

Admittedly, calculating measures of religious affiliation differently between waves permits the variables to measure different concepts. To examine similarity across waves, various affiliation variables are calculated and correlated. The affiliation variables calculated are highly correlated among one another within Waves and moderately correlated across Waves. For example, the two mother affiliation variables correlate with each other at .927 (see Table 1). Although the affiliation variables are operationalized slightly differently, they appear to measure the same concept. The affiliation variables that are constructed as previously outlined and are used in this study are bolded in Table 1.

Table 1 Correlation Between Mothers' and Respondents' Affiliation (weighted)

	Mother1	<b>Mother 2</b>	Child1	<b>Child2</b>	Child3	Adult1	<b>Adult2</b>
Mother1	1						
<b>Mother2</b>	.927***	1					
Child1	.224***	.181***	1				
<b>Child2</b>	.226***	.259***	.963***	1			
Child3	.623***	.568***	.472***	.503***	1		
Adult1	.203***	.174***	.251***	.246***	.229***	1	
<b>Adult2</b>	.244***	.274***	.234***	.277***	.285***	.866***	1

Variable Descriptions:

Mother1: Mothers' affiliation includes separate categories for other Christians and Protestants

Mother2: Mothers' affiliation combines other Christians and Protestants

Child1: Respondents' childhood affiliation includes separate categories for other Christians and Protestants and codes those who have been born again as conservative Protestants

Child2: Respondents' childhood affiliation codes those who have been born again as conservative Protestants and combines other Christians and Protestants.

Child3: Respondents' childhood affiliation includes separate categories for other Christians and Protestants and does not include born again status

Adult1: Respondents' adult affiliation includes separate categories for other Christians and Protestants

Adult2: Respondents' adult affiliation combines other Christians and Protestants

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001(two tailed test)

In Wave I, mothers are asked: “How important is religion to you?” Possible responses include “not important,” “fairly unimportant,” “fairly important,” and “very important.” This variable is operationalized to match that of respondents’ childhood and adult importance of religion variables (i.e., “very important” (=2), “somewhat important” (=1; “fairly important”) and “not important” (=0; combines “not important” and “fairly unimportant”). Mothers with no affiliation skipped this question and are coded as “not important. “

Mothers’ service attendance is calculated using the question: “How often have you gone to religious services in the past year?” Possible responses are “never” (=0), “less than once a month” (=0.5) “less than once a week, but more than once a month” (=2.5) and “once a week or more” (=5.5). Responses are coded to a categorical midpoint of times per month and match respondents’ childhood and adult corresponding variables. Mothers with no affiliation skipped this question and are coded as “never.”

Demographic variables for mother figure include: age, and marital status. Mothers’ age is entered as a continuous variable. Mothers’ marital status is entered as a dummy variable with unmarried being the reference category. Due to multicollinearity, only children’s race/ethnicity is entered into the final analyses as a series of mutually exclusive dummy variables (i.e., black, Hispanic, other, white (=reference). Only about five percent (n=361) of children report a race/ethnicity different than their mother.

Sociodemographic variables for the mothers include education and household income. Mothers’ education attainment is entered as a ratio variable coded as “some high school or less” (=10), “high school graduate or general diploma equivalent” (=12), “some college” (=14), “college graduate” (=16), “professional training beyond four year degree” (=18). Mothers’ household income is derived from the singular question “About how

much total income, before taxes did your family receive in 1994? Include your own income, the income of everyone else in your household, and income from welfare benefits, dividends, and all other sources.” Mothers’ household income is entered as categorical midpoints that match respondent’s adult household income coding midpoints (i.e., \$2,500, \$7,499.50, \$12,499.50, \$17,499.50, \$22,499.50, \$27,499.50, \$34,999.50, \$44,999.50, \$62,499.50, \$87,499.50, \$124,999.50, \$174,999.50). Missing mothers’ household income was imputed using a regression model (weighted using Wave I weight) that included mothers’ education (“some high school or less”=10; “high school or GED”=12; “some college or vocational school after high school”=14; “college graduate”=16; “professional training beyond four year degree”=reference), mothers’ race entered as a series of dummy variables (white=reference; black, Hispanic=1, other=1, but all other analyses use only children’s race/ethnicity variables), marital status (married=1; not married=0), whether she worked for pay outside of the home in the last year (yes=1; no=0), or if there was enough money to pay the bills (yes=1; no=0). This resulted in 704 imputations out of the total 6578 cases in the analytical sample.

#### *Father figures’ core variables*

Father figure’s characteristics were not self-reported and did not include comparable religious involvement questions to the mother figure or the primary respondent—unless the father figure was the “mother figure.” In fact, it is not possible to classify the father figure as a conservative Protestant using Burdette et al.’s (2009) technique of being born-again as a proxy as this variable does not exist in the data. Consequential to the limited scope of this and other characteristics of father figures, fathers’ characteristics are not included in this analysis.

### **Sample attrition**

This study uses a life-course approach to examine the possibility of an ADHD-religion association using longitudinal panel data. In order to ascertain if respondents who leave the sample as adults (i.e., Wave IV) are significantly different than those who participated as adults, I have performed a simple cross-tabulation analysis by survey wave participation and ADHD symptom severity. My analytical sample begins by selecting those who participated at Wave I as well as at Wave III (when childhood ADHD symptomology questions were included). After omitting respondents who were missing ADHD symptomology measures and/or analytical weights, my childhood analytical sample (i.e., Wave III) size is 10,603 respondents. Of these 10,603 respondents, 9,225 participated in the data collection as adults (i.e., Wave IV) and had appropriate ADHD diagnosis information, a net difference of 13 percent (see Table 2). Crosstabulations were performed comparing adults who fell out of the sample to adult participants based on ADHD symptom characteristics.

As illustrated in Table 2, those with severe symptoms were not significantly more or less likely to participate in data collection as an adult than those with few symptoms. I also compared the means of the sum total ADHD scores using independent samples t-tests instead of the simple dichotomous ADHD symptom severity variable. The results were not significantly different and comparable to those displayed in Table 2 and are not included in this study as they do not add substantive information to the study. Knowing that those who fell out of the sample are not substantively different than those who participated in the questionnaire as adults provides evidence that my analytical sample is not under-representing those with ADHD. Note that aside from mothers' household income and respondents' adult household income (which were imputed as described



above), no one single variable had an unusually high percent of missing cases, suggesting that these data were missing at random; therefore, while the sample population of adult participants was 9225, after list-wise deletion, the final analytical sample in this study is 6578.

Table 2 Analytical Wave IV Sample Attrition by ADHD Symptom Severity

	<b>Sample Size</b>			
	n	Pct.		
<b>Wave Participants</b>				
Wave III	10603			
Wave IV	9225			
Total Change	1378	13.0%		
	<b>Did Not Participate in Wave IV</b>		<b>Participated in Wave IV</b>	
	n	Pct.	n	Pct.
<b>ADHD Symptoms</b>				
Few Symptoms	1289	13.0%	8606	87.0%
Severe Symptoms	89	12.6%	619	87.4%

Note: Those who fell out of the sample are not statistically significantly different from Wave IV participants in terms of ADHD symptoms.

### Methods of analysis

To test the hypotheses that guide this study, three methods are used. First, a descriptive analysis compares the percentages of children’s and mothers’ characteristics by children’s ADHD symptoms and diagnosis. Next, I use weighted binary logistic regression to test how mothers’ (i.e., prayer frequency, importance of religion, and service attendance) and respondents’ childhood (i.e., prayer frequency, importance of religion, service attendance, and religious activity attendance) religious involvement is significantly related to children’s risk of symptoms and diagnosis. Weighted logistic regression is also used to examine if childhood ADHD symptoms and diagnosis are significant predictors of respondents’ being a conservative Protestant as an adult. The

logistic regression analyses testing childhood symptoms and diagnosis on adult affiliation test for causality. Logistic regression analysis is an appropriate statistical technique when the predicted variable is dichotomized (Menard 2002). Logistic regression is a particularly helpful analysis because it provides results in odds ratios; in other words, it clearly states how much greater (or less) one's odds are of being diagnosed with ADHD (compared to not being diagnosed), based on a given characteristic (e.g. affiliation). The third method of analyses uses weighted OLS regression to test for causal effects of childhood symptoms and diagnosis on adult religious participation (i.e., prayer frequency, importance of religion, service attendance, and religious activity attendance). OLS regression is an appropriate statistical technique when the dependent variable is continuous (Achen 1982). One benefit of OLS regression is that it tends to provide correct estimates even when minor statistical assumptions have been violated (Achen 1982). All analyses excluding the descriptive analyses are performed separately for daughters and sons to account for the vast differences between females' and males' risk of ADHD.

## CHAPTER IV

### RESULTS

Data from the National Longitudinal Study of Adolescent Health are used to determine first, how mothers' and children's religious involvement affect the relationship between religion and ADHD and how childhood ADHD affects religious involvement in adulthood. I use longitudinal methods and control for previous religious participation and affiliation. Data in this study include only those who participated in Waves I, III, and IV and contained valid information in the ADHD questions. Missing data were imputed for mothers' and respondents' adult household income; see Chapter III for details. All analyses except descriptive analyses are weighted to Wave IV weights because ADHD diagnosis is measured in Wave IV. Tables 3 through 9 show the unweighted means, percentages, and standard deviations for variables used in this study.

#### **Descriptive analysis**

##### **Dependent variables**

The first two sets of analyses predict ADHD symptoms and diagnosis. The variables measuring the severity of ADHD symptoms between the ages of 5 and 12 are constructed using 16 survey questions in the Wave III data based on DSM-IV's partial diagnostic criteria for the disorder. All people experience some of the ADHD associated behaviors some of the time; however, few people experience most of the behaviors most of the time, thereby qualifying them as probable candidates with ADHD.

Table 3 Dependent Variable Descriptive Statistics by ADHD Symptoms

	ADHD Symptoms						
	<i>Few ADHD Symptoms</i>			<i>Severe Symptoms</i>			
	n	Mean	SD/Pct	n	Mean	SD/Pct	Sig.
<b>ADHD Variables</b>							
Hyperactivity Symptoms	6029	5.87	3.69	449	16.12	4.11	***
Inattention Symptoms	6029	4.77	3.48	449	13.84	5.02	***
Total Symptoms	6029	10.64	6.44	449	29.96	6.57	***
<b>ADDH Diagnosis</b>							
No	5836		96.8%	345		76.8%	***
Yes	193		3.2%	104		23.2%	
<b>Adult Religious Involvement</b>							
<b>Affiliation</b>							
None	1134		18.8%	110		24.5%	
Protestant	2297		38.1%	164		36.5%	
Catholic	1451		24.1%	85		18.9%	
Conservative Protestant	1147		19.0%	90		20.0%	
<b>Service Attendance</b>							
Never	1689		28.0%	154		34.3%	*
.5 times per month	1986		32.9%	147		32.7%	
2.5 times per month	1237		20.5%	71		15.8%	
5.5 times per month	1117		18.5%	77		17.1%	
<b>Religious Activity Attendance</b>							
Never	4274		70.9%	327		72.8%	
.5 times per month	985		16.3%	68		15.1%	
2.5 times per month	407		6.8%	29		6.5%	
5.5 times per month	363		6.0%	25		5.6%	
<b>Prayer Frequency</b>							
Never	946		15.7%	92		20.5%	
.5 times per month	550		9.1%	34		7.6%	
2.5 times per month	861		14.3%	54		12.0%	
15.0 times per month	1175		19.5%	86		19.2%	
42.0 times per month	2497		41.4%	183		40.8%	
<b>Importance of Religion</b>							
Not important	863		14.3%	83		18.5%	*
Somewhat important	1845		30.6%	135		30.1%	
Very important	3321		55.1%	231		51.4%	

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Refer to Chapter III for variable coding details. The vast majority (93 percent) have few symptoms, while only 7 percent have severe symptoms/probable ADHD

(referred to as severe symptoms henceforth). Descriptive statistics are analyzed parsing out results between those with few symptoms and those with severe symptoms for comparison. By definition, the average number of hyperactivity, inattention and total symptoms are substantively lower for those who are defined as having few symptoms (i.e., 5.87; 4.77; 10.64) compared to those with severe symptoms (i.e., 16.12; 13.84; 29.96). F statistics from ANOVA analyses show that the differences between the mean number of symptoms between those who have few symptoms and those who have severe symptoms and within the groups are significantly different ( $p < .001$ , Table 3), as should be the case by definition.

Wave IV survey data notes whether the primary respondent reported ever being formally diagnosed as having ADHD (1=yes; 0=no). Among those who have been diagnosed with ADHD, 3.2 percent ( $n=193$ ) have few symptoms; in contrast, nearly a quarter (23.2;  $n=104$ ) of those who have severe symptoms have not been diagnosed (Table 3). Splitting the results similarly by ADHD diagnosis the average number of hyperactive type symptoms (6.35) and inattentive type symptoms (5.14) among those who have not been diagnosed with ADHD are about half (i.e., 11.42; 10.77) that of those who have been diagnosed with the disorder ( $p < .001$ , Table 4).

Five dependent variables in the second set of analyses measure children's religious involvement and affiliation as an adult. Adult affiliation is operationalized as a series of mutually exclusive categorical dichotomous variables: "none, atheist, or agnostic," "Protestant," "Catholic," and "conservative Protestant" (=reference) based on the Steensland et al. (2000) typology. People who report a non-Christian faith (e.g., Muslims, Buddhists, etc.) are excluded from this study (see Chapter III). Tables 3 and 4 show that the distribution of respondents' adult affiliation are the same when comparing

those with few symptoms to those with severe symptoms, as well as when contrasting those who have been diagnosed with the disorder to those who have not. ANOVA analyses confirm the lack of statistical association between and within the groups. In general, 20 percent of the sample is conservative Protestant, 20 percent is Catholic, 35 percent is Protestant, and about 20 percent have no religion, are atheist or are agnostic (Tables 3 and 4).

Turning the attention to Table 3, 28 percent (n=1689) of those with few symptoms never attend religious services as adults compared to about a third (n=154) of those who have severe symptoms. Those who occasionally attend (i.e., .5 times a month) constitute about a third of adult respondents, regardless of whether they report few (n=1986) or severe symptoms (32.7; n=147). Among those with few symptoms, 20.5 percent (n=1237) attend religious services as adults 2.5 times per month compared to only 15.8 percent (n=71) with severe symptoms. The differences between those who have few symptoms (18.5 percent: n=1117) and those who have severe symptoms (17.1 percent; n=77) narrow again when examining those who frequently attend (i.e., 5.5 times per month) religious services. ANOVA tests show that the differences between adult service attendance and ADHD symptoms are statistically significant ( $p < .05$ ).

The distribution of adult service attendance and ADHD diagnosis are also statistically different from one another ( $p < .05$ , Table 4). Among those who are diagnosed, 68.4 percent never attend religious services as adults (38.4; n=114 vs. 28.0, n=1729) or attend only .5 times per month (30.0, n=89 vs. 33.1, n=2044) compared to 61.1 percent of those who have not been diagnosed with ADHD. Similarly, 31.6 percent of those diagnosed with ADHD attend religious services 2.5 times per month or 5.5 times per month compared to nearly 40 percent of those not diagnosed.

Referring to Tables 3 and 4 more than 85 percent of adult respondents never attend religious group activities or do so only .5 times per month regardless of whether they report few symptoms or severe symptoms or are diagnosed with ADHD or not. Differences in bivariate analyses between adult activity attendance by ADHD symptoms and diagnosis are not statistically significantly different.

About 40 percent of respondents pray more than once per day (estimated at 42 times per month) as adults regardless of whether they have few symptoms (41.4, n=2497) or severe symptoms (40.8, n=183, Table 3). In fact, when examining adult prayer frequency by ADHD symptoms, those who have few versus severe symptoms do not significantly differ from each other. However, when examining the differences between adult prayer frequency and ADHD diagnosis, more variation is found; although, ANOVA tests do not indicate differences between and within the groups are statistically significant ( $p > .05$ , Table 4). The general pattern is that those who have not been diagnosed with ADHD tend to pray more often than those who have been diagnosed.

The distribution of the final dependent variable, respondents' adult views of the importance of religion, is illustrated in Tables 3 and 4. Table 3 shows that those who have few symptoms, a greater percentage report that religion is very important (55.1, n=3321) compared to those who have severe symptoms (51.4, n=231). On the other hand, a greater percentage of those with severe symptoms (18.5, n=83) report that religion is not important than those with few symptoms (14.3, n=863). Examining respondents' adult views of the importance of religion by ADHD diagnosis shows similar findings where those who have been diagnosed with ADHD are more likely to believe that religion is not important (18.9, n=56) compared to those who have not been diagnosed (14.4, n=890, Table 4).

Table 4 Dependent Variable Descriptive Statistics by ADHD Diagnosis

	ADHD Diagnosis						
	<i>Not Diagnosed</i>			<i>ADHD Diagnosed</i>			
	n	Mean	SD/Pct.	n	Mean	SD/Pct.	Sig.
<b>ADHD Variables</b>							
Hyperactivity Symptoms	6181	6.35	4.34	297	11.42	5.83	***
Inattention Symptoms	6181	5.14	4.03	297	10.77	5.83	***
Symptom Severity							
Few Symptoms	5836		94.4%	193		65.0%	***
Severe Symptoms	345		5.6%	104		35.0%	
Total Symptoms	6181	11.49	7.62	297	22.20	10.72	***
<b>Adult Religious Involvement</b>							
Affiliation							
None	1168		18.9%	76		25.6%	
Protestant	2356		38.1%	105		35.4%	
Catholic	1488		24.1%	48		16.2%	
Conservative Protestant	1169		18.9%	68		22.9%	
Service Attendance							
Never	1729		28.0%	114		38.4%	*
.5 times per month	2044		33.1%	89		30.0%	
2.5 times per month	1261		20.4%	47		15.8%	
5.5 times per month	1147		18.6%	47		15.8%	
Religious Activity Attendance							
Never	4363		70.6%	238		80.1%	
.5 times per month	1024		16.6%	29		9.8%	
2.5 times per month	421		6.8%	15		5.1%	
5.5 times per month	373		6.0%	15		5.1%	
Prayer Frequency							
Never	978		15.8%	60		20.2%	
.5 times per month	543		8.8%	41		13.8%	
2.5 times per month	882		14.3%	33		11.1%	
15.0 times per month	1209		19.6%	52		17.5%	
42.0 times per month	2569		41.6%	111		37.4%	
Importance of Religion							
Not important	890		14.4%	56		18.9%	**
Somewhat important	1881		30.4%	99		33.3%	
Very important	3410		55.2%	142		47.8%	

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Likewise, those who have been diagnosed with ADHD are less likely to believe that religion is very important (47.8, n=142) as adults than those who have not been



diagnosed with the disorder (55.2, n=3410). While the differences in adult religious importance appear to be relatively small between ADHD symptom groups and ADHD diagnosis status, ANOVA tests show that they are significantly different from each other ( $p < .05$ , Tables 3 and 4).

### **Independent variables**

There are three categories of independent variables in this research: mothers' characteristics (Wave I) and respondents' childhood (Wave I) and adult (Wave IV) characteristics. Mothers' variables include: religious involvement (i.e., affiliation, service attendance, prayer frequency, and views towards the importance of religion), demographics (i.e., age, marital status), and socioeconomic status (i.e., education, household income). Respondents' childhood control variables include: religious involvement (i.e., affiliation, service attendance, activity attendance, prayer frequency, importance of religion) and demographics (i.e., race, age, sex). Respondents' adult independent variables contain: marital status, number of children, education, and household income. For a detailed explanation of how these variables are constructed, refer to Chapter III.

#### *Children's independent variables*

About 20 percent more males have severe symptoms (59.2, n=266) than females (40.8, n=183) (Table 5) and more than two-thirds of those diagnosed with ADHD are male (64.6, n=192, Table 6). To control for the vast sex differences, all multivariate analyses are performed separately for males and females.

Table 5 Children's Independent Variable Descriptive Statistics by ADHD Symptoms (unweighted)

	ADHD Symptoms						
	Few Symptoms			Severe Symptoms			
	n	Mean	SD/Pct.	n	Mean	SD/Pct.	Sig.
<b>Childhood Religion</b>							
Affiliation							
None	683		11.3%	64		14.3%	
Protestant	1639		27.2%	122		27.2%	
Catholic	1676		27.8%	106		23.6%	
Conservative Protestant	2031		33.7%	157		35.0%	
Service Attendance (times per month)							
Never	1271		21.1%	110		24.5%	
.5	1028		17.1%	81		18.0%	
2.5	1171		19.4%	90		20.0%	
5.5	2559		42.4%	168		37.4%	
Religious Activity Attendance (times per month)							
Never	2815		46.7%	222		49.4%	
.5	808		13.4%	55		12.2%	
2.5	954		15.8%	71		15.8%	
5.5	1452		24.1%	101		22.5%	
Prayer Frequency (times per month)							
Never	1025		17.0%	90		20.0%	**
.5	456		7.6%	43		9.6%	
2.5	535		8.9%	46		10.2%	
15.0	1343		22.3%	98		21.8%	
42.0	2670		44.3%	172		38.3%	
Importance of Religion							
Not important	1202		19.9%	113		25.2%	*
Somewhat important	2146		35.6%	148		33.0%	
Very important	2681		44.5%	188		41.9%	
<b>Demographics</b>							
Sex							
Female	3389		56.2%	183		40.8%	***
Male	2640		43.8%	266		59.2%	
Race							
Black	1211		20.1%	63		14.0%	***
Hispanic	937		15.5%	50		11.1%	
Other	360		6.0%	18		4.0%	
White	3521		58.4%	318		70.8%	
Age							
Wave I	6029	15.25	1.584	449	15.36	1.555	
Wave IV	6029	28.12	1.614	449	28.22	1.601	
Wave IV Marital Status							
Unmarried	3340		55.4%	270		60.1%	*
Married	2689		44.6%	179		39.9%	
Number of Children at Wave IV							
	6029	0.85	1.115	449	0.86	1.147	
<b>Children's SES as Adults</b>							
Education							
Student	6029	14.42	2.125	449	13.73	2.156	***
No	5029		83.4%	385		85.7%	
Yes	1000		16.6%	64		14.3%	
Wave IV Household Income (Median \$)							
	6029	62499.50	40240.31	449	62499.50	40976.59	*

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Whites compose about 60 percent (58.4, n=3521) of the population of those with few symptoms but slightly more than 70 percent of those who have severe symptoms. Blacks account for the second largest racial/ethnic category with 20.1 percent (n=1211) showing few symptoms and 14 percent having severe symptoms (n=63) (Table 5). Hispanics (15.5, n=937; 11.1, n=50) and those of “other” race/ethnicity (6.0, n=360; 4.0, n=18) have the smallest proportions of the few symptoms and severe symptoms groups. Based on the low probability ( $p < .001$ ) of the F-statistic from an ANOVA, the differences between and within the symptom groups (Table 5) and the diagnosis groups (Table 6) are statistically significant. While whites constitute about 60 percent of (n=3593) of those who have not been diagnosed, they account for 82.8 percent (n=246) of those who have been diagnosed with ADHD ( $p < .001$ ; Table 6).

Examining the distribution of demographic variables to ADHD symptoms and ADHD diagnosis, the general trend shows a greater percentage of those who exhibit severe symptoms are unmarried, have slightly less education, and lower household incomes as adults than those with few symptoms and/or are not diagnosed ( $p < .05$ , Tables 5 and 6).

As for childhood affiliation, conservative Protestants compose about a third of the sample, regardless of their ADHD symptoms or ADHD diagnosis (Tables 5 and 6). Those with no religion constitute the smallest percentage of the population, while Protestants and Catholics make up about a quarter each, regardless of ADHD symptoms or ADHD diagnosis status ( $p > 0.05$ , Tables 5 and 6).

In reference to respondents’ childhood service attendance, the percent of “never attenders” is greater (24.5, n=110) among those who have severe symptoms than those who have few symptoms (21.1, 1271) (Table 5). In contrast, 42.4 percent (n=2559) of

those with few symptoms attend 5.5 times per month compared to 37.4 percent (n=168) with severe symptoms. Differences between ADHD symptoms groups are much less for those who attend .5 or 2.5 times per month. Differences between and within ADHD symptom groups and childhood service attendance are statistically significant ( $p < .05$ , Table 5). Childhood service attendance is not significantly different across diagnosis groups, however ( $p > .05$ , Table 6).

Frequency of childhood participation in religious group activities is essentially within one or two percentage points regardless of ADHD symptoms (Table 5) and ADHD diagnosis (Table 6). In general, about half of children “never” attend religious group activities. About 13 percent attend “once in a while” (coded as .5 times per month) or fairly regularly (coded as 2.5 times per month) and a quarter attend 5.5 times per month (Tables 5 and 6).

Childhood prayer frequency is significantly different for those with few symptoms and those with severe symptoms ( $p < .01$ , Table 5) as well as between those who have been diagnosed with ADHD and those who have not ( $p < .05$ , Table 6). Although those who pray make up the largest percentage of each group, it is about 5 percent higher among those who have few symptoms compared to those with severe symptoms (Table 5) and those who have not been diagnosed with the disorder compared to those who have (Table 6). Additionally, the percentage of those who “never” pray or pray .5 times per month is about six percent higher among those with severe symptoms compared to those with few symptoms and those diagnosed with the disorder compared to those who have not (Tables 5 and 6).

Table 6 Children's Independent Variable Descriptive Statistics by ADHD Diagnosis (unweighted)

	ADHD Diagnosis						
	<i>Not Diagnosed</i>			<i>ADHD Diagnosed</i>			
	n	Mean	SD/Pct.	n	Mean	SD/Pct.	Sig.
<b>Childhood Religion</b>							
Affiliation							
None	713		11.5%	34		11.4%	
Protestant	1666		27.0%	95		32.0%	
Catholic	1716		27.8%	66		22.2%	
Conservative Protestant	2086		33.7%	102		34.3%	
Service Attendance (times per month)							
Never	1314		21.3%	67		22.6%	
.5	1049		17.0%	60		20.2%	
2.5	1205		19.5%	56		18.9%	
5.5	2613		42.3%	114		38.4%	
Religious Activity Attendance (times per month)							
Never	2899		46.9%	138		46.5%	
.5	826		13.4%	37		12.5%	
2.5	977		15.8%	48		16.2%	
5.5	1479		23.9%	74		24.9%	
Prayer Frequency (times per month)							
Never	1055		17.1%	60		20.2%	*
.5	474		7.7%	25		8.4%	
2.5	550		8.9%	31		10.4%	
15.0	1370		22.2%	71		23.9%	
42.0	2732		44.2%	110		37.0%	
Importance of Religion							
Not important	1243		20.1%	72		24.2%	*
Somewhat	2181		35.3%	113		38.0%	
Very important	2757		44.6%	112		37.7%	
<b>Demographics</b>							
Sex							
Female	3467		56.1%	105		35.4%	***
Male	2714		43.9%	192		64.6%	
Race							
Black	1254		20.3%	20		6.7%	***
Hispanic	964		15.6%	23		7.7%	
Other	370		6.0%	8		2.7%	
White	3593		58.1%	246		82.8%	
Age							
Childhood	6181	15.26	1.58	297	15.27	1.55	
Adult	6181	28.1	1.6	297	28.2	1.50	
Adult Marital Status							
Unmarried	3422		55.4%	188		63.3%	**
Married	2759		44.6%	109		36.7%	
Number of Children as Adult	6181	0.9	1.1	297	0.7	1.0	**
<b>Adult SES</b>							
Education	6181	14.4	2.1	297	13.8	2.2	***
Student							
No	5161		83.5%	253		85.2%	
Yes	1020		16.5%	44		14.8%	
Household Income (Median \$)	6181	62499.50	40386.32	297	44999.50	38031.39	**

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Examining children's views towards childhood religious importance show that a greater percent of those with few symptoms report that religion is somewhat important (35.6, n=2146) or very important (44.5, n=2681) compared to those with severe symptoms (33, n=148; 41.9, n=188) (Table 5). Conversely, the percent (25.2, n=113) of those who report religion is not important is higher among those with severe symptoms compared to those with few symptoms (19.9, n=1202) ( $p < .05$ , Table 5). A similar statistically significant trend ( $p < .05$ ) is observed where more importance is placed on religion among those who have not been diagnosed with ADHD compared to those who have (Table 6).

#### *Mothers' independent variables*

Turning attention to Table 7, among mothers who have children with few symptoms, six percent (n=360) have no religious affiliation, are atheist, or agnostic, 54 percent (n=3256) are Protestant, 30.7 percent (n=1853) are Catholic and 9.3 (n=560) are conservative Protestants. Religious affiliation among mothers who have children with severe symptoms is similar; 8 percent (n=36), 56.8 percent (n=255) are Protestants, 28.1 percent (n=126) are Catholics and 7.1 percent (n=32) are conservative Protestants. Differences between and within the groups are statistically significant ( $p < .05$ , Table 7). The distribution of mothers' religious affiliation by children's ADHD diagnosis is comparable to that of affiliation and children's ADHD symptoms with the differences between and within the groups also being statistically significant ( $p < .05$ , Table 8). However, as described in Chapter III, the survey instrument altered the wording and questions asked between childhood (i.e., Wave I) and adult (i.e., Wave IV) questionnaires, as well as between respondents (i.e., mother and daughter/son in Wave I).

These changes in the survey questionnaire have altered how religious affiliation is operationalized in this study and account for the distributional differences between mothers' and children's affiliation in Wave I. To ensure that statistically significant effects are not a result of discrepancies in the operationalization process, analyses testing the hypotheses have been run twice; once including mothers' affiliation in the models (shown in Tables 22 through 32 in Appendix A), and once excluding it.

When examining the effects of mothers' service attendance on respondents' childhood ADHD symptoms, the general pattern shows that, on average, the mothers of children with few symptoms attend religious services more frequently than mothers whose children have severe symptoms (Table 7,  $p < .01$ ). Likewise, a significantly ( $p < .01$ ) greater percent (40.5,  $n = 2506$ ) of mothers whose children have not been diagnosed with ADHD attend religious services 5.5 times per month than mothers whose children have been diagnosed with the disorder (33.7,  $n = 100$ , Table 8).

Statistically significant differences ( $p < .01$ ) in child's ADHD symptoms emerge when comparing mothers' prayer frequency (Table 7). Among mothers' whose children show few symptoms, seven percent ( $n = 422$ ) never pray, nearly 10 percent ( $n = 557$ ) pray .5 times per month, three percent ( $n = 173$ ) pray 2.5 times per month, 14.3 percent ( $n = 863$ ) pray 15 times per month and two-thirds ( $n = 4014$ ) pray more than once a day. On the other hand, about 10 percent ( $n = 44$ ) of mothers whose children have severe symptoms never pray, 12.7 percent ( $n = 57$ ), pray .5 times per month, less than two percent ( $n = 7$ ) pray 2.5 times, 15.1 percent ( $n = 68$ ) pray 15 times, and the majority (60.8,  $n = 273$ ) pray more than once a day. Differences in mothers' prayer frequency are statistically significant when analyzed by ADHD symptoms, but no statistical differences are found between mothers' prayer frequency and children's ADHD diagnosis (Table 8).

Table 7 Mothers' Independent Variable Descriptive Statistics by Children's ADHD Symptoms (unweighted)

	<b>Children's ADHD Symptoms</b>						
	<i>Few Symptoms</i>			<i>Severe Symptoms</i>			Sig.
	n	Mean	SD/Pct.	n	Mean	SD/Pct.	
<b>Religion</b>							
Affiliation							
None	360		6.0%	36		8.0%	
Protestant	3256		54.0%	255		56.8%	
Catholic	1853		30.7%	126		28.1%	
Conservative Protestant	560		9.3%	32		7.1%*	
Service Attendance (times per month)							
Never	1057		17.5%	93		20.7%	
.5	1357		22.5%	131		29.2%	
2.5	1158		19.2%	76		16.9%	
5.5	2457		40.8%	149		33.2%***	
Prayer Frequency (times per month)							
Never	422		7.0%	44		9.8%	
.5	557		9.2%	57		12.7%	
2.5	173		2.9%	7		1.6%	
15.0	863		14.3%	68		15.1%	
42.0	4014		66.6%	273		60.8%**	
Importance of Religion							
Not important	650		10.8%	66		14.7%	
Somewhat important	1518		25.2%	115		25.6%	
Very important	3861		64.0%	268		59.7%*	
<b>Demographics</b>							
Race							
Black	1165		19.3%	60		13.4%	
Hispanic	851		14.1%	36		8.0%	
Other	355		5.9%	13		2.9%	
White	3658		60.7%	340		75.7%***	
Age	6029	41.65	6.552	449	41.57	6.246	
Marital Status							
Unmarried	1611		26.7%	121		26.9%	
Married	4418		73.3%	328		73.1%	
<b>SES</b>							
Education	6029	13.45	2.372	449	13.37	2.193	
Household Income (Median \$)	6029	4499.50	31997.50	494	44999.50	33156.03	

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Examining mothers' views towards religious importance at shows that a greater percent of those whose children have few symptoms report that religion is very important



(64.0, n=3861) compared to those with severe symptoms (59.7, n=268) (Table 7).

Conversely, the percent (14.7, n=66) of mothers who report that religion is not important is higher among those whose children have severe symptoms compared to mothers whose children have few symptoms (10.8, n=650). Differences between and within the groups are statistically significant ( $p < .05$ , Table 7). Very small differences on mothers' views on the importance of religion are observed when analyzed by children's ADHD diagnosis status; although ANOVA results indicate these differences are not statistically significant ( $p > .05$ , Table 8).

The mean age of mothers whose children have few symptoms is virtually identical (41.7, SD=6.6) to the average age of mothers whose children have severe symptoms (41.6, SD=6.3,  $p > .05$ , Table 7). The mean age of mothers of children who are not diagnosed with ADHD (42.5, SD=6.8) is significantly higher ( $p < .05$ ) than that of mothers whose children are diagnosed with ADHD (42.5, SD=6.8); however these differences are not substantively different (Table 8).

Lastly, mothers' average years of education are relatively indistinguishable among mothers of children with few symptoms (13.5, SD=2.4) when compared to mothers of children with severe symptoms (13.4, SD=2.2, Table 7). On average, mothers' years of education is significantly ( $p < .05$ ) higher among those whose children are diagnosed with ADHD (13.8, SD=2.3) compared to those whose children are not diagnosed (13.4, SD=2.4, Table 8).

Table 8 Mothers' Independent Variable Descriptive Statistics by Children's ADHD Diagnosis (unweighted)

	Children's ADHD Diagnosis						
	<i>Not Diagnosed</i>			<i>ADHD Diagnosed</i>			Sig.
	n	Mean	SD/Pct.	n	Mean	SD/Pct.	
<b>Religion</b>							
Affiliation							
None	375		6.1%	21		7.1%	
Protestant	3333		53.9%	178		59.9%	
Catholic	1901		30.8%	78		26.3%	
Conservative Protestant	572		9.3%	20		6.7%	*
Service Attendance (times per month)							
Never	1082		17.5%	68		22.9%	
.5	1411		22.8%	77		25.9%	
2.5	1182		19.1%	52		17.5%	
5.5	2506		40.5%	100		33.7%	**
Prayer Frequency (times per month)							
Never	438		7.1%	28		9.4%	
.5	584		9.4%	30		10.1%	
2.5	173		2.8%	7		2.4%	
15.0	880		14.2%	51		17.2%	
42.0	4106		66.4%	181		60.9%	
Importance of Religion							
Not important	673		10.9%	43		14.5%	
Somewhat important	1558		25.2%	75		25.3%	
Very important	3950		63.9%	179		60.3%	
<b>Demographics</b>							
Race							
Black	1208		19.5%	17		5.7%	
Hispanic	872		14.1%	15		5.1%	
Other	365		5.9%	3		1.0%	
White	3736		60.4%	262		88.2%	***
Age	6181	41.6	6.5	297	42.5	6.8	*
Marital Status							
Unmarried	1654		26.8%	78		26.3%	
Married	4527		73.2%	219		73.7%	
<b>SES</b>							
Education	6181	13.4	2.4	297	13.8	2.3	**
Household Income (Median \$)	6181	44999.50	31705.98	297	44999.50	37143.26	

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

### **Analyses examining the relationship between mothers' religious involvement and children's ADHD symptoms**

To test Hypotheses 1 that mothers' religious affiliation significantly predict differences in children's in ADHD symptoms and Hypothesis 2 that mothers' religious participation is negatively related to children's symptoms, weighted binary logistic regression models compare ADHD symptoms (1= severe symptoms, 0= few symptoms). All analyses are weighted and shown for boys and girls separately.

The results in Table 9 show mixed findings for Hypothesis 1—that children of conservative Protestant mothers will have significantly fewer ADHD symptoms than children whose mothers are of another (or no) faith. Daughters of Catholic (2.41,  $p < .05$ ) and Protestant (2.32,  $p < .05$ ) mothers have much higher probabilities of having severe symptoms than daughters whose mothers are conservative Protestants, controlling for other factors. Among sons, however, mothers' affiliation—compared to conservative Protestants—does not significantly ( $p > .05$ ) predict differences in the likelihood of having severe symptoms, holding other factors constant. Among both daughters (.99,  $p < .05$ ) and sons (.99,  $p < .01$ ), mothers' prayer frequency is negatively related to the probabilities of daughters' having severe symptoms, all else being equal. Other indicators of mothers' religious involvement (i.e., importance of religion and service attendance) are not significantly related to children's ADHD symptoms in Table 9. These results show limited evidence to reject the null hypothesis that mothers' religious participation are not be negatively related to children's ADHD symptoms (Hypothesis 2). Ancillary regression analyses exploring the effects of mothers' religious involvement—excluding mothers' affiliation—show comparable results among both daughters and sons to those in Table 9 except that among sons, mothers' service attendance (.95,  $p < .05$ ) is also negatively related to severe symptoms (Table 22, Appendix A). Other supplemental

weighted Ordinary Least Square regressions are also performed on children’s inattentive type symptoms by mothers’ religious involvement—with (Table 23, Appendix A) and without (Table 24, Appendix A) mother’s affiliation —generally reflect the findings in Table 9. Additional weighted Ordinary Least Square regressions examining children’s hyperactive type symptoms by mothers’ religious involvement—with (Table 25; Appendix A) and without (Table 26; Appendix A) mother’s affiliation —generally reflect the findings in Table 9 among both daughters and sons except that mother’s prayer frequency is not a significant predictor among sons while mothers’ service attendance is.

Table 9 Children’s Odds Ratios of Severe Symptoms by Mothers’ Religious Participation and Children’s Controls (weighted)

<b>Mothers' Characteristics</b>	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
Catholic	2.214*	1.399
Protestant	2.349*	1.293
None	2.397	1.514
Conservative Protestant (=ref.)		
Prayer Frequency	0.984*	0.985**
Importance of Religion	1.224	1.418
Service Attendance	0.944	0.948
Age	0.987	1.016
Married (yes=1)	1.072	0.983
Education	0.945	1.000
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Black	0.638	0.700
Other	0.287*	0.481
Hispanic	0.981	0.399**
White (=ref.)		
Age	1.092	1.009
n	3572	2906
X <sup>2</sup>	30.75**	25.96*
df	14	14
Log Pseudolikelihood	-722.80	-889.95
Pseudo R <sup>2</sup>	.03	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

### **Children's religious involvement and ADHD symptoms**

To test Hypotheses 3 (conservative Protestant children will be less likely to report ADHD symptoms) and 4 (childhood religious participation is significantly negatively related to symptoms) binary logistic regression analysis is used. In Models 2 and 4 the effects of mothers' religious involvement are controlled. All analyses are weighted and shown for sons and daughters separately.

Models 1 (daughters) and 3 (sons) of Table 10 show that children's religious involvement is not a predictor of having severe symptoms, controlling for other factors. In fact, the only significant predictor of children's symptoms in Models 1 (black .56,  $p < .05$ ; other .31,  $p < .05$ ) and 3 (Hispanic .40,  $p < .01$ ) is race/ethnicity—compared to their white counterparts (Table 10). In Models 2 (daughters) and 4 (sons) mothers' religious involvement and demographics are entered into the analysis (Table 10). Model 2 shows that daughters whose mothers are Catholic (3.21,  $p < .05$ ), Protestant (2.69,  $p < .01$ ), or have no affiliation (3.11,  $p < .05$ ) have higher odds of having severe symptoms compared to daughters of conservative Protestants. Conversely, mothers' affiliation is not significantly related to sons' likelihood of having severe ADHD symptoms, controlling other variables in Model 4. Only mothers' prayer frequency predicts differences in daughters' (.98,  $p < .05$ ) and sons' (.98,  $p < .01$ ) odds of having severe symptoms (Table 10), all else being equal. None of the children's religious indicators (i.e., affiliation, prayer frequency, importance of religion, service attendance and activity attendance) are significantly ( $p > .05$ , Table 10) related to severe symptoms among daughters or sons. Ancillary analyses examining the effects of childhood religious participation on ADHD symptoms, controlling for mothers' religious participation—excluding affiliation—indicate similar results to those described in Table 10 (Table 27, Appendix A).

Table 10 Children's Odds Ratios of Severe Symptoms by Children's and Mothers' Religious Participation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Catholic		3.210*		1.646
Protestant		2.687**		1.326
None		3.109*		1.627
Conservative Protestant (=ref.)				
Prayer Frequency		0.984*		0.984**
Importance of Religion		1.222		1.441
Service Attendance		0.922		0.970
Age		0.990		1.017
Married (yes=1)		1.056		0.993
Education		0.945		1.003
Household Income	1.000	1.000	1.000	1.000
<b>Respondent's Childhood Characteristics</b>				
Catholic	0.752	0.557	0.983	0.813
Protestant	0.772	0.660	0.958	0.914
None	0.686	0.545	0.900	0.873
Conservative Protestant (=ref.)				
Prayer Frequency	0.995	0.998	0.999	1.000
Importance of Religion	0.964	0.958	1.034	1.042
Service Attendance	0.992	1.058	0.928	0.930
Religious Activity Attendance	0.942	0.942	1.018	1.023
Black	0.555*	0.635	0.665	0.702
Other	0.308*	0.303*	0.522	0.489
Hispanic	1.005	1.063	0.402**	0.399**
White (=ref.)				
Age	1.069	1.095	1.017	1.005
n	3572	3572	2906	2906
X <sup>2</sup>	18.34	35.26*	15.23	28.91
df	12	21	12	21
Log Pseudolikelihood	-734.70	-718.58	-896.86	-888.18
Pseudo R <sup>2</sup>	.01	.04	.01	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Other supplemental weighted OLS regressions are also performed on children's *inattentive* and *hyperactive type symptoms* by mothers' religious involvement—with (Tables 28 and 30; Appendix A) and without (Tables 29 and 31; Appendix A) mothers' affiliation—show that various religious indicators have statistically significant effects on children's symptoms, although they are not substantively different from those described in Table 10.

In summary, the results described in Table 10 among sons do not support Hypothesis 1 (mothers' affiliation predicts differences in children's ADHD symptoms), but is supported among daughters. Among both daughters and sons, mothers' prayer frequency is significantly negatively related to severe symptoms, indicating support for Hypothesis 2 (mothers' religious participation is significantly negatively related to children's symptoms). Hypothesis 3 (conservative Protestant children will report fewer ADHD symptoms) is not supported while Hypothesis 4 (children's religious participation is significantly negatively related to symptoms) is not.

### **Mothers' religious involvement and children's ADHD diagnosis**

Table 11 shows the effects of mothers' religious participation on children's odds of being diagnosed with ADHD. Neither mothers' affiliation nor religious participation are significant predictors of children being diagnosed with ADHD. In fact, aside from severe symptoms, the only substantive predictor is race/ethnicity. Compared to daughters who are white, black daughters are 89 percent ( $p < .001$ ) less likely to be diagnosed with ADHD and daughters of an "other" race/ethnicity are 85 percent ( $p < .05$ ) less likely, all else being equal. Hispanic sons are 81 percent ( $p < .001$ ) less likely to be diagnosed than their white counterparts, controlling for other factors.

Ancillary regression analyses predicting children's odds of diagnosis without mothers' affiliation show similar results to those described in Table 11 (Table 32, Appendix A). Likewise, results from additional analyses predicting children's odds of diagnosis using children's inattentive and hyperactive symptoms (instead of the simpler severe symptoms dummy) with (Table 33, Appendix A) and without (Table 34, Appendix A) mothers' affiliation also mirror those in Table 11.

Table 11 Children's Odds Ratios of ADHD Diagnosis by Mothers' Religious Participation and Controls (weighted)

	<b>Daughters</b>	<b>Sons</b>
<b>Mothers' Characteristics</b>	OR.	OR.
Catholic	3.667	0.660
Protestant	3.049	0.890
None	5.456	0.629
Conservative Protestant (=ref.)		
Prayer Frequency	0.987	1.003
Importance of Religion	1.632	0.797
Service Attendance	0.930	0.987
Age	1.032	1.036**
Married (yes=1)	0.795	0.863
Education	1.037	0.981
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Severe Symptoms (yes=1)	9.151***	5.982***
Black	0.108***	0.503
Other	0.152*	0.309
Hispanic	0.450	0.191***
White (=ref.)		
Age	0.888	1.073
n	3572	2906
X <sup>2</sup>	98.68***	109.91***
Df	15	15
Log Pseudolikelihood	-448.82	-694.88
Pseudo R <sup>2</sup>	.13	.11

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001



Findings from Table 11 indicate I should null Hypotheses 5 (children of conservative Protestant mothers do not have the lowest odds of ADHD diagnosis) and 6 (mothers' religious involvement is significantly negatively related to children's odds of ADHD diagnosis).

### **Children's religious involvement and ADHD diagnosis**

To test Hypotheses 7 (conservative Protestant children are significantly less likely to be diagnosed with ADHD than children of other/no faiths) and 8 (children's religious participation is significantly negatively related to diagnosis) binary logistic regression analysis is used. In Models 2 (among daughters) and 4 (among sons) of Table 12, the effects of mothers' religious involvement are. All analyses are weighted and shown for sons and daughters separately.

Models 1 (among daughters) and 3 (among sons) show that compared to conservative Protestants children, affiliation is not significantly related to ADHD diagnosis, controlling for other factors (Table 12). Model 1 does show that daughters' service attendance (.81,  $p < .05$ ) is negatively related to ADHD diagnosis, holding other variables in the model constant. Model 3 among sons, however, does not show service attendance (1.00,  $p > .05$ ), or any other religious indicators to be significantly related to ADHD diagnosis after controlling for other variables in the model.

In Models 2 (among daughters) and 4 (among sons), mothers' religious involvement and demographics are entered into the equations. Daughters of Catholic mothers are 12 times ( $p < .01$ ) more likely and daughters of mothers with no affiliation are nearly 10 times as likely to be diagnosed with ADHD than daughters of conservative Protestants (Model 2, Table 12). Catholic (.23,  $p < .001$ ) daughters have significantly

fewer odds of ADHD diagnosis than their otherwise equal conservative Protestant counterpart (Model 2).

Table 12 Children's Odds Ratios of ADHD Diagnosis by Children's and Mother's Religious Participation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Catholic		11.954**		0.534
Protestant		3.348		0.857
None		9.739*		0.805
Conservative Protestant (=ref.)				
Prayer Frequency		0.987		1.004
Importance of Religion		1.517		0.798
Service Attendance		0.964		0.972
Age		1.030		1.033*
Married (yes=1)		0.837		0.831
Education		1.049		0.978
Household Income	1.000	1.000	1.000	1.000
<b>Respondents' Childhood Characteristics</b>				
Severe Symptoms (yes=1)	10.079***	9.531***	5.922***	6.115***
Catholic	0.723	0.227***	0.904	1.264
Protestant	0.969	0.849	1.097	1.120
None	0.627	0.352	0.439	0.444
Conservative Protestant (=ref.)				
Prayer Frequency	1.006	1.007	0.994	0.993
Importance of Religion	1.049	1.093	0.816	0.827
Service Attendance	0.810*	0.824*	0.995	1.024
Religious Activity Attendance	1.161	1.165	1.067	1.069
Black	0.095***	0.098***	0.567	0.523
Other	0.214	0.180	0.347	0.351
Hispanic	0.511	0.559	0.187***	0.194***
White (=ref.)				
Age	0.924	0.919	1.107	1.079
n	3572	3572	2906	2906
X <sup>2</sup>	107.72***	116.97***	104.59***	119.19***
df	13	22	13	22
Log Pseudolikelihood	-449.68	-433.45	-695.39	-687.04
Pseudo R <sup>2</sup>	.13	.16	.11	.12

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

After including mother's demographics and religious involvement indicators as control variables in Model 2, service attendance (.82,  $p < .05$ ) continues to be significantly negatively correlated to ADHD diagnosis among daughters, all else being equal. In the equivalent analysis among sons, none of the mothers' or sons' religious involvement indicators are significantly related to sons' likelihood of ADHD diagnosis (Model 4, Table 12).

In supplemental analyses excluding mothers' affiliation but otherwise replicating Table 12, similar results are found except in Model 2 of Table 35, Catholic daughters no longer are associated with significantly different odds diagnosis than their otherwise equal conservative Protestants counterpart (Appendix A). Additional analyses using the number of inattentive and hyperactive symptoms in place of the simple dichotomous severe symptoms variable, but other otherwise equivalent duplicating Tables 12 (Table 36, Appendix A) and 27 (Table 37, Appendix A) are also examined. The findings in Tables 36 and 37 (Appendix A) reflect those in their corresponding tables. One exception is that in Model 2 of Table 36, daughters with no childhood affiliation are less likely to be diagnosed with ADHD than conservative Protestants, all else being equal.

To summarize, the results in Table 12 have mixed findings. Among daughters, Hypothesis 5 (children of conservative Protestant mothers have the lowest odds of ADHD diagnosis) is mostly supported, but among sons it is not. Hypothesis 6 (mothers' religious involvement is negatively related to children's risk of ADHD diagnosis) is not supported. Hypothesis 7 (conservative Protestant children are less likely to be diagnosed than others) is largely rejected among both daughters and sons. Only after controlling for the affects of mothers' affiliation do differences emerge among Catholic daughters.

Lastly, modest support is provided for Hypothesis 8 (children's religious involvement is negatively related to ADHD diagnosis) among daughters, but not sons.

### **Childhood ADHD symptoms/diagnosis and adult religious involvement**

To test whether respondents with childhood ADHD symptoms (Hypothesis 9) or diagnosis (Hypothesis 10) are less religiously involved as an adult on average, than those who do not have childhood symptoms and/or diagnosis, weighted Ordinary Least Square regressions examine the effects of ADHD symptoms and diagnosis on adult prayer frequency, importance of religion, service attendance, and religious activity attendance. Analyses are performed separately for adult sons and daughters.

In Models 1a (among daughters) and 1b (among sons), the relationships between severe symptoms and diagnosis with adult daughters and sons adult prayer frequency are examined (Table 13). Childhood ADHD symptoms (daughters 1.86,  $p > .05$ ; sons .70,  $p > .05$ ) and diagnosis (daughters 1.01,  $p > .05$ ; sons .35,  $p > .05$ ) are not significantly related to adult prayer frequency, all else being equal. On average, blacks (daughters 4.76,  $p < .001$ ; sons 3.89,  $p < .001$ ) pray more frequently as adults than whites, controlling for other variables (Models 1a and 1b, Table 13). Unsurprisingly, Model 1a shows daughters' adult prayer frequency (.19,  $p < .001$ ), importance of religion views (9.80,  $p < .001$ ), service attendance (1.49  $p < .001$ ), and religious activity attendance (.41  $p < .05$ , Table 13) are all significantly positively associated with daughters' adult prayer frequency, holding all other factors constant. Daughters with no adult affiliation pray 5 days less ( $p < .001$ ) per month than conservative Protestant daughters, controlling for other variables (Model 1a, Table 13). Among males, childhood prayer frequency (.17,  $p < .001$ ), adult importance of religion (10.42,  $p < .001$ ), service attendance (2.10,  $p < .001$ ), and

religious activity attendance (.75,  $p < .001$ ) are significantly positively associated with sons' adult prayer frequency, controlling for other variables in Model 1b. Holding other variables in the model constant, adult Catholic (-3.21,  $p < .05$ ) sons, pray less frequently as than conservative Protestants (Model 1b, Table 13).

No statistical relationship is observed between childhood ADHD symptoms (daughters -.05,  $p > .05$ ; sons -.01,  $p > .05$ ) and diagnosis (daughters .03,  $p > .05$ ; sons .02,  $p > .05$ ) and adult views towards the importance of religion (Models 2a and 2b, Table 13). Consistent with logic, daughters' childhood importance of religion (.12,  $p < .001$ ) views, adult prayer frequency (.01,  $p < .001$ ), and adult service attendance (.07,  $p < .001$ ) are associated with higher views of importance of the religion as adults, all else controlled in Model 2a. Adult Catholic (-.11,  $p < .01$ ) daughters and daughters with no affiliation (-.63,  $p < .001$ ) tend to have lower perceptions of the importance of religion as adults when compared to conservative Protestant daughters, holding other variables in the model constant. After controlling for all other indicators in Model 2b, sons' adult prayer frequency (.02,  $p < .001$ ) and service attendance (.05,  $p < .001$ , Table 13) predict higher levels of importance of religion as adults. Sons with no childhood affiliation (.15,  $p < .05$ ) have slightly higher views of the importance of religion as adults, on average, compared to those who were conservative Protestants as children, all else being equal. Conversely, sons with no adult affiliation (-.71,  $p < .001$ ) have lower predicted importance of religion coefficients than adult conservative Protestants, holding other variables in the model constant. Compared to whites, blacks (daughters .09,  $p < .01$ ; sons .17,  $p < .001$ ) tend to have slightly higher perceptions of the importance of religion as adults, controlling other variables in Models 2a and 2b.

The effects of childhood severe ADHD symptoms (daughters .03,  $p > .05$ ; sons .15,  $p > .05$ ) and diagnosis (daughters .23,  $p > .05$ ; sons -.11,  $p > .05$ ) do not significantly predict service attendance as adults, holding other variables constant (Models 3a and 3b, Table 13). Controlling for other variables in Model 3a, mothers' service attendance (.06,  $p < .001$ ) is positively associated with daughters' adult service attendance; as is, daughters' childhood service attendance (.05,  $p < .05$ ), adult prayer frequency (.02,  $p < .001$ ), importance of religion (.62,  $p < .001$ ), and religious activity attendance (.56,  $p < .001$ ). Daughters who were Protestants (-.20,  $p < .05$ ) children and/or had no adult affiliation are associated with lower adult service attendance (-.51,  $p < .001$ ) than conservative Protestants, all else being equal (Model 3a, Table 13). Among sons, adult prayer frequency (.02,  $p < .001$ ), importance of religion (.36,  $p < .001$ ), and religious activity attendance (.67,  $p < .001$ ) are positively related to adult service attendance, after controlling for other variables in Model 3b. Among sons, the effects of no adult affiliation (-.48,  $p < .001$ ) are negatively related to one's adult service attendance among sons, holding other factors constant in Model 3b.

The results of Models 4a (among daughters) and 4b (among sons) in Table 13 fail to show significant relationships between childhood ADHD symptoms and diagnosis and adult religious activity attendance. Among daughters, childhood religious activity attendance (.03,  $p < .05$ ) and adult service attendance (.27,  $p < .001$ ) are positively related to adult religious activity attendance, holding other variables constant in Model 4a. Adult Catholic (-.32,  $p < .001$ ) daughters have lower predicted coefficients of adult religious activity attendance than conservative Protestant daughters, all else being equal in Model 4a. Among sons, the only variables of statistical import are adult religious involvement indicators (Table 13). Adult Protestant (-.45,  $p < .001$ ) sons and sons with no adult

affiliation (-.30,  $p < .05$ ) are slightly less involved with religious activities than conservative Protestants, on average. Adult service attendance (-.03,  $p < .05$ ) and prayer frequency (-.20,  $p > .05$ ) are significant predictors of sons' adult religious activity

Table 13 OLS Coefficients Predicting Sons' and Daughters' Adult Religious Involvement by Childhood ADHD Symptoms and Diagnosis and Controls (weighted)

	Prayer Frequency		Importance of Religion		Service Attendance		Religious Activity Attendance		
	Daughters	Sons	Daughters	Sons	Daughters	Sons	Daughters	Sons	
	<i>Model 1a</i>	<i>Model 1b</i>	<i>Model 2a</i>	<i>Model 2b</i>	<i>Model 3a</i>	<i>Model 3b</i>	<i>Model 4a</i>	<i>Model 4b</i>	
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	
<b>Mothers' Characteristics</b>									
Prayer Frequency	-0.005	0.034	0.001	0.000	-0.001	-0.002	0.000	0.000	
Importance of Religion	0.540	0.290	0.038	0.040	0.032	-0.086	-0.017	0.017	
Service Attendance	-0.032	-0.089	0.004	0.005	0.062**	0.064**	-0.020	-0.014	
Age	-0.125*	-0.016	0.001	0.001	0.009	-0.001	0.001	-0.004	
Married (yes=1)	0.780	-0.357	0.007	0.058***	0.040	0.061	0.051	-0.067	
Education	0.202	0.131	-0.002	-0.014	-0.018	-0.008	0.018	0.017	
Household Income	0.000***	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
<b>Respondents' Childhood Characteristics</b>									
Severe ADHD (yes=1)	1.855	0.697	-0.049	-0.008	-0.225	0.150	0.120	0.001	
ADHD Diagnosis (yes=1)	1.014	0.346	0.030	0.020	0.267	-0.112	-0.130	-0.003	
Catholic	0.256	-0.141	-0.021	-0.040	-0.047	0.014	-0.115	-0.026	
Protestant	-0.703	-0.713	-0.009	0.015	-0.013	-0.012	-0.109	-0.101	
None	1.765	0.716	0.162**	0.152*	0.245	0.168	-0.092	-0.079	
Conservative Protestant (=ref.)									
Prayer Frequency	0.191***	0.172***	0.000	0.001	0.003	-0.004	0.000	-0.050	
Importance of Religion	-0.496	-0.307	0.115***	0.113***	-0.049	0.035	0.058	0.001	
Service Attendance	-0.140	-0.385	-0.009	0.002	0.047*	0.036	-0.014	-0.033	
Religious Activity Attendance	-0.065	0.019	0.002	-0.005	0.017	0.023	0.032*	0.020	
Black	4.758***	3.894***	0.088**	0.165***	0.162	-0.185	-0.084	0.019	
Other	0.443	-0.130	0.016	0.032	0.384*	-0.301*	-0.147	-0.054	
Hispanic	-1.075	1.043	0.102**	0.131***	0.150	0.057	-0.075	0.137	
White (=ref.)									



Table 13 (continued)

	Prayer Frequency		Importance of Religion		Service Attendance		Religious Activity Attendance	
	Daughters	Sons	Daughters	Sons	Daughters	Sons	Daughters	Sons
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
<b>Respondents' Adult Characteristics</b>								
Age	0.460*	0.141	-0.002	-0.004	-0.018	0.028	0.021	-0.006
Married ( yes=1)	0.363	0.158	0.043	0.048	0.359***	0.172*	-0.088	-0.004
Number of Children	0.682*	0.219	-0.011	-0.005	0.025	0.036	0.036	0.050
Education	-0.140	0.058	-0.006	0.002	0.077***	0.031	0.021	-0.022
Student (yes=1)	0.746	-0.426	-0.068*	-0.019	0.131	0.166	-0.067	0.013
Household Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086
Catholic	-2.242	-3.210*	-0.107**	-0.085	-0.186	-0.059	-0.315**	0.000***
Protestant	-1.567	-1.654	0.002	0.020	-0.195*	-0.195	-0.144	-0.449***
None	-5.002***	-1.832	-0.629***	-0.705***	-0.506***	-0.484***	-0.068	-0.300*
Conservative Protestant ( =ref.)								
Prayer Frequency	9.979***	10.419 ***	0.012***	0.015***	0.016***	0.021 ***	0.003*	-0.203*
Importance of Religion	1.490***	2.097***	0.066***	0.051***	0.618***	0.355***	0.022	0.004
Service Attendance	0.045***	0.750*	-0.004	-0.008	0.563 ***	0.674 ***	0.373***	-0.028***
Religious Activity Attendance	3572	2906	3572	2906	3572	2906	3572	2906
n	116.24***	95.70***	114.30***	125.29***	126.85***	101.40***	19.25***	11.42***
F	31	31	31	31	31	31	31	31
df	.46	.49	.46	.60	.52	.50	.34	.38
R <sup>2</sup>								

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

### **Childhood ADHD symptoms/diagnosis and adult religious affiliation**

To test the final hypotheses that children with ADHD symptoms (H11) or have been diagnosed (H12) and are religiously involved as adults are more likely to be conservative Protestants than they are of another affiliation, weighted binary logistic regression analyses are used. Results in Table 14 show no support for Hypotheses 11 and 12. Adult prayer frequency (1.01,  $p < .05$ ), importance of religion (1.80,  $p < .001$ ), and service attendance (1.09,  $p < .05$ ) are all associated with increased odds of daughters' being a conservative Protestant as an adult, controlling all other variables in the analysis (Model 1, Table 14). Sons' adult importance of religion (1.79,  $p < .001$ ), service attendance (1.10,  $p < .001$ ), religious activity attendance (1.20,  $p < .001$ ) being married (1.47,  $p < .05$ ) are all significantly related to elevated odds of being a conservative Protestant as an adult, controlling for all other variables (Model 2). Adult black daughters (.55,  $p < .001$ ) and sons (.63,  $p < .05$ ) are significantly less likely to be conservative Protestant than their otherwise equal counterpart (Models 1 and 2).

Complementary analyses looking at the effects of hyperactive type and inattentive type ADHD symptoms as continuous variables rather than the simplistic severe symptoms dichotomized variable show similar results to those described in Table 14 (Table 39, Appendix A).

Table 14 Odds Ratios of Being an Adult (Wave IV) Conservative Protestant by Childhood ADHD Severe Symptoms and Diagnosis and Controls.

	<b>Daughters</b>	<b>Sons</b>
	<i>Model 1</i>	<i>Model 2</i>
<b>Mothers' Characteristics</b>	OR.	OR.
Prayer Frequency	1.000	0.999
Importance of Religion	0.980	0.919
Service Attendance	1.076*	1.035
Age	0.990	0.987
Married (yes=1)	1.034	1.181
Education	1.002	1.019
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Severe Symptoms (yes=1)	1.341	0.779
ADHD Diagnosis	1.017	1.568
Catholic	0.110***	0.231***
Protestant	0.475***	0.540***
None	0.334***	0.458*
Conservative Protestant (=ref.)		
Prayer Frequency	1.001	0.986**
Importance of Religion	1.031	1.259
Service Attendance	0.939	1.049
Religious Activity Attendance	1.043	0.932
Black	0.554***	0.627*
Other	0.877	1.430
Hispanic	1.070	1.041
White (=ref.)		
<b>Respondents' Adult Characteristics</b>		
Age	1.047	1.088
Married ( yes=1)	1.183	1.436*
Number of Children	0.990	0.947
Education	0.983	1.008
Student ( yes=1)	1.150	0.990
Household Income	1.000	1.000**
Prayer Frequency	1.011*	1.009
Importance of Religion	1.802***	1.793***
Service Attendance	1.091*	1.096*
Religious Activity Attendance	1.053	1.197***
n	3572	2906
X <sup>2</sup>	335.85 ***	277.00***
df	29	29
Log Pseudolikelihood	-1442.53	-1116.22
Pseudo R <sup>2</sup>	.18	.17

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

## Support for hypotheses

To test the 12 hypotheses guiding this study, a variety of analyses are performed and discussed in this chapter. In this section, each hypothesis is restated and accompanied with a chart describing whether it is supported by the findings in this study.

Table 15 shows mixed support for Hypothesis 1: Children of conservative Protestant mothers will be significantly less likely to report ADHD symptoms compared to others. Among sons, Hypothesis 1 is rejected, but among daughters it is partially supported. When compared to daughters whose mothers are conservative Protestant, daughters whose mothers are Catholic or Protestant have significantly higher odds of having severe symptoms. The data generally do not support Hypotheses 2: Mothers' religious participation is significantly negatively related to children's ADHD symptoms. As seen in Table 15, some exceptions are found. Mothers' prayer frequency is significantly negatively related to ADHD symptoms among daughters and sons; however, the significant relationships between mothers' prayer frequency and children's symptoms are modest and not substantively meaningful.

Table 15 Summary of Results Testing Hypotheses 1 and 2

<b>Support Among Daughters</b>				<b>Support Among Sons</b>		
<i>Mothers' Affiliation</i>				<i>Mothers' Affiliation</i>		
<b>H1</b>	<b>Yes</b>			<b>No</b>		
<i>Mothers' Religious Involvement</i>				<i>Mothers' Religious Involvement</i>		
				Prayer	Importance	Service
				Frequency	of Religion	Attendance
<b>H2</b>	<b>Modest</b>	<b>No</b>	<b>No</b>	<b>Modest</b>	<b>No</b>	<b>No</b>

Note: H1: Children of conservative Protestant mothers' will be significantly less likely to report symptoms compared to others. H2: Mothers' religious participation is negatively related to children's ADHD symptoms.

As summarized in Table 16, the findings in this research show mixed support for Hypothesis 3: Conservative Protestant children will be significantly less likely to report ADHD symptoms compared to others. Among daughters, in some models Catholic daughters are less likely to have severe symptoms than their otherwise equal conservative Protestant counterpart; however, among sons, childhood conservative Protestantism is not significantly associated with decrease risk of symptom severity. Table 16 also shows that the findings in this study fail to support Hypothesis 4: Childhood religious involvement is negatively related to ADHD symptoms.

Table 16 Summary of Results Testing Hypotheses 3 and 4

<b>Support Among Daughters</b>			<b>Support Among Sons</b>			
<i>Childhood Affiliation</i>			<i>Childhood' Affiliation</i>			
<b>H3</b>	<b>Yes</b>			<b>No</b>		
	<i>Childhood Religious Involvement</i>			<i>Childhood Religious Involvement</i>		
	Prayer Frequency	Importance of Religion	Service Attendance	Prayer Frequency	Importance of Religion	Service Attendance
<b>H4</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: H3: Conservative Protestant children will be significantly less likely to report ADHD symptoms compared to others. H4: Childhood religious participation is negatively related to ADHD symptoms.

As illustrated in Table 17, no support is found for Hypotheses 5 (children of conservative Protestant mothers will be significantly less likely to be diagnosed with ADHD than others) and 6 (mothers' religious participation is negatively related to children's odds of ADHD diagnosis). In other words, neither mothers' religious affiliation nor involvement is associated with children's risk of being diagnosed with ADHD.

Table 17 Summary of Results Testing Hypotheses 5 and 6

<b>Support Among Daughters</b>			<b>Support Among Sons</b>			
<i>Mothers' Affiliation</i>			<i>Mothers' Affiliation</i>			
<b>H5</b>	<b>No</b>			<b>No</b>		
	<i>Mothers' Religious Involvement</i>			<i>Mothers' Religious Involvement</i>		
	Prayer Frequency	Importance of Religion	Service Attendance	Prayer Frequency	Importance of Religion	Service Attendance
<b>H6</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: H5: Children of conservative Protestant mothers will be significantly less likely to be diagnosed with ADHD compared to others. H6: Mothers' religious participation is negatively related to children's ADHD diagnosis.

As shown in Table 18 the results fail to support Hypothesis 7 (conservative Protestant children will be significantly less likely to be diagnosed with ADHD compared to others) among either daughters or sons. Table 18 also shows slight variations of support for Hypothesis 8 (respondents' childhood religious participation is negatively related to odds of ADHD diagnosis). Among sons the findings are lucid and fail to support Hypothesis 8; among daughters, however, childhood service attendance is associated with reduced odds of ADHD diagnosis.

Table 18 Summary of Results Testing Hypotheses 7 and 8

<b>Support Among Daughters</b>			<b>Support Among Sons</b>			
<i>Childhood Affiliation</i>			<i>Childhood' Affiliation</i>			
<b>H7</b>	<b>No</b>			<b>No</b>		
	<i>Childhood Religious Involvement</i>			<i>Childhood Religious Involvement</i>		
	Prayer Frequency	Importance of Religion	Service Attendance	Prayer Frequency	Importance of Religion	Service Attendance
<b>H8</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: H7: Conservative Protestant children will be significantly less likely to be diagnosed with ADHD than others. H8: Childhood religious participation is negatively related to ADHD diagnosis.

Table 19 exemplifies that the findings in this study show no support Hypotheses 9 (those who displayed childhood ADHD symptoms are less religiously involved as adults than others) and 10 (those who have been diagnosed with ADHD are less religiously

involved as adults than others). In other words, childhood ADHD symptoms and diagnosis do not substantively effect ones' adult religious involvement.

Table 19 Summary of Results Testing Hypotheses 9 and 10

	<b>Support Among Daughters</b>			<b>Support Among Sons</b>		
	<i>Adult Religious Involvement</i>			<i>Adult Religious Involvement</i>		
	Prayer Frequency	Importance of Religion	Service Attendance	Prayer Frequency	Importance of Religion	Service Attendance
<b>H9</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>
<b>H10</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>

Note: H9: Those who displayed childhood ADHD symptoms will be significantly less likely to be religiously involved as adults than others without the disorder. H10: Those diagnosed with ADHD will be significantly less likely to be religiously involved as adults than others without the disorder.

As seen in Table 20, the findings of this study fail to support Hypotheses 11 and 12: Those who displayed ADHD symptoms (H11) or who are diagnosed with the disorder (H12) and are religiously involved as adults are more likely to attend conservative Protestant services than they are of another denomination.

Table 20 Summary of Results Testing Hypotheses 11 and 12

	<b>Support Among Daughters</b>	<b>Support Among Sons</b>
<b>H11</b>	No	No
<b>H12</b>	No	No

Note: H11: Those who displayed childhood ADHD symptoms and are religiously involved as adults are more likely to attend conservative Protestant services than they are of another affiliation. H12: Those who have been diagnosed with ADHD and are religiously involved as adults are more likely to attend conservative Protestant services than they are of another affiliation.

## CHAPTER V

### DISCUSSION AND CONCLUSION

#### **Discussion**

ADHD is one of the most commonly diagnosed disorders among children, even across cultures (Canino and Alegría 2008; Prudent et al. 2005). It is not simply a childhood disorder as its symptoms (e.g., lack of self-control, inattention, hyperactivity, or impulsiveness) often continue well into adulthood (Barkley 2006). Research shows the associations between religion and health are generally healthful (e.g., Hummer et al. 1999; Koenig 2009; Koenig et al. 2001) and that there is a positive relationship between self-control and religious participation (see McCullough and Willoughby 2009). In spite of the fact that low levels of self-control are chief symptoms of ADHD and the possibility that religious participation may be used as a treatment option for those who have the disorder, few investigations have specifically examined the relationship between religion and ADHD. This research investigates the role of (1) mothers' and children's religious involvement on childhood ADHD *symptoms* and *diagnosis* and (2) the role that childhood ADHD *symptoms* and *diagnosis* have on one's adult religious involvement. In other words, it investigates religion and ADHD—one newly medicalized disorder—are related across the life-course.

Two important theoretical concepts guided this research. Hathaway and Barkley's theory (2003) suggests that individuals with ADHD have several disadvantages that affect their secular lives (e.g., behavioral and time inhibitions, nonverbal and verbal



working memory disadvantages, difficulties of internalizing and self-regulation of emotion, and impediments in performing mental play/reconstitution) that may also affect their religious participation. Specifically, people with ADHD may have difficulty maintaining religious focus, internalizing the faith, experiencing religious alienation, and being less involved when they are religiously active. Additionally, Ross and Ross' (1982) theory notes that differences in diagnosis prevalence are a result of whether people with ADHD tendencies—not symptoms—were raised in a consistent or inconsistent culture. Ross and Ross argue that the norms of consistent cultures require conformity, emphasize group solidarity, and highlight low tolerance for deviation from strict norms. Due to the strict norms associated with conservative Protestantism and its emphasis on solidarity, conservative Protestants can be considered a consistent culture. Those who have ADHD tendencies and belong to a consistent culture like conservative Protestantism may learn to control their ADHD desires to appropriately maintain group membership and participate in religious actions, which logically results in less ADHD diagnosis among active members in the group. On the other hand, children with ADHD symptoms who are raised in inconsistent cultures which emphasize individual achievements and segregate on social characteristics may not learn to repress their ADHD symptoms and thereby may be more likely to be diagnosed with the disorder.

Literature on the subject of ADHD and religion is mixed but does suggest that religious affiliation and participation may be important predictors of ADHD symptoms and diagnosis. For example, ADHD symptoms negatively affect adolescents' ability to appropriately follow worship norms and rites (Feldman 2004, Filip 2005). Some faiths fundamentally reject the origin of the disorder being biological (Prudent et al. 2005). Another study has found that children attending multi-religious schools in Lebanon have

fewer ADHD symptoms on average than those who attend Christian or Muslim schools (Bathiche 2007). Yet, others in the U.S. have found no association between religious involvement and ADHD (Dew et al. 2007). The generalizability of these studies' findings, however, are limited due to small samples (Feldman 2004), samples based on clinical populations (Dew et al. 2007, Filip 2005), and samples unrepresentative of the dominant religious population in the United States (Bathicie 2007, Prudent et al. 2005).

This study uses bivariate and multivariate analyses to explore the relationship between religious involvement and ADHD. Because the affects of sex on ADHD are overpowering, all multivariate analyses are performed separately for girls/women and boys/men. As noted in more detail in Chapter III, survey questions regarding affiliation differed between waves (Wave I and IV) as well as between individuals (i.e., mother and child); consequently, how mothers' affiliation is operationalized is substantially different from the children's. Multivariate analyses are run with and without mothers' affiliation in order to ascertain if relationships between religious involvement and children's ADHD symptoms and diagnosis are artifacts of the data.

The first series of analyses performed in this study examine the relationship between mothers' religious involvement and children's ADHD. Bivariate analyses show mothers' religious affiliation/involvement (i.e., service attendance, prayer frequency, and importance of religion) and children's ADHD symptoms are significantly correlated. Multivariate regressions show that daughters of Catholic and Protestant mothers have higher odds of severe symptoms compared to daughters whose mothers are conservative Protestants; however, no relationship is found for sons, all else being equal.

Even though most mental health researchers acknowledge that the origin of ADHD is rooted in biology, cultural differences are observed in the presence of the

disorder. Using multivariate regression analyses, cultural differences appear to be significantly related to ADHD symptoms among girls—but not among boys—as indicated by mothers’ affiliation in this study. This finding provides support to Ross and Ross’ (1982) theory that exposure to consistent cultures—including conservative religious cultures—may reduce ADHD symptoms because individuals learn to repress ADHD tendencies to fit within group norms, at least among girls. Because mothers’ affiliation is computed in an untraditional method, however, the association between mothers’ affiliation and daughters’ symptoms needs to be interpreted cautiously.

In both weighted multivariate regression analyses including and excluding mothers’ affiliation, mothers’ prayer frequency is significantly negatively related to both daughters’ and sons’ odds of reporting severe symptoms; although other indicators of mothers’ religious involvement are not significant, controlling for other variables. Hypothetically, mothers’ who are highly religiously active have high levels of self-control. Mothers’ who have high levels of self-control may be modeling/teaching their children to have self-control and thus lower reports of ADHD among their children. Because findings regarding mothers’ prayer frequency are in the direction hypothesized and the results persist regardless of whether or not mothers’ affiliation is entered into the equation, these findings suggest that relationship between mothers’ prayer frequency and children’s symptoms is not an artifact of the data and mothers’ religious involvement may be indirectly affecting children’s ADHD, albeit marginally.

The next set of analyses in this study examined the relationship between childhood religious involvement and ADHD symptoms. Unlike mothers’ affiliation, children’s affiliation is not associated with childhood symptoms in bivariate analyses; however, childhood symptoms are correlated with childhood prayer frequency, and

importance of religion. In multivariate regressions examining the affects of children's religious affiliation and involvement on ADHD symptoms, affiliation is not significantly related to symptoms among either sex. This finding is especially insightful because most children may have the same faith as their parents, suggesting that the association between mothers' affiliation and daughters' symptoms described above may be a data artifact due to coding. In other words, religious affiliation is not significantly related to children's ADHD symptoms; thus, these findings fail to support Ross and Ross' (1982) consistent culture hypothesis.

While mothers' prayer frequency is significantly negatively related to children's symptoms in multivariate regression models, children's prayer frequency is not associated, neither are other measures of children's religious involvement. The overall lack of statistical evidence of the relationship between religious involvement and ADHD symptoms fails to support the idea that those who have ADHD tendencies may learn to repress ADHD behaviors by gaining more self-control by participating in religion. After controlling for other factors, only mothers' prayer frequency is significantly related to children's ADHD symptoms, and even then, only marginally so. In other words, if self-control is increased like a muscle because the very effort of participating in religion often requires self-control, the benefit of increased self-control does not translate into repressing ADHD symptoms. Stated differently, religious involvement does not appear to be a predictor of childhood ADHD.

Although the origins of ADHD are in part biological, diagnosis of the disorder is a cultural concept; thus, rates of diagnosis vary by culture. One aspect of culture is religion. Theoretically, conservative Protestants whose children display ADHD symptoms may be more likely to see symptoms as behavioral problems and an

unwillingness to control bodily desires than do parents of other faiths—including those with no affiliation. Consequently, conservative Protestants, particularly those who are religiously active, may be less likely to seek medical advice for their children's ADHD and thereby be less likely to be diagnosed. In bivariate statistical analyses, mothers' affiliation is significantly related to children's diagnosis (although children's affiliation is not); both mothers' and children's prayer frequency are significantly correlated with children's diagnosis. The multivariate analyses in this study, however, fail to find significant relationships between the mothers' or children's affiliation/religious involvement and ADHD diagnosis. Although null findings in this study are surprising, they are consistent with those obtained from a small pilot study (Dew et al. 2007). In short, these findings fail to support the notion that ADHD diagnosis is culturally influenced, at least in terms of religious affiliation and involvement.

In examining the relationship that childhood ADHD has on adult religious involvement, neither childhood ADHD symptoms nor diagnosis are significantly related to one's adult affiliation in exploratory bivariate analyses. Conversely, bivariate analyses do show childhood ADHD symptoms and diagnosis are both significantly associated with one's adult service attendance and importance of religion views, but are not related to one's adult religious activity, attendance or prayer frequency. Statistically significant multivariate relationships are not found between ADHD symptoms or diagnosis and the said religious involvement indicators or affiliation. That is, childhood ADHD is not related to adult religious affiliation or involvement and hypotheses predicting an inverse relationship between childhood ADHD and adult religious involvement are rejected.

The findings from this study fail to support Hathaway and Barkley's (2003) theory that just as ADHD symptoms make focusing on secular activities difficult for

those who have the disorder, ADHD symptoms may also make it more difficult to maintain attention and focus on spiritual matters, resulting in decreased religious participation. The findings of this study are based on longitudinal panel data, and the possible relationship between childhood ADHD and religion was tested at multiple times and little or no association was found—even controlling for mothers’ religion measures. Because this study uses childhood ADHD to predict adult religious involvement, and most adults decide how religiously un/involved they are autonomous from their mothers’ participation, the null relationship found between childhood ADHD and adult religious involvement is not an affect of mothers’ forcing their adult children to be religiously involved (an argument which could be made about childhood religious participation). In other words, childhood ADHD is not a significant predictor of one’s adult religious involvement; those who have the disorder are just as likely to be religiously un/involved as those who do not have ADHD. It is likely that this finding simply stems from individuals with ADHD learning to cope with it in religious settings much like they have in education or other secular environments.

### **Limitations**

Several factors limit the results of this study. Foremost surrounds the issue of time measurement and the use of secondary data which were collected for reasons other than this study. While research questions guiding the original Add Health survey design necessitated gathering religious information at each data collection point, questions surrounding ADHD were not a part of the original research agenda, consequently they were not included until Wave III. At Wave III, adolescents are asked a series of questions as to how often they felt that a particular statement described them when they

were between the ages of five and 12; these questions are used to measure ADHD symptoms. The retrospective nature of the design might limit the number of respondents who recall accurately whether they experienced those symptoms several years prior.

The analyses in this study use Wave I religious involvement as independent variables to predict adolescents' ADHD symptoms which are obtained post-factum in Wave III. It is assumed that the reported Wave I religious involvement behaviors are very similar to the adolescents' religious involvement behaviors when they were younger (i.e., between the ages of five and 12); however, one's religious involvement may vary across time.

Another data limitation of this study focused on the changing responses for various questions regarding religious involvement between waves (Waves I and IV) and across individuals (i.e., mothers and children). The differences are relatively minor between data collection points, but the differences between mothers' and children's affiliations are more acute, thus making the validity of mothers' affiliation variable questionable and not directly comparable to children's affiliation. To compensate for this, analyses are run with and without mothers' affiliation. A third limitation of this study results from the fact that less than 10 percent of the population has ADHD and even fewer are diagnosed by a professional healthcare provider. Therefore, some of differences between religious involvement and ADHD may be masked simply due to the survey design not intentionally oversampling for individuals with ADHD—a disorder that the original research design was never meant to specifically study.

## **Implications**

### **Theoretical implications**

Despite the limitations in this research, several implications result from this study. First, this study contributes to the body of literature of religion and ADHD in several ways. To date, very few studies have investigated the possible relationship between religion and ADHD. The few that have been performed use cross-sectional data from ungeneralizable samples and their findings have been less than clear regarding what the relationship between religion and ADHD might be. Moreover, there is very little peer-reviewed literature on the subject. Using panel data from the National Longitudinal Study of Adolescent Health, this study finds that across two different points in time, religious affiliation and involvement appears to be independent of ADHD symptoms and diagnosis. Because the null findings of this study are observed in one of the most respected health data sets due to its generalizability to the U.S. population, the findings are more robust than previous studies and leave fewer questions as whether the null relationship between religion and ADHD results from sampling issues.

Even though the findings from this study are null findings, they are critical additions to the literature because of the distinct gap in research. Perhaps, this gap in the literature results from publication bias, in which case, the results of this study are even more valuable as they provide future researchers with knowledge that well-respected nationally representative data fail to indicate a relationship between religious involvement and ADHD. Therefore, instead of asking “Is there a relationship between religion and ADHD?” researchers can invest their efforts in exploring other social factors that might correlate with ADHD.



The lack of statistical significance between religious involvement and ADHD symptoms and diagnosis when using multivariate regressions is a valuable contribution to social psychological theory broadly, but is also of particular importance in light of Hathaway's (2003) postulate that some people may suffer from a "significant religious impairment." Hathaway's theorem suggests that some people are unable to participate in religious experiences as fully as they would like because they suffer from a mental disorder that adversely affects their ability to do so. Hathaway (2003) notes that this religious impairment does not suggest that people who choose not to be involved in religion suffer from a mental disorder and need treatment; rather, some people who would like to worship are unable to do so because of symptoms—like those from ADHD—stemming from mental disorders. Findings from this study fail to show a significant relationship between ADHD and religious involvement; therefore, findings from this study do not support Hathaway's theorem.

### **Societal implications**

Findings in this study fail to show significant differences in religious involvement between those who have ADHD and those who do not; thus, another implication of this study is that religious centers may be valuable places for ADHD individuals to receive support because it is an institution that many are already attending and feel comfortable. Places of worship are often used as places to host addiction programs and abuse counseling and may be beneficial institutions to provide mental health counseling to people with ADHD.

ADHD is associated with risk of comorbid mental health disorders; one of the most common is depression. Active religious participation and devotion to one's faith

are associated with lower risk of depression and active participants generally have higher levels of well-being (see Koenig et al. 2001), but it is unknown what relationship exists between religion, ADHD, and comorbid mental health problems.

Religious participation may offset the associated risk of comorbid mental health problems with ADHD, particularly if religious members acknowledge ADHD tendencies as symptoms and are involved with counseling or support services through their place of worship. One recent study found service attendance is negatively associated with depression and anxiety disorders, while congregational criticism and negative religious coping skills (e.g., withdrawing from god, blaming self because of sin) are positively related (Sternthal, Musick, and Buck 2010). It is thus logical that people with ADHD who are members of faiths' which view ADHD symptoms as character flaws may be at greater risk of developing comorbid mental health disorders than those who belong to another faith or no faith. Therefore, places of worship have the potential to be healthful or unhealthful. If places of worship actively participate in providing mental health services, individuals who have ADHD may be at lower risk of comorbid mental health disorders.

### **Methodological implications**

In spite of the many research projects that are completed using Add Health data, few published studies have used ADHD variables contained in Add Health data. Reported symptoms prevalence in the Add Health data is congruent with national estimates of the disorder, giving these data validity. Few data sets include ADHD symptoms and diagnosis indicators and even fewer are nationally representative, Add Health data fill that gap. As it is not well understood how social factors affect ADHD,

more studies need to investigate this topic. Even though the findings in this study are not statistically significant, this study is a valuable contribution to the literature as it is an exemplary use of quality data investigating one possible social factor related to ADHD.

These results also pose the question “What relationship might be observed between ADHD and religion if more indicators measuring private religiosity were used?” It is possible, that because this study largely used public religiosity measures, the relationship between religion and ADHD might look differently if more private measures were used. If Hathaway and Barkley’s (2003) theorem that individuals with ADHD may experience “less meaningful” worship than others due to disadvantages with the disorder is correct, differences in religious involvement may be found in elements more central to one’s beliefs and values as opposed to more rote elements of worship, like attendance. In short, this study fails to observe a relationship between religion and ADHD using traditional religious indicators; however, using more intra-perspective religious indicators might highlight different findings.

Another methodological question posed from these results from the timing of the survey questionnaire. During the 1990s, several advancements were made in ADHD research and treatment that pushed ADHD into popular U.S. culture. For example, ADHD children were made eligible for special educational resources via the Individuals with Disabilities Education Action Act. Adderall® a stimulant prescription medication that lasts about twice as long as previous prescription medications was introduced to the market for ADHD treatment in the mid 1990s, as have several others since then (Mayes et al. 2009). Many of these new ADHD medications have been advertised on television. In the midst of the medicalization of ADHD, many parents began to question the effects of ADHD medication on children, whether the disorder was over-diagnosed, and some

even questioned the validity of the disorder. To answer parents concerns, or arguable raise them, day time television talk shows hosts, popular magazines, and other media prominently discussed ADHD (Mayes et al. 2009). In short, parents of the cohort of children selected to participate in Add Health in 1994 may have had an unusual awareness about inattention and hyperactivity generally speaking. Perhaps because they had acute exposure to ADHD these respondents' perceptions of their ADHD symptomology may be uniquely differently compared to those of other cohorts.

In response to all of the attention surrounding ADHD, a general heightened awareness of ADHD may have been so embedded in U.S. culture that sub-cultural religious differences (i.e., consistent cultures vs. inconsistent cultures of religion) may have been masked. That is once ADHD became medicalized and part of U.S. culture, ADHD children were able to *partially* remove responsibility for their actions. Therefore, society at large, as well as their consistent religious sub-culture, exercised more tolerance towards them due to the understanding that their inappropriate ADHD tendencies, since it was thought they were rooted at least partially in biology. ADHD children may have consequently no longer felt that they had to learn to repress their ADHD tendencies as much as ADHD children who were raised in the same consistent culture, but in a different cohort. In other words, before ADHD became a pedestrian part of U.S. culture (circa 1990s), some consistent sub-cultures (e.g., conservative religion) may have had lower reports of ADHD due to the strict norms and moral values exercising social control to teach ADHD children to repress their ADHD tendencies.

### **Future research**

Although this study fails to find significant relationships between religion and ADHD, these results do not mean that religious involvement is not an important factor regarding ADHD and mental health more broadly. ADHD is associated with risk of comorbid mental health disorders; religious participation and beliefs may be related to risk of ADHD and comorbid health problems.

Many studies show service attendance to be the strongest religious predictor of mental health, but Sternthal et al. (2010) found sense of meaning to be the most powerful indicator. Significant effects between traditional measures of religious involvement and ADHD were not observed in this study, suggesting that those who have ADHD have similar religious involvement as those without ADHD. These data cannot assess more intra-personal elements of religion, like sense of meaning. Future studies should investigate how sense of meaning is associated with ADHD and what relationships (if any) religiously-oriented sense of meaning might have with risk of comorbid mental health disorders among individuals with ADHD. It is quite possible that religion be indirectly related to ADHD through risk of comorbid mental health disorders.

Future research should also investigate whether there are differences in treatment type by one's religious involvement. The findings from this study fail to show relationships between religion and ADHD symptoms and diagnosis, but this does not mean that *treatment* for the disorder does not vary across faiths. Future work should examine whether there are variations in treatment (e.g., medication, counseling, behavior therapy, religiously motivated therapy) by religious involvement, something that is not possible using the Add Health data at this time.

The most obvious direction of future research should be in sex/gender differences. Sex is the most powerful predictor of ADHD symptoms and diagnosis in this study, and all multivariate analyses are run separately so sex would not mask the statistical affects of other indicators; however, like most research on ADHD, this study does not differentiate between sex and gender. ADHD literature shows consistent sex differences in the disorder's prevalence; yet, it is not well understood if the differences are in fact a result of sex, or if the observed differences are merely indicating disparities due to gender. Considering that sex is consistently one of the most robust predictors of ADHD, social scientists need to critically examine whether the correlation biological or social.

## REFERENCES

- Abramowitz, Jonathan, S., Brett J. Deacon, Carol M. Woods, and David F. Tolin. 2004. "Association between Protestant Religiosity and Obsessive-Compulsive Symptoms and Cognitions." *Depression and Anxiety* 20: 70-76.
- Achen, Christopher H. 1982. *Interpreting and Using Regression*. Sage University Paper Series on Quantitative Applications in the Social Sciences, series number 26. Newberry Park, CA: Sage Publications.
- Adamczyk, Amy and Jacob Felson. 2008. "Fetal Positions: Unraveling the Influence of Religion on Premarital Pregnancy Resolution." *Social Science Quarterly* 89:17-38.
- Antonovsky, Aaron. 1980. *Health, Stress, and Coping*. San Francisco: Jossey-Bass.
- Arnold, L. Eugene. 2000. *Contemporary Diagnosis and Management of Attention-Deficit/Hyperactivity Disorder*. Newtown: Handbooks in Health Care Co.
- Baldwin, Steve and Paul Cooper. 2000. "How Should ADHD be Treated?" *The Psychologist* 13:598-601.
- Barkley, Russell A. 1997. *ADHD and the Nature of Self-Control*. New York: The Guilford Press.
- . 2006. *Attention-Deficit Hyperactivity Disorder*. New York: The Guilford Press.

Barkley, Russell A., Edwin H. Cook Jr, Adele Diamond, Alan Zametkin, Anita Thapar, Ann Teeter, Arthur D. Anastopoulos, Avi Sadeh, Bennett L. Leventhal, Irving B. Harris, Betsy Hoza, Brooke Molina, Bruce Pennington, Carl E. Paternite, Carol Whalen, Caryn Carlson, Charlotte Johnston, Christopher Gillberg, Cynthia Hartung, Daniel A. Waschbusch, Daniel F. Connor, Deborah L. Anderson, Donald R. Lynam, Eric J. Mash, Eric Taylor, Erik Willcutt, Florence Levy, Gabrielle Carlson, George J. DuPaul, Harold S. Koplewicz, Arnold Simon, Debbie Simon, Hector R. Bird, Herbert Quay, Howard Abikoff, J. Bart Hodgens, James J. McGough, Jan Loney, Jeffrey Halperin, John Piacentini, John S. Werry, Jose J. Bauermeister, Joseph Biederman, Joseph Sergeant, Keith McBurnett, Ken C. Winters, Kevin R. Murphy, Laurence Greenhill, Lawrence Lewandowski, Lily Hechtman, Linda Pfiffner, Lisa L. Weyandt, Marc Atkins, Margot Prior, Mark A. Stein, Mark D. Rapport, Mariellen Fischer, Mary A. Fristad, Mary Solanto-Gardner, Michael Aman, Michael Gordon, Michelle DeKlyen, Mina Dulcan, Oscar Bukstein, Patrick H. Tolan, Philip Firestone, Richard Milich, Rob McGee, Ronald T. Brown, Rosemary Tannock, Russell Schachar, Salvatore Mannuzza, Sandra K. Loo, Sheila Eyberg, Stephen Houghton, Stephen P. Hinshaw, Stephen Shapiro, Stephen V. Faraone, Steven R. Pliszka, Steven W. Evans, Susan Campbell, Terje Sagvolden, Terri L. Shelton, Thomas E. Brown, Thomas Joiner, Thomas M. Lock, Thomas Spencer, and William Pelham Jr. 2002. "International Consensus Statement on ADHD." *Clinical Child and Family Psychology Review* 5:89-111.

Bartkowski, John P., W. Bradford Wilcox, and Christopher G. Ellison. 2000. "Charting the Paradoxes of Evangelical Family Life: Gender and Parenting in Conservative Protestant Households." *Journal of Family Ministry* 14:9-21.

Bartkowski, John P., Xiaohe Xu, and Martin L. Levin. 2008. "Religion and Child Development: Evidence from the Early Childhood Longitudinal Study." *Social Science Research* 37:18-36.

Bathiche, Marie. 2007. "The Prevalence of ADHD Symptoms in a Culturally Diverse and Developing Country, Lebanon." Department of Psychiatry, McGill University, Montreal.

Biederman, Joseph, Eric Mick, Stephen V. Faraone, Ellen Braaten, Alysa Doyle, Thomas Spencer, Timothy E. Wilens, Elizabeth Frazier, and Mary Ann Johnson. 2002. "Influence of Gender on Attention Deficit Hyperactivity Disorder in Children Referred to a Psychiatric Clinic." *American Journal of Psychiatry* 159:36-42.

Blau, A. 1936. "Mental Changes Following Head Trauma in Children." *Archives of Neurology and Psychiatry* 35:723-769.

Block, Gerald H. 1977. "Hyperactivity: A Cultural Perspective." *Journal of Learning Disabilities* 10:236-240.



- Bloom, B and RA Cohen. 2007. "Summary Health Statistics for U.S. Children: National Health Interview Survey, 2006." vol. 10, edited by National Center for Health Statistics. Washington, DC.
- Bollen, Kenneth A. 1989. *Structural Equations with Latent Variables*. New York: John Wiley and Sons, Inc.
- Breggin, Peter R. and Ginger Ross Breggin. 1994. "Born to be "Disruptive?"". Pp. 71-95 in *The War Against Children*. New York: Saint Martin's Press.
- Brody, Gene H. and Douglas L. Flor. 1998. "Maternal Resources, Parenting Practices, and Child Competence in Rural, Single-Parent African American Families." *Child Development* 69:803-816.
- Brody, Gene H., Zolinda Stoneman, and Douglas Flor. 1996. "Parental Religiosity, Family Processes, and Youth Competence in Rural, Two-Parent African American Families." *Developmental Psychology* 32:696-706.
- Burdette, Amy M., Victor Wang, Glen H. Elder, Terrence D. Hill, and Janel Benson. 2009. "Serving God and Country? Religious Involvement and Military Service Among Young Adult Men." *Journal for the Scientific Study of Religion* 48:794-804.
- Bussing, Regina, Mirka E Koro-Ljungberg, Pamela Williamson, Faye A. Gary, and Cynthia Wilson Garvan. 2006. "What "Dr. Mom" Ordered: A Community-Based Exploratory Study of Parental Self-Care Responses to Children's ADHD Symptoms." *Social Science and Medicine* 63:871-882.
- Canino, Glorisa and Margarita Alegría. 2008. "Psychiatric Diagnosis: Is It Universal or Relative to Culture?" *Journal of Child Psychology and Psychiatry* 49:237-250.
- Carver, Charles S. and Michael F. Scheier. 1998. *On the Self-Regulation of Behavior*. New York: Cambridge University Press.
- Castellanos, F. Xavier, Jay N. Giedd, Wendy L. Marsh, Susan D. Hamburger, A. Catherine Vaituzis, Daniel P. Dickstein, Stacey E. Sarfatti, Yolanda C. Vauss, John W. Snell, Nicholas Lange, Debra Kaysen, Amy L. Krain, Gail F. Ritchie, Jagath C. Rajapakse, and Judith L. Rapoport. 1996. "Quantitative Brain Magnetic Resonance Imaging in Attention-Deficit Hyperactivity Disorder." *Archives of General Psychiatry* 53:607-616.
- Childers, A.T. 2009. "Hyper-activity in Children Having Behavior Disorders." *Journal of Attention Disorders* 13:224-228.
- Cimera, Robert Evert. 2002. *Making ADHD a Gift: Teaching Superman How to Fly*. Lanham: The Scarecrow Press, Inc.

- Cline, Krista M. C. and Kenneth F. Ferraro. 2006. "Does religion increase the prevalence and incidence of obesity in adulthood?" *Journal for the Scientific Study of Religion* 45:269-281.
- Cohen, Adam B. 2003. "Religion, Likelihood of Action, and the Morality of Mentality." *International Journal for the Psychology of Religion* 13:273 - 285.
- Cohen, Adam Brian and Paul Rozin. 2001. "Religion and the Morality of Mentality." *Journal of Personality and Social Psychology* 81:697-710.
- Connors, C. Keith. 1980. *Food Additives and Hyperactive Children*. New York: Plenum Press.
- Conrad, Peter. 1975. "The Discovery of Hyperkinesis: Notes on the Medicalization of Deviant Behavior." *Social Problems* 23:12-21.
- . 1992. "Medicalization and Social Control." *Annual Review of Sociology* 18:209-32.
- . 2007. "Expansion of From Hyperactive Children to Adult ADHD." Pp. 46-69 in *The Medicalization of Society: On the Transformation of Human Conditions into Treatable Disorders*. Baltimore: The Johns Hopkins University Press.
- Conrad, Peter and Deborah Potter. 2000. "From Hyperactive Children to ADHD Adults: Observations on the Expansion of Medical Categories." *Social Problems* 47:559-582.
- . 2003. "From Hyperactive Children to ADHD Adults." Pp. 33-65 in *Health and Health Care as Social Problems*, edited by P. Conrad and V. Leiter. New York: Rowman and Littlefield Publishers, Inc.
- Cotton, Sian, Kathy Zebracki, Susan L. Rosenthal, Joel Tsevat, and Dennis Drotar. 2006. "Religion/Spirituality and Adolescent Health Outcomes: A Review." *Journal of Adolescent Health* 38:472-480.
- Davis, Timothy L., Barbara A. Kerr, and Sharon E. Robinson Kurpius. 2003. "Meaning, Purpose, and Religiosity in At-Risk Youth: The Relationship Between Anxiety and Spirituality." *Journal of Psychology and Theology* 31:356-365.
- Dew, Rachel, Stephanie Daniel, Tonya Armstrong, David Goldston, Mary Triplett, and Harold Koenig. 2008. "Religion/Spirituality and Adolescent Psychiatric Symptoms: A Review." *Child Psychiatry and Human Development* 39:381-398.
- Dew, Rachel E., Stephanie S. Daniel, and Harold G. Koenig. 2007. "A Pilot Study on Religiousness/Spirituality and ADHD." *International Journal of Adolescent Medicine and Health* 19:507-510.
- Eaton, William W. 2001. *The Sociology of Mental Disorders*. Westport: Praeger.

- Ellison, Christopher G. 1991. "Religious Involvement and Subjective Well-Being." *Journal of Health and Social Behavior* 32:80-99.
- . 1993. "Religious Involvement and Self-Perception Among Black Americans." *Social Forces* 71:1027-1055.
- . 1996. "Conservative Protestantism and the Corporal Punishment of Children : Clarifying the Issues." *Journal for the Scientific Study of Religion* 35:1-16.
- Ellison, Christopher G., John P. Bartkowski, and Michelle L. Segal. 1996. "Conservative Protestantism and the Parental Use of Corporal Punishment." *Social Forces* 74:1003-1028.
- Ellison, Christopher G., Jason D. Boardman, David R. Williams, and James S. Jackson. 2001. "Religious Involvement, Stress, and Mental Health: Findings from the 1995 Detroit Area Study." *Social Forces* 80:215-249.
- Ellison, Christopher G., Robert A. Hummer, Amy M. Burdette, and Maureen R. Benjamins. 2010. "Race, Religious Involvement, and Health: The Case of African Americans." Pp. 321-348 in *Religion Families and Health: Population-Based Research in the United States*, edited by C. G. Ellison and R. A. Hummer. New Brunswick: Rutgers University Press.
- Ellison, Christopher G. and Jeffrey S. Levin. 1998. "The Religion-Health Connection: Evidence, Theory, and Future Directions." *Health Education and Behavior* 25:700-720.
- Ellison, Christopher G., Marc A. Musick, and Andrea K. Henderson. 2008. "Balm in Gilead: Racism, Religious Involvement, and Psychological Distress Among African-American Adults." *Journal for the Scientific Study of Religion* 47:291-309.
- Ellison, Christopher G. and Darren E. Sherkat. 1993. "Conservative Protestantism and Support for Corporal Punishment." *American Sociological Review* 58:131-144.
- Emmons, Robert A. 2005. "Emotion and Religion." Pp. 235-252 in *Handbook of Psychology and Religion*, edited by R. F. Paloutzian and C. L. Park. New York: The Guilford Press.
- Emmons, Robert A., Chi Cheung, and Keivan Tehrani. 1998. "Assessing Spirituality Through Personal Goals: Implications for Research on Religion and Subjective Well-Being." *Social Indicators Research* 4:391-422.
- Exline, Julie Juola. 2002. "Stumbling Blocks on the Religious Road: Fractured Relationships, Nagging Vices, and the Inner Struggle to Believe." *Psychological Inquiry* 13:182-189.

- Feldman, Aaron David. 2004. "Parenting Style and Behaviors Associated with Attention Deficit/Hyperactivity Disorder (ADHD) in At-Risk Adolescents in the Orthodox Jewish Community." College of Education, Georgia State University.
- Ferraro, Kenneth F. 1998. "Firm believers? Religion, body weight, and well-being." *Review of Religious Research* 39:224-245.
- Filip, Daniela D. 2005. "Initial Clinical Validation of the Faith Situation Questionnaire." School of Psychology and Counseling, Regent University.
- Flics, David H. and William G. Herron. 1991. "Activity-withdrawal, Diagnosis, and Demographics as Predictors of Premorbid Adjustment." *Journal of Clinical Psychology* 47: 189-98.
- Frederick, Carl. 2010. "A Crosswalk for Using Pre-2000 Occupational Status and Prestige Codes with Post-2000 Occupation Codes." in *CDE Working Paper No. 2010-03*. Madison: Center for Demography and Ecology at the University of Wisconsin-Madison.
- Gau, Jacinta M. 2010. "Basic Principles and Practices of Structural Equation Modeling in Criminal Justice and Criminology Research." *Journal of Criminal Justice Education* 21:136-151.
- Gearing, Robin Edward, Dana Alonzo, Alex Smolak, Katie McHugh, Sherelle Harmon, and Susanna Baldwin. 2011. "Association of Religion with Delusions and Hallucinations in the Context of Schizophrenia: Implications for Engagement and Adherence." *Schizophrenia Research* 126: 150-163.
- George, Linda K., Christopher G. Ellison, and David B. Larson. 2002. "Explaining the Relationships Between Religious Involvement and Health." *Psychological Inquiry* 13:190-200.
- Getz, Glen E., Dave E. Fleck, and Stephen M. Strakowski. 2001. "Frequency and Severity of Religious Delusions in Christian Patients with Psychosis." *Psychiatry Research* 103: 87-91.
- Gilkes, Cheryl Townsend. 1980. "The Black Church as a Therapeutic Community : Suggested Areas for Research into the Black Religious Experience." *Journal of the Interdenominational Theological Center* 8:29-44.
- Gingerich, Karla J., Patrick Turnock, Jodi K. Litfin, and Lee A. Rosén. 1998. "Diversity and Attention Deficit Hyperactivity Disorder." *Journal of Clinical Psychology* 54:415-426.
- Goldstein, Sam and Michael Goldstein. 1998. *Managing Attention Deficit Hyperactivity Disorder in Children*. New York: John Wiley and Sons, Inc.

- Haas, Steven A. 2007. "The Long-Term Effects of Poor Childhood Health: An Assessment and Application of Retrospective Reports." *Demography* 44:113-135.
- Hallowell, Edward M. and John J. Ratey. 1995. *Driven to Distraction*. New York: Touchstone.
- Harris, K. M., C. T. Hapern, E. Whitsel, J. Hussey, J. Tabor, P. Entzel, and J. R. Udry. 2009. "The National Longitudinal Study of Adolescent Health: Research Design", vol. 2010.
- Harrison, Myleme O., Harold G. Koenig, Judith C. Hays, Anedi G. Eme-Akwari, and Kenneth I. Pargament. 2001. "The Epidemiology of Religious Coping: A Review of Recent Literature." *International Review of Psychiatry* 13:86-93.
- Hartz, Gary W. and Henry C. Everett. 1989. "Fundamentalism Religion and Its Effect on Mental Health." *Journal of Religion and Health* 28:207-217.
- Hathaway, William L. 2003. "Clinically Significant Religious Impairment." *Mental Health, Religion and Culture* 6:113-29.
- Hathaway, William L. and Russell A. Barkley. 2003. "Self Regulation, ADHD, and Child Religiousness." *Journal of Psychology and Christianity* 22:101-124.
- Hathaway, William L., Darryl Douglas, and Kristen Grabowski. 2003. "Faith Situations Questionnaire: Childhood Normative Data." *Journal of Psychology and Christianity* 22:141-154.
- Hefti, René. 2011. "Integrating Religion and Spirituality into Mental Health Care , Psychiatry and Psychotherapy." *Religions* 2: 611-627.
- Herman-Stahl, Mindy A., Christopher P. Krebs, Larry A. Kroutil, and David C. Heller. 2006. "Risk and Protective Factors for Nonmedical Use of Prescription Stimulants and Methamphetamine among Adolescents." *Journal of Adolescent Health* 39:374-380.
- . 2007. "Risk and Protective Factors for Methamphetamine Use and Nonmedical Use of Prescription Stimulants among Young Adults Aged 18 to 25." *Addictive Behaviors* 32:1003-1015.
- Hill, Terrence D., Christopher G. Ellison, Amy M. Burdette, and Marc A. Musick. 2007. "Religious Involvement and Healthy Lifestyles: Evidence from the Survey of Texas Adults." *Annals Of Behavioral Medicine: A Publication Of The Society Of Behavioral Medicine* 34:217-222.

- Himle, Joseph A., Linda M. Chatters, Robert Joseph Taylor, and Ann Nguyen. 2011. "The Relationship between Obsessive-Compulsive Disorder and Religious Faith: Clinical Characteristics and Implications for Treatment." *Psychology Religion and Spirituality* 3: 241-258.
- House, James S., Karl R. Landis, and Debra Umberson. 1988. "Social Relationships and Health." *Science* 241:540-545.
- Hummer, Robert A., Maureen R. Benjamins, Christopher G. Ellison, and Richard G. Rogers. 2010. "Religious Involvement and Mortality Risk among Pre-Retirement Aged U.S. Adults." Pp. 273-291 in *Religion Families and Health: Population-Based Research in the United States*, edited by C. G. Ellison and R. A. Hummer. New Brunswick: Rutgers University Press.
- Hummer, Robert A., Richard G. Rogers, Charles B. Nam, and Christopher G. Ellison. 1999. "Religious Involvement and U.S. Adult Mortality." *Demography* 36:273-285.
- Hurtig, Tuula, Hanna Ebeling, Anja Taanila, Jouko Miettunen, Susan Smalley, James McGough, Sandra Loo, Marjo-Riitta Järvelin, and Irma Moilanen. 2007. "ADHD and Comorbid Disorders in Relation to Family Environment and Symptom Severity." *European Child and Adolescent Psychiatry* 16:362-369.
- Hynd, George W., Margaret Semrud-Clikeman, Alison R. Lorys, Edward S. Novey, and Deborah Eliopoulos. 1990. "Brain Morphology in Developmental Dyslexia and Attention Deficit Disorder/Hyperactivity." *Archives of Neurology* 47:919-926.
- Hynd, George W., Margaret Semrud-Clikeman, Alison R. Lorys, Edward S. Novey, Deborah Eliopoulos, and Heikki Lyytinen. 1991. "Corpus Callosum Morphology in Attention Deficit-Hyperactivity Disorder: Morphometric Analysis of MRI." *Journal of Learning Disabilities* 24:141-146.
- Iannaccone, Laurence R. 1990. "Religious Practice : A Human Capital Approach." *Journal for the Scientific Study of Religion* 29:297-314.
- Idler, Ellen L. and Stanislav V. Kasl. 1997. "Religion among Disabled and Nondisabled Persons II: Attendance at Religious Services as a Predictor of the Course of Disability." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 52B:S306-S316.
- Kahn, E and LH Cohen. 1934. "Organic Driveness: A Brain Stem Syndrome and an Experience." *New England Journal of Medicine* 210:748-756.
- Kean, Brian. 2009. "ADHD in Australia: The Emergence of Globalization." Pp. 169-197 in *Rethinking ADHD: From Brain to Culture*, edited by S. Timimi and J. Leo. China: Palgrave Macmillan.

- Kendler, Kenneth S., Xiao-Qing Liu, Charles O. Gardner, Michael E. McCullough, David Larson, and Carol A. Prescott. 2003. "Dimensions of Religiosity and Their Relationship to Lifetime Psychiatric and Substance Use Disorders." *American Journal of Psychiatry* 160:496-503.
- Kessler, Ronald C., Lenard Adler, Russell Barkley, Joseph Biederman, C. Keith Conners, Olga Demler, Stephen V. Faraone, Laurence L. Greenhill, Mary J. Howes, Kristina Secnik, Thomas Spencer, T. Bedirhan Ustun, Ellen E. Walters, and Alan M. Zaslavsky. 2006. "The Prevalence and Correlates of Adult ADHD in the United States: Results From the National Comorbidity Survey Replication." *American Journal of Psychiatry* 163:716-723.
- Kewley, G D. 2001. *Attention Deficit Hyperactivity Disorder Recognition, Reality and Resolution*. London: David Fulton Publishers.
- Kline, Rex B. 2005. *Principles and Practice of Structural Equation Modeling*, Edited by D. A. Kenny. New York: The Guilford Press.
- Koch, Jerome R. 2008. "Is Religion a Health Resource for the Poor?" *The Social Science Journal* 45:497-503.
- Koenig, Harold G. 2007. "Religion and Remission of Depression in Medical Inpatients with Heart Failure/Pulmonary Disease." *Journal of Nervous and Mental Disease* 195: 389-395.
- Koenig, Harold G. 2009. "Research on Religion, Spirituality, and Mental Health: A Review." *Canadian Journal of Psychiatry* 54:283-291.
- Koenig, Harold G., Stephen M. Ford, Linda K. George, Dang Blazer, and Keith G. Meador. 1993. "Religion and Anxiety Disorder: An Examination and Comparison of Associations in Young, Middle-aged, and Elderly Adults." *Journal of Anxiety Disorders* 7: 321-342.
- Koenig, Harold. G, Linda K. George, Keith Meador, Dan G. Blazer, and Peter B. Dyck. 1994. "Religious Affiliation and Psychiatric Disorder in Protestant Baby Boomers." *Hospital and Community Psychiatry* 45: 586-596.
- Koenig, Harold G., Michael E. McCullough, and David B. Larson. 2001. "Handbook of Religion and Health." New York: Oxford University Press.
- Kollins, Scott H., F. Joseph McClernon, and Bernard F. Fuemmeler. 2005. "Association Between Smoking and Attention-Deficit/Hyperactivity Disorder Symptoms in a Population-Based Sample of Young Adults." *Archives of General Psychiatry* 62:1142-1147.

- Krause, Neal. 2003. "Religious Meaning and Subjective Well-Being in Late Life." *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 58:S160-S170.
- . 2010. "Religion and Depressive Symptoms in Late Life." Pp. 229-247 in *Religion Families and Health: Population-Based Research in the United States*, edited by C. G. Ellison and R. A. Hummer. New Brunswick: Rutgers University Press.
- Krause, Neal and Keith M. Wulff. 2004. "Religious Doubt and Health: Exploring the Potential Dark Side of Religion." *Sociology of Religion* 65:35-56.
- Kutcher, Stan, Michael Aman, Sarah J. Brooks, Jan Buitelaar, Emma van Daalen, Jörg Fegert, Robert L. Findling, Sandra Fisman, Laurence L. Greenhill, Michael Huss, Vivek Kusumakar, Daniel Pine, Eric Taylor, and Sam Tyano. 2004. "International Consensus Statement on Attention-Deficit/Hyperactivity Disorder (ADHD) and Disruptive Behaviour Disorders (DBDs): Clinical Implications and Treatment Practice Suggestions." *European Neuropsychopharmacology* 14:11-28.
- Lee, Li-Ching, Rebecca A. Harrington, Brian B. Louie, and Craig J. Newschaffer. 2008. "Children with Autism: Quality of Life and Parental Concerns." *Journal of Autism & Developmental Disorders* 38:1147-1160.
- Leo, Jonathan and David Cohen. 2003. "Broken Brains or Flawed Studies? A Critical Review of ADHD Neuroimaging Research." *The Journal of Mind and Behavior* 24:29-56.
- Levin, PM. 1938. "Restlessness in Children." *Archives of Neurology and Psychiatry* 39:764-770.
- Link, Bruce G. and Jo C. Phelan. 2001. "Conceptualizing Stigma." *Annual Review of Sociology* 27:363-385.
- Loser, Rachel W., Shirley R. Klein, E. Jeffrey Hill, and David C. Dollahite. 2008. "Religion and the Daily Lives of LDS Families: An Ecological Perspective." *Family and Consumer Sciences Research Journal* 37:52-70.
- Maddock, Jay. 2004. "The Relationship Between Obesity and the Prevalence of Fast Food Restaurants: State-Level Analysis." *American Journal of Health Promotion* 19:137-143.
- Mah, Janet W. T. and Charlotte Johnston. 2007. "Cultural Variations in Mothers' Attributions: Influence of Child Attention-Deficit/Hyperactivity Disorder." *Child Psychiatry and Human Development* 38:135-153.
- Mahoney, Annette, Kenneth I. Pargament, Aaron Murray-Swank, and Nichole Murray-Swank. 2003. "Religion and the Sanctification of Family Relationships." *Review of Religious Research* 44:220-236.



- Mahoney, Annette, Kenneth I. Pargament, Nalini Tarakeshwar, and Aaron B. Swank. 2001. "Religion in the Home in the 1980s and 1990s: A Meta-Analytic Review and Conceptual Analysis of Links between Religion, Marriage, and Parenting." *Journal of Family Psychology* 15:559-596.
- Marin, Humberto, Javier I. Escobar, and William A. Vega. 2006. "Mental Illness in Hispanics: A Review of the Literature." *Focus* 4:23-37.
- Marks, Loren. 2006. "Religion and Family Relational Health: An Overview and Conceptual Model." *Journal of Religion and Health* 45:603-618.
- Mason, Philip B. 2007. "The Relationship Between Religious Involvement, Health Behaviors, and Body Mass." Department of Sociology, Anthropology, and Social Work, Utah State University, Logan.
- Mason, Philip B, Michael B. Toney, and Youngtae Cho. 2011. "Religious Affiliation and Hispanic Health in Utah." *The Social Science Journal* 48(1): 175-192.
- Mayes, Rick, Catherine Bagwell, and Jennifer Erkulwater. 2009 *Medicating Children: ADHD and Pediatric Mental Health*. Cambridge: Harvard University Press.
- Maynard, Robert. 1970. "Omaha Pupils Given "Behavior" Drugs." Pp. 2 in *The Washington Post*. Washington.
- McCullough, Michael E. and Brian L. B. Willoughby. 2009. "Religion, Self-Regulation, and Self-Control: Associations, Explanations, and Implications." *Psychological Bulletin* 135:69-93.
- Meador, Keith G., Harold G. Koenig, Dana C. Hughes, Dan G. Blazer, Linda K. George and Joanne Turnbull. 1992. "Religious Affiliation and Major Depression." *Psychiatric Services* 43: 1204-1208.
- Menard, Scott. 2002. *Applied Logistic Regression Analysis*. Sage University Paper Series on Quantitative Applications in the Social Sciences, series number 106. Thousand Oaks: Sage.
- Merrill, Ray M., Sterling C. Hilton, and Melissa Daniels. 2003. "Impact of the LDS Church's Health Doctrine on Deaths from Diseases and Conditions Associated with Cigarette Smoking." *Annals of Epidemiology* 13:704-711.
- Mitchell, Jim, Donald R. Lannin, Holly F. Mathews, and Melvin S. Swanson. 2002. "Religious Beliefs and Breast Cancer Screening." *Journal of Women's Health* 11:907-915.

- Morris, Martina, Mark S. Handcock, William C. Miller, Carol A. Ford, John L. Schmitz, Marcia M. Hobbs, Myron S. Cohen, Kathleen M. Harris, and J. Richard Udry. 2006. "Prevalence of HIV Infection Among Young Adults in the United States: Results From the Add Health Study." *American Journal of Public Health* 96:1091-1097.
- Muraven, Mark and Roy F. Baumeister. 2000. "Self-Regulation and Depletion of Limited Resources: Does Self-Control Resemble a Muscle?" *Psychological Bulletin* 126:247-259.
- Muraven, Mark, Roy F. Baumeister, and Dianne M. Tice. 1999. "Longitudinal Improvement of Self-Regulation Through Practice: Building Self-Control Strength Through Repeated Exercise." *The Journal of Social Psychology* 139:446 - 457.
- Murphy, Patricia E., Joseph W. Ciarrocchi, Ralph L. Piedmont, Sharon Cheston, Mark Peyrot, and George Fitchett. 2000. "The Relation of Religious Belief and Practices, Depression, and Hopelessness in Persons with Clinical Depression." *Journal of Consulting and Clinical Psychology* 68:1102-1106.
- Nigel, M. Williams, Zaharieva Irina, Martin Andrew, Langley Kate, Mantripragada Kiran, Fossdal Ragnheidur, Stefansson Hreinn, Stefansson Kari, Magnusson Pall, O. Gudmundsson Olafur, Gustafsson Omar, Holmans Peter, J. Owen Michael, O'Donovan Michael, and Thapar Anita. 2010. "Rare Chromosomal Deletions and Duplications in Attention-Deficit Hyperactivity Disorder: A Genome-Wide Analysis." *Lancet* 376 (9750): 1401-1408.
- Nonnemaker, James M., Clea A. McNeely, and Robert Wm Blum. 2003. "Public and Private Domains of Religiosity and Adolescent Health Risk Behaviors: Evidence from the National Longitudinal Study of Adolescent Health." *Social Science and Medicine* 57:2049-2054.
- Norvilitis, Jill M., Travis Ingersoll, Jie Zhang, and Shuhua Jia. 2008. "Self-Reported Symptoms of ADHD Among College Students in China and the United States." *Journal of Attention Disorders* 11:558-567.
- O'Dea, Thomas F. 1966. *The Sociology of Religion*, Edited by A. Inkeles. Englewood Cliffs: Prentice-Hall, Inc.
- Ornelas, India, Krista Perreira, and Guadalupe Ayala. 2007. "Parental Influences on Adolescent Physical Activity: A Longitudinal Study." *International Journal of Behavioral Nutrition and Physical Activity* 4:3.
- Pargament, Kenneth I. 1997. *The Psychology of Religion and Coping: Theory, Research, Practice*. New York: Guilford Publications.

- Pargament, Kenneth I., Harold G. Koenig, and Lisa M. Perez. 2000. "The Many Methods of Religious Coping: Development and Initial Validation of the RCOPE." *Journal of Clinical Psychology* 56:519-543.
- Pastor, Patricia N. and Cynthia A. Reuben. 2008. "Diagnosed Attention Deficit Hyperactivity Disorder and Learning Disability: United States, 2004-2006." vol. 10, *Vital and Health Statistics*, edited by National Center for Health Statistics. Washington, DC.
- Pearce, Michelle J., Todd D. Little, and John E. Perez. 2003. "Religiousness and Depressive Symptoms Among Adolescents." *Journal of Clinical Child and Adolescent Psychology* 32:267-276.
- Pickard, Joseph G., and Baorong Guo. 2008. "Clergy as Mental Health Service Providers to Older Adults." *Aging and Mental Health* 12: 615-624.
- Pope, Alice W., Susan M. McHale, and W. Edward Craighead. 1988. *Self-esteem Enhancement with Children and Adolescents*, Edited by A. P. Goldstein, L. Krasner, and S. L. Garfield. Boston: Allyn and Bacon.
- Price, Richard H. and Dennis L. Bouffard. 1974. "Behavioral Appropriateness and Situational Constraint as Dimensions of Social Behavior." *Journal of Personality and Social Psychology* 30:579-586.
- Primack, Brian A., Brandi Swanier, Anna M. Georgiopoulos, Stephanie R. Land, and Michael J. Fine. 2009. "Association Between Media Use in Adolescence and Depression in Young Adulthood: A Longitudinal Study." *Archives of General Psychiatry* 66:181-188.
- Prothero, Stephen. 2007. *Religious Literacy: What Every American Needs to Know and Doesn't*. New York: HarperCollins Publishers.
- Prudent, Nicole, Peggy Johnson, Johnson Carroll, and Larry Culpepper. 2005. "Attention-Deficit/Hyperactivity Disorder: Presentation and Management in the Haitian American Child." *Primary Care Companion to the Journal of Clinical Psychiatry* 7:190-197.
- Radcliffe, Nick and Sami Timimi. 2004. "The Rise and Rise of ADHD." *Clinical Psychology* 40:8-13.
- Regnerus, Mark D. 2003. "Religion and Positive Adolescent Outcomes: A Review of Research and Theory." *Review of Religious Research* 44:394-413.
- . 2007. *Forbidden Fruit: Sex and Religion in the Lives of American Teenagers*. New York: Oxford University Press.

- Regnerus, Mark D. and Christian Smith. 2005. "Selection Effects in Studies of Religious Influence." *Review of Religious Research* 47:23-50.
- Ross, Dorothea M. and Sheila A. Ross. 1982. *Hyperactivity Current Issues, Research, and Theory*. New York: John Wiley and Sons.
- Rothe, Eugenio M. 2005. "Considering Cultural Diversity in the Management of ADHD in Hispanic Patients." *Journal of the National Medical Association* 97:17S-23S.
- Russell, Stephen T. and Kara Joyner. 2001. "Adolescent Sexual Orientation and Suicide Risk: Evidence From a National Study." *American Journal of Public Health* 91:1276-1281.
- Sandberg, Seja. 1996. "Hyperkinetic or Attention Deficit Disorder." *The British Journal of Psychiatry* 169:10-17.
- Saroglou, Vassilis, Vanessa Delpierre, and Rebecca Dernelle. 2004. "Values and Religiosity: A Meta-Analysis of Studies using Schwartz/s Model." *Personality and Individual Differences* 37:721-734
- Schieman, Scott, Tetyana Pudrovska, and Melissa A. Milkie. 2005. "The Sense of Divine Control and the Self-Concept: A Study of Race Differences in Late Life." *Research on Aging* 27:165-196.
- Searight, H. Russell and A. Lesley McLaren. 1998. "Attention-Deficit Hyperactivity Disorder: The Medicalization of Misbehavior." *Journal of Clinical Psychology in Medical Settings* 5:467-495.
- Shaw-Zirt, Barbara, Leelawatte Popali-Lehane, William Chaplin, and Andrea Bergman. 2005. "Adjustment, Social Skills, and Self-Esteem in College Students With Symptoms of ADHD." *Journal of Attention Disorders* 8:109-120.
- Shin, Sunny Hyucksun, Erika M. Edwards, and Timothy Heeren. 2009. "Child Abuse and Neglect: Relations to Adolescent Binge Drinking in the National Longitudinal Study of Adolescent Health (AddHealth) Study." *Addictive Behaviors* 34:277-280.
- Smith, Christian. 1998. *American Evangelicalism: Embattled and Thriving*. Chicago: The University of Chicago Press.
- . 2003. "Theorizing Religious Effects Among American Adolescents." *Journal for the Scientific Study of Religion* 42:17-30.
- Smith, Christian and Melinda Lundquist Denton. 2005. *Soul Searching: The Religious and Spiritual Lives of American Teenagers*. New York: Oxford University Press.

- Sorenson, Ann Marie, Carl F. Grindstaff, and R. Jay Turner. 1995. "Religious Involvement among Unmarried Adolescent Mothers: A Source of Emotional Support?" *Sociology of Religion* 56: 71-81.
- Spencer, Thomas J. 2006. "ADHD and Comorbidity in Childhood." *Journal of clinical Psychiatry* 67:27-31.
- Spilka, Bernard. 2005. "Religious Practice, Ritual, and Prayer." Pp. 365-378 in *Handbook of the Psychology of Religion and Spirituality*, edited by R. F. Paloutzian and C. L. Park. New York The Guilford Press.
- Steensland, Brian, Jerry Z. Park, Mark D. Regnerus, Lynn D. Robinson, W. Bradford Wilcox, and Robert D. Woodberry. 2000. "The Measure of American Religion: Toward Improving the State of the Art." *Social Forces* 79:291-318.
- Sternthal, Michelle J., Marc A. Musick, and Anna C. Buck. 2010. "Depression, Anxiety, and Religious Life: A Search for Mediators." *Journal of Health and Social Behavior* 51:343-359.
- Still, George F. 1902. "The Coulstonian Lectures on Some Abnormal Physical Conditions in Children." *Lancet* I:1008-1012.
- . 2006. "Some Abnormal Psychological Conditions in Children." *Journal of Attention Disorders* 10:126-136.
- Strawbridge, W. J., S. J. Shema, R. D. Cohen, and G. A. Kaplan. 2001. "Religious Attendance Increases Survival by Improving and Maintaining Good Health Behaviors, Mental Health, and Social Relationships." *Annals Of Behavioral Medicine: A Publication Of The Society Of Behavioral Medicine* 23:68-74.
- Strawbridge, William J., Richard D. Cohen, Sarah J. Shema, and George A. Kaplan. 1997. "Frequent Attendance at Religious Services and Mortality Over 28 Years." *American Journal of Public Health* 87:957-961.
- Swanson, J. M., J. A. Sergeant, E. Taylor, E. J. S. Sonuga-Barke, P. S. Jensen, and D. P. Cantwell. 1998a. "Attention-Deficit Hyperactivity Disorder and Hyperkinetic Disorder." *The Lancet* 351:429-433.
- Swanson, J. M., G. A. Sunohara, J. L. Kennedy, R. Regino, E. Fineberg, T. Wigal, M. Lerner, L. Williams, G. J. LaHoste, and S. Wigal. 1998b. "Association of the Dopamine Receptor D4 (DRD4) Gene with a Refined Phenotype of Attention Deficit Hyperactivity Disorder (ADHD): A Family- Based Approach." *Molecular Psychiatry* 3:38-42.
- Swanson, James M. 1997. "Hyperkinetic Disorders and Attention Deficit Hyperactivity Disorders." *Current Opinion in Psychiatry* 10:300-305.

- Taylor, Robert Joseph, Christopher G. Ellison, Linda M. Chatters, Jeffrey S. Levin, and Karen D. Lincoln. 2000. "Mental Health Services in Faith Communities: The Role of Clergy in Black Churches." *Social Work* 45:73-87.
- Tepper, Leslie, Steven A. Rogers, Esther M. Coleman, and H. Newton Malony. 2001. "The Prevalence of Religious Coping Among Persons with Persistent Mental Illness." *Psychiatric Services* 52:660-665.
- The Pew Forum on Religion and Public Life. 2008. "U.S. Religious Landscape Survey." Washington: Pew Forum Web Publishing.
- Timimi, Sami and Begum Maitra. 2009. "ADHD and Globalization." Pp. 198-217 in *Rethinking ADHD: From Brain to Culture*, edited by S. Timimi and J. Leo. China: Palgrave and Macmillan.
- Timimi, Sami, Joanna Moncrieff, Jon Jureidini, Jonathan Leo, David Cohen, Charles Whitfield, Duncan Double, Jonathan Bindman, Henry Andrews, Eia Asen, Pat Bracken, Barry Duncan, Michael Dunlap, Albert Galves, Michael Green, Tom Greening, Janice Hill, Rhodri Huws, Bertram Karon, Brian Kean, Michael McCubbin, Begum Miatra, Loren Mosher, Sue Parry, S DuBose Ravenel, Dominick Riccio, Richard Shulman, Jeanne Stolzer, Phil Thomas, Graham Vimpani, Al Wadsworth, Dave Walker, Norbert Wetzels, and Rupert White. 2004. "A Critique of the International Consensus Statement on ADHD." *Clinical Child and Family Psychology Review* 7:59-63.
- Tix, Andrew P. and Patricia A. Frazier. 2005. "Mediation and Moderation of the Relationship Between Intrinsic Religiousness and Mental Health." *Personality and Social Psychology Bulletin* 31:295-306.
- Uecker, Jeremy E., Mark D. Regnerus, and Margaret L. Vaaler. 2007. "Losing My Religion: The Social Sources of Religious Decline in Early Adulthood." *Social Forces* 85:1667-1692.
- van Praag, H. M. 1996. "Comorbidity (Psycho) Ananalysed." *British Journal of Psychiatry* 168:129-134.
- Watters, Ethan. 2010. *Crazy Like Us: The Globalization of the American Psyche*. New York: Free Press.
- Webb, Marcia, Anna M. Charbonneau, Russell A. McCann, and Kristin R. Gayle. 2011. "Struggling and Enduring with God, Religious Support, and Recovery from Severe Mental Illness." *Journal of Clinical Psychology* 67: 1161-1176.
- Whitley, Rob. 2012. "Thank you God:" Religion and Recovery from Dual Diagnosis among Low-income African Americans." *Transcultural Psychiatry* 49: 87-104.

- Wilcox, Claire E., Rachel Washburn, and Vikram Patel. 2007. "Seeking Help for Attention Deficit Hyperactivity Disorder in Developing Countries: A Study of Parental Explanatory Models in Goa, India." *Social Science and Medicine* 64:1600-1610.
- Wilcox, W. Bradford. 1998. "Conservative Protestant Childrearing: Authoritarian or Authoritative?" *American Sociological Review* 63:796-809.
- Wolraich, Mark L., E. Warren Lambert, Anna Baumgaertel, Santiago Garcia-Tornel, Irene D. Feurer, Leonard Bickman, and Melissa A. Doffing. 2003. "Teachers' Screening for Attention Deficit/Hyperactivity Disorder: Comparing Multinational Samples on Teacher Ratings of ADHD." *Journal of Abnormal Child Psychology* 31:445-455.

APPENDIX A  
ANCILLARY REGRESSION ANALYSES



**Mothers' religious involvement and children's ADHD symptoms**

Table 21 Children's Odds Ratios of Severe Symptoms by Mothers' Religious Participation Without Affiliation and Controls (weighted)

<b>Mothers' Characteristics</b>	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
Prayer Frequency	0.984*	0.985**
Importance of Religion	1.200	1.365
Service Attendance	0.934	0.948*
Age	0.988	1.016
Married (yes=1)	1.090	0.974
Education	0.947	1.000
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Black	0.630	0.675
Other	0.286**	0.493
Hispanic	0.982	0.416**
White (=ref.)		
Age	1.090	1.008
n	3572	2906
X <sup>2</sup>	29.82**	25.02**
Df	11	11
Log Pseudolikelihood	-726.03	-890.78
Pseudo R <sup>2</sup>	.03	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 22 Children's Ordinary Least Square Coefficients of Inattentive Symptoms by Mothers' Religious Participation and Controls (weighted)

<b>Mothers' Characteristics</b>	<b>Daughters</b>	<b>Sons</b>
	Coeff.	Coeff.
Catholic	0.098	-0.356
Protestant	0.295	0.006
None	0.363	-0.414
Conservative Protestant (=ref.)		
Prayer Frequency	-0.015*	-0.017*
Importance of Religion	0.186	0.341
Service Attendance	-0.056	-0.129*
Age (yrs.)	0.000	-0.009
Married (yes=1)	-0.322	-0.116
Education	-0.069	-0.033
Household Income	0.000*	0.000
<b>Respondents' Childhood Characteristics</b>		
Black	-0.696**	-0.451
Other	-0.568	-0.527
Hispanic	0.065	-0.772*
White (=ref.)		
Age	0.023	0.245
n	3572	2906
F	3.51***	3.00*
Df	14	14
R <sup>2</sup>	.02	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 23 Ordinary Least Square Coefficients of Inattentive Symptoms by Mothers' Religious Participation Without Affiliation and Controls (weighted)

<b>Mothers' Characteristics</b>	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
Prayer Frequency	-0.015*	-0.017*
Importance of Religion	0.170	0.410
Service Attendance	-0.061	-0.134*
Age	0.000	-0.009
Married (yes=1)	-0.321	-0.094
Education	-0.069	-0.027
Household Income	0.000*	0.000
<b>Respondents' Childhood Characteristics</b>		
Black	-0.664**	-0.374
Other	-0.607	-0.588
Hispanic	-0.003	-0.919**
White (=ref.)		
Age	0.022	0.247***
n	3572	2906
F	4.33***	3.55***
df	11	11
R <sup>2</sup>	.02	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 24 Ordinary Least Square Coefficients of Hyperactive Symptoms by Mothers' Religious Participation and Controls (weighted)

<b>Mothers' Characteristics</b>	<b>Daughters</b>	<b>Sons</b>
	Coeff.	Coeff.
Catholic	0.333	-0.382
Protestant	0.397	0.089
None	0.549	-0.450
Conservative Protestant (=ref.)		
Prayer Frequency	-0.019*	-0.003
Importance of Religion	0.243	0.330
Service Attendance	-0.079	-0.180**
Age	-0.008	-0.005
Married (yes=1)	-0.516*	-0.185
Education	0.011	0.062
Household Income	0.000**	0.000
<b>Respondents' Childhood Characteristics</b>		
Black	-0.725**	-0.917**
Other	-1.160**	-0.626
Hispanic	-0.535	-0.846*
White (=ref.)		
Age	-0.116	0.017
n	3572	2906
F	4.49***	2.17**
df	14	14
R <sup>2</sup>	.03	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 25 Ordinary Least Square Coefficients of Hyperactive Symptoms by Mothers' Religious Participation Without Affiliation Controls (weighted)

	<b>Daughters</b>	<b>Sons</b>
<b>Mothers' Characteristics</b>	Coeff.	Coeff.
Prayer Frequency	-0.019*	-0.003
Importance of Religion	0.210	0.418
Service Attendance	-0.084	-0.187**
Age	-0.007	-0.005
Married (yes=1)	-0.509	-0.160
Education (yrs.)	0.011	0.070
Household Income (Wave I)	0.000**	0.000
<b>Respondents' Childhood Characteristics</b>		
Black	-0.724**	-0.826*
Other	-1.168**	-0.704
Hispanic	-0.550	-1.037**
White (=ref.)		
Age (yrs.)	-0.118	0.020
n	3572	2906
F	5.35***	2.47**
df	11	11
R <sup>2</sup>	.03	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

## Children's religious involvement and ADHD symptoms

Table 26 Children's Odds Ratios of Severe Symptoms by Children's and Mothers' Religious Participation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Prayer Frequency		0.983*		0.985**
Importance of Religion		1.176		1.387
Service Attendance		0.915		0.972
Age		0.990		1.016
Married (yes=1)		1.081		0.990
Education		0.946		1.002
Household Income	1.000	1.000	1.000	1.000
<b>Respondents' Childhood Characteristics</b>				
Catholic	0.752	0.742	0.983	1.007
Protestant	0.772	0.754	0.958	0.964
None	0.686	0.653	0.900	0.958
Conservative Protestant (=ref.)				
Prayer Frequency	0.995	0.998	0.999	1.001
Importance of Religion	0.964	0.969	1.034	1.038
Service Attendance	0.992	1.060	0.928	0.932
Religious Activity Attendance	0.942	0.940	1.018	1.022
Black	0.555*	0.623	0.665	0.679
Other	0.308*	0.301	0.522	0.505
Hispanic	1.005	1.056	0.402**	0.414**
White (=ref.)				
Age (yrs.)	1.069	1.089	1.017	1.004
n	3572	3572	2906	2906
X <sup>2</sup>	18.34	32.34*	15.23	27.55
df	12	18	12	18
Log Pseudolikelihood	-734.70	-723.35	-896.86	-889.42
Pseudo R <sup>2</sup>	.01	.03	.01	.02

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 27 Ordinary Least Square Coefficients of Inattentive Symptoms by Children's and Mothers' Religious Participation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	Coeff.	Coeff.	Coeff.	Coeff.
<b>Mothers' Characteristics</b>				
Catholic		0.652		0.374
Protestant		0.402		0.092
None		0.458		-0.103
Conservative Protestant (=ref.)				
Prayer Frequency		-0.013		-0.017
Importance of Religion		0.221		0.368
Service Attendance		-0.079		-0.075
Age		0.001		-0.005
Married (yes=1)		-0.333		-0.115
Education		-0.070		-0.024
Household Income	0.000***	0.000*	0.000	0.000
<b>Respondents' Childhood Characteristics</b>				
Catholic	-0.409	-0.711	-0.709*	-0.928*
Protestant	-0.112	-0.224	-0.194	-0.242
None	0.145	0.032	-0.569	-0.534
Conservative Protestant (=ref.)				
Prayer Frequency	-0.018**	-0.016*	-0.020***	-0.018*
Importance of Religion	0.019	0.020	0.202	0.211
Service Attendance	0.022	0.085	-0.185**	-0.157*
Religious Activity Attendance	0.005	0.003	0.106	0.116
Black	-0.661**	-0.677**	-0.476	-0.429
Other	-0.469	-0.489	-0.459	-0.443
Hispanic	0.170	0.194	-0.681*	-0.703*
White (=ref.)				
Age	0.014	0.022	0.230***	0.236***
n	3572	3572	2906	2906
F	3.68***	2.96***	4.58***	2.93***
df	12	21	12	21
R <sup>2</sup>	.02	.03	.03	.04

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 28 Ordinary Least Square Coefficients of Inattentive Symptoms by Children's and Mothers' Religious Participation Without Mother's Affiliation and Controls (weighted)

	<b>Daughters</b>	<b>Daughters</b>	<b>Sons</b>	<b>Sons</b>
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	Coeff.	Coeff.	Coeff.	Coeff.
<b>Mothers' Characteristics</b>				
Prayer Frequency		-0.013		-0.016
Importance of Religion		0.215		0.401
Service Attendance		-0.082		-0.073
Age		0.001		-0.006
Married (yes=1)		-0.327		-0.122
Education		-0.070		-0.025
Household Income	0.000***	0.000*	0.000	0.000
<b>Respondents' Childhood Characteristics</b>				
Catholic	-0.409	-0.418	-0.709*	-0.683*
Protestant	-0.112	-0.142	-0.194*	-0.202
None	0.145	0.150	-0.569	-0.517
Conservative Protestant (=ref.)				
Prayer Frequency	-0.018**	-0.016	0.020**	-0.018
Importance of Religion	0.019	0.028	0.202	0.201
Service Attendance	0.022	0.086	0.185**	-0.157*
Religious Activity Attendance	0.005	0.002	0.106	0.115
Black	-0.661**	-0.708***	0.476	-0.464
Other	-0.469	-0.502	0.459	-0.426
Hispanic	0.170	0.188	0.681*	-0.662*
White (=ref.)				
Age	0.014	0.019	0.230***	0.236***
n	3572	3572	2906	2906
F	3.68***	3.37***	4.58***	3.35***
df	12	18	12	18
R <sup>2</sup>	.02	.02	.03	.03

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001



Table 29 Ordinary Least Square Coefficients of Hyperactive Symptoms by Children's and Mothers' Religious Participation and Controls (weighted)

	<b>Daughters Daughters</b>		<b>Sons Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	Coeff.	Coeff.	Coeff.	Coeff.
<b>Mothers' Characteristics</b>				
Catholic		0.681		0.269
Protestant		0.490		0.229
None (Wave I)		0.626		-0.257
Conservative Protestant (=ref.)				
Prayer Frequency		-0.019*		-0.005
Importance of Religion		0.290		0.326
Service Attendance		-0.119*		-0.139*
Age		-0.008		-0.002
Married (yes=1)		-0.525*		-0.161
Education		0.007		0.064
Household Income	0.000***	0.000**	0.000	0.000
<b>Respondents' Childhood Characteristics</b>				
Catholic	-0.217	-0.486	-0.665	-0.720
Protestant	-0.120	-0.245	-0.425	-0.471
None	-0.014	-0.128	-0.321	-0.196
Conservative Protestant (ref.)				
Prayer Frequency	-0.003	0.000	-0.003	-0.002
Importance of Religion	-0.306	-0.274	0.347	0.336
Service Attendance	0.018	0.107	-0.272***	-0.226**
Religious Activity Attendance	-0.001	-0.007	0.135*	0.142*
Black	-0.695**	-0.701**	-0.916**	-0.915**
Other	-1.112**	-1.141**	-0.612	-0.570
Hispanic	-0.601	-0.454	-0.944**	-0.833*
White (=ref.)				
Age (yrs.)	-0.133*	-0.110***	0.013	0.014
n	3572	3572	2906	2906
F	3.68***	3.35***	3.36***	2.25***
df	12	21	12	21
R <sup>2</sup>	.02	.03	.02	.03

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 30 Ordinary Least Square Coefficients of Hyperactive Symptoms by Children's and Mothers' Religious Participation Without Mothers' Affiliation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	Coeff.	Coeff.	Coeff.	Coeff.
<b>Mothers' Characteristics</b>				
Prayer Frequency		-0.019*		-0.004
Importance of Religion		0.267		0.394
Service Attendance		-0.124*		-0.141*
Age		-0.007		-0.002
Married (yes=1)		-0.517*		-0.170
Education		0.006		0.065
Household Income	0.000***	0.000**	0.000	0.000
<b>Respondents' Childhood Characteristics</b>				
Catholic	-0.217	-0.224	-0.665	-0.637
Protestant	-0.120	-0.147	-0.425	-0.425
None	-0.014	0.018	-0.321	-0.231
Conservative Protestant (=ref.)				
Prayer Frequency	-0.003	0.000	-0.003	-0.003
Importance of Religion	-0.306	-0.260	0.347	0.329
Service Attendance	0.018	0.108	-0.272***	-0.227**
Religious Activity Attendance	-0.001	-0.009	0.135*	0.142*
Black	-0.695**	-0.728**	-0.916**	-0.947**
Other	-1.112**	-1.156**	-0.612	-0.581
Hispanic	-0.601	-0.464	-0.944**	-0.838*
White (=ref.)				
Age	-0.133*	-0.113	0.013	0.015
n	3572	3572	2906	2906
F	3.68***	3.67***	3.36***	2.55***
df	12	18	12	18
R <sup>2</sup>	.02	.03	.02	.03

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

**Mothers' religious involvement and children's ADHD diagnosis**

Table 31 Children's Odds Ratios of ADHD Diagnosis by Mothers' Religious Participation Without Mothers' Affiliation and Controls (weighted)

	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
<b>Mothers' Characteristics</b>		
Prayer Frequency	0.986	1.003
Importance of Religion	1.393	0.851
Service Attendance	0.930	0.982
Age	1.036	1.036**
Married (yes=1)	0.827	0.880
Education	1.036	0.987
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Severe Symptoms	9.579***	5.896***
Black	0.102***	0.541
Other	0.158*	0.297
Hispanic	0.486	0.169***
White (=ref.)		
Age (yrs.)	0.886	1.075
n	3572	2906
X <sup>2</sup>	99.91***	102.8***
df	12	12
Log Pseudolikelihood	-452.40	-696.78
Pseudo R <sup>2</sup>	.13	.11

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 32 Odds Ratios of ADHD Diagnosis by Children's Symptom Types and Mothers' Wave I Religious Participation and Controls (weighted)

	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
<b>Mothers' Characteristics</b>		
Catholic	3.654	0.772
Protestant	3.185	0.949
None	5.883	0.791
Conservative Protestant (=ref.)		
Prayer Frequency	0.988	1.004
Importance of Religion	1.654	0.746
Service Attendance	0.944	1.018
Age	1.028	1.048***
Married (yes=1)	0.858	0.938
Education	1.039	0.979
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Inattentive Symptoms	1.164***	1.188***
Hyperactive Symptoms	1.083*	1.049
Black	0.106***	0.533
Other	0.164*	0.325
Hispanic	0.357	0.209***
White (=ref.)		
Age	0.891	1.014
n	3572	2906
X <sup>2</sup>	120.77***	155.88***
df	16	16
Log Pseudolikelihood	-418.23	-641.17
Pseudo R <sup>2</sup>	.19	.18

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 33 Odds Ratios of Children's ADHD Diagnosis by Children's Symptom Types and Mothers' Religious Participation Without Mothers' Affiliation and Controls (weighted)

	<b>Daughters</b>	<b>Sons</b>
	OR.	OR.
<b>Mothers' Characteristics</b>		
Prayer Frequency	0.987	1.004
Importance of Religion	1.399	0.769
Service Attendance	0.941	1.015
Age	1.030	1.048***
Married (yes=1)	0.895	0.948
Education	1.038	0.983
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Inattentive Symptoms	1.165***	1.188***
Hyperactive Symptoms	1.085*	1.049
Black	0.104***	0.559
Other	0.173	0.315
Hispanic	0.386	0.193***
White (=ref.)		
Age	0.890	1.015
n	3572	2906
X <sup>2</sup>	120.40***	147.63***
df	13	13
Log Pseudolikelihood	-421.89	-641.93
Pseudo R <sup>2</sup>	.19	.18

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

## Children's religious involvement and ADHD diagnosis

Table 34 Odds Ratios of Children's ADHD Diagnosis by Children's and Mothers' Religious Participation Without Mothers' Affiliation and Controls (weighted)

	Daughters		Sons	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Prayer Frequency		0.985		1.003
Importance of Religion		1.225		0.805
Service Attendance		0.965		0.965
Age		1.035		1.035**
Married (yes=1)		0.883		0.838
Education		1.041		0.981
Household Income	1.000	1.000	1.000	1.000
<b>Respondents' Childhood Characteristics</b>				
Severe Symptoms (yes=1)	10.079***	10.029***	5.922***	6.009***
Catholic	0.723	0.688	0.904	0.846
Protestant	0.969	0.928	1.097	1.055
None	0.627	0.607	0.439	0.410
Conservative Protestant (=ref.)				
Prayer Frequency	1.006	1.007	0.994	0.993
Importance of Religion	1.049	1.076	0.816	0.840
Service Attendance	0.810*	0.834	0.995	1.024
Religious Activity Attendance	1.161	1.153	1.067	1.069
Black	0.095***	0.094***	0.567	0.547
Other	0.214	0.189	0.347	0.340
Hispanic	0.511	0.571	0.187***	0.182***
White (=ref.)				
Age	0.924	0.904	1.107	1.078
n	3572	3572	2906	2906
X <sup>2</sup>	107.72***	109.61***	104.59***	114.82***
df	13	19	13	19
Log Pseudolikelihood	-449.68	-444.63	-695.39	-688.88
Pseudo R <sup>2</sup>	.13	.14	.11	.12

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 35 Odds Ratios of Children's ADHD Diagnosis by Symptoms Types and Children's and Mothers' Religious Participation and Controls (weighted)

	<b>Daughters</b>		<b>Sons</b>	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Catholic		11.982**		0.612
Protestant		3.561*		0.912
None		10.911		0.986
Conservative Protestant (=ref.)				
Prayer Frequency		0.988		1.004
Importance of Religion		1.484		0.755
Service Attendance		0.981		0.997
Age		1.024		1.046***
Married (yes=1)		0.917		0.909
Education		1.042		0.975
Household Income	1.000	1.000	1.000	1.000
<b>Respondents' Childhood Characteristics</b>				
Inattentive Type Symptoms	1.169***	1.164***	1.180***	1.189***
Hyperactive Type Symptoms	1.087*	1.085*	1.050	1.049
Catholic	0.717	0.225**	1.023	1.343
Protestant	0.903	0.787	1.121	1.140
None	0.545	0.302*	0.494	0.483
Conservative Protestant (=ref.)				
Prayer Frequency	1.008	1.009	0.996	0.995
Importance of Religion	1.072	1.085	0.765	0.788
Service Attendance	0.815*	0.828*	1.023	1.040
Religious Activity Attendance	1.134	1.133	1.063	1.059
Black	0.100***	0.105***	0.594	0.562
Other	0.242	0.208	0.353	0.349
Hispanic	0.421	0.435	0.208**	0.214**
White (=ref.)				
Age (yrs.)	0.922	0.930	1.055	1.015
n	3572	3572	2906	2906
X <sup>2</sup>	127.46 ***	135.00 ***	135.07 ***	162.57 ***
df	14	23	14	23
Log Pseudolikelihood	-417.96	-404.09	-644.45	-634.29
Pseudo R <sup>2</sup>	.19	.22	.18	.19

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

Table 36 Odds Ratios of Children's ADHD Diagnosis by Symptoms Types and Children's and Mothers' Religious Participation Without Mothers' Affiliation and Controls (weighted)

	Daughters		Sons	
	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>
	OR.	OR.	OR.	OR.
<b>Mothers' Characteristics</b>				
Prayer Frequency		0.986		1.004
Importance of Religion		1.176		0.740
Service Attendance		0.980		0.991
Age		1.028		1.047***
Married (yes=1)		0.980		0.917
Education		1.039		0.977
Household Income	1.000	1.000	1.000	1.000
<b>Respondents' Childhood Characteristics</b>				
Inattentive Type Symptoms	1.169***	1.67***	1.180***	1.188***
Hyperactive Type Symptoms	*	*		
Catholic	1.087	1.086	1.050	1.049
Protestant	0.717	0.680	1.023	0.964
None	0.903	0.876	1.121	1.087
Conservative Protestant (=ref.)	0.545	0.535	0.494	0.458
Prayer Frequency	1.008	1.009	0.996	0.995
Importance of Religion	1.072	1.088	0.765	0.802
Service Attendance	0.815*	0.837	1.023	1.042
Religious Activity Attendance	1.134	1.121	1.063	1.059
Black	0.100***	0.102***	0.594	0.582
Other	0.242	0.220	0.353	0.335
Hispanic	0.421	0.441	0.208**	0.201***
White (=ref.)				
Age	0.922	0.909	1.055	1.015
n	3572	3572	2906	2906
X <sup>2</sup>	127.46***	130.63***	135.07***	152.80***
df	14	20	14	20
Log Pseudolikelihood	-417.96	-414.43	-644.45	-635.61
Pseudo R <sup>2</sup>	.19	.20	.18	.19

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001



### Childhood ADHD symptoms/diagnosis and adult religious involvement

Table 37 OLS Coefficients Predicting Adult Sons' and Daughters' Religious Involvement by Childhood ADHD Symptom Types and Diagnosis and Controls (weighted)

	Prayer Frequency		Importance of Religion		Service Attendance		Religious Activity Attendance	
	Daughters <i>Model 1a</i>	Sons <i>Model 1b</i>	Daughters <i>Model 2a</i>	Sons <i>Model 2b</i>	Daughters <i>Model 3a</i>	Sons <i>Model 3b</i>	Daughters <i>Model 4a</i>	Sons <i>Model 4b</i>
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
<b>Mothers' Characteristics</b>								
Prayer Frequency	-0.005	0.033	0.001	0.000	-0.001	-0.002	-0.001	0.000
Importance of Religion	0.523	0.296	0.038	0.041	0.034	-0.087	0.034	0.017
Service Attendance	-0.022	-0.084	0.004	0.005	0.061**	0.064**	0.061*	-0.014
Age	-0.123*	-0.015	0.001	0.001	0.009	-0.001	0.009	-0.004
Married (yes=1)	0.851	-0.346	0.007	0.058	0.031	0.061	0.031	-0.067
Education	0.195	0.127	-0.002	-0.014*	-0.016	-0.008	-0.016	0.017
Household Income	0.000***	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Respondents' Childhood Characteristics</b>								
Inattentive Symptoms	-0.276**	-0.029	0.008*	-0.008*	0.024*	0.019	0.024*	0.001
Hyperactive Symptoms	0.283**	0.067	-0.005	0.004	-0.031**	-0.005	-0.031***	-0.003
ADHD Diagnosis (yes=1)	1.570	0.377	-0.001	0.038	0.227	-0.141	0.227	-0.026
Catholic	0.238	-0.122	-0.020	-0.042	-0.045	0.020	-0.045	-0.101
Protestant	-0.715	-0.694	-0.009	0.015	-0.011	-0.011	-0.011	-0.079
None	1.747	0.713	0.161**	0.149*	0.247	0.174	0.247	-0.050
Conservative Protestant (=ref.)								
Prayer Frequency	0.186***	0.172***	0.000	0.000	0.003	-0.004	0.003	0.001
Importance of Religion	-0.408	-0.319	0.113***	0.113***	-0.058	0.033	-0.058	-0.033
Service Attendance	-0.137	-0.378	-0.010	0.002	0.048*	0.037	0.048*	0.020

Table 37 (continued)

	Prayer Frequency		Importance of Religion		Service Attendance		Religious Activity Attendance	
	Daughters	Sons	Daughters	Sons	Daughters	Sons	Daughters	Sons
	<i>Model 1a</i>	<i>Model 1b</i>	<i>Model 2a</i>	<i>Model 2b</i>	<i>Model 3a</i>	<i>Model 3b</i>	<i>Model 4a</i>	<i>Model 4b</i>
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
<b>Respondents' Childhood Characteristics</b>								
Religious Activity Attendance	-0.070	0.013	0.002	-0.005	0.018	0.022	0.018	0.019
Black	4.734***	3.921***	0.091**	0.166***	0.159	-0.186	0.159	-0.054
Other	0.568	-0.134	0.016	0.034	0.368*	-0.307*	0.368*	0.137
Hispanic	-0.883	1.042	0.098**	0.130***	0.131	0.053	0.131	-0.006
White (=ref.)								
<b>Respondents' Adult Characteristics</b>								
Age	0.508**	0.148	-0.003	-0.002	-0.023	0.024	-0.023	-0.004
Married (yes=1)	0.348	0.150	0.045	0.048	0.358***	0.170	0.358***	0.050
Number of Children	0.659*	0.218	-0.010	-0.004	0.027	0.035	0.027	-0.022
Education (yrs.)	-0.212	0.056	-0.003	0.000	0.082***	0.034	0.082***	0.013
Student (yes=1)	0.758	-0.432	-0.068*	-0.021	0.128	0.171	0.128	0.086
Household Income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Catholic	-2.290	-3.188*	-0.103**	-0.085	-0.181	-0.056	-0.181	-0.449***
Protestant	-1.562	-1.635	0.002	0.021	-0.195*	-0.195	-0.195	-0.300***
None	-4.883***	-1.817	-0.629***	-0.705***	-0.513***	-0.474***	-0.513***	-0.203*
Conservative Protestant (=ref.)								
Prayer Frequency	10.004***	10.408***	0.012***	0.015***	0.016***	0.021***	0.016***	0.004*
Importance of Religion	1.518***	2.101***	0.065***	0.052***	0.611***	0.360***	0.611***	-0.028
Service Attendance	0.370	0.750*	-0.003	-0.008	0.564***	0.672***	0.564***	0.341***
Religious Activity Attendance	3572	2906	3572	2906	3572	2906	3572	2906
n	111.82***	93.31***	110.71***	122.10***	122.56***	98.78***	122.56***	114.2***
F	32	32	32	32	32	32	32	32
df	.46	.49	.46	.60	.52	.50	.52	.38
R <sup>2</sup>	Note: *p<.05, **p<.01, ***p<.001							

## Childhood ADHD symptoms/diagnosis and adult religious affiliation

Table 38 Odds Ratios of Being an Adult Conservative Protestant by Childhood ADHD Inattention and Hyperactive Symptoms and Diagnosis and Controls.

	<b>Daughters</b>	<b>Sons</b>
	<i>Model 1</i>	<i>Model 2</i>
	OR.	OR.
<b>Mothers' Characteristics</b>		
Prayer Frequency	1.000	0.999
Importance of Religion	0.979	0.913
Service Attendance	1.076*	1.037
Age	0.990	0.987
Married (yes=1)	1.043	1.185
Education	1.001	1.018
Household Income	1.000	1.000
<b>Respondents' Childhood Characteristics</b>		
Inattentive Type Symptoms	0.992	0.987
Hyperactive Type Symptoms	1.016	1.012
ADHD Diagnosis	1.071	1.486
Catholic	0.110***	0.231***
Protestant	0.473***	0.543***
None	0.332***	0.458*
Conservative Protestant (=ref.)		
Prayer Frequency	1.000	0.986**
Importance of Religion	1.035	1.258
Service Attendance	0.940	1.050
Religious Activity Attendance	1.042	0.932
Black	0.557***	0.635*
Other	0.875	1.460
Hispanic	1.075	1.058
White (=ref.)		
<b>Respondents' Adult Characteristics</b>		
Age	1.051	1.093*
Married (yes=1)	1.185	1.434*
Number of Children	0.988	0.948
Education	0.981	1.009
Student	1.159	0.996
Household Income	1.000	1.000**
Prayer Frequency	1.011*	1.009
Importance of Religion	1.795***	1.788***
Service Attendance	1.092*	1.096*
Religious Activity Attendance	1.052	1.198***
n	3572	2906
X <sup>2</sup>	328.87***	273.65***
df	30	30
Log Pseudolikelihood	-1442.91	-1116.69
Pseudo R <sup>2</sup>	.18	.17

Note: \*p<.05, \*\*p<.01, \*\*\*p<.001

APPENDIX B  
REGULATORY COMPLIANCE DOCUMENTATION



**MISSISSIPPI STATE**  
UNIVERSITY

Compliance Division  
Administrative Offices  
Animal Care and Use (IACUC)  
Human Research Protection  
Program (IRB)  
1207 Hwy 182 West, Suite C  
Starkville, MS 39759  
(662) 325-3496 - fax

Safety Division  
Biosafety (IBC)  
Radiation Safety  
Hazardous Waste  
Chemical & Lab Safety  
Fire & Life Safety  
70 Morgan Avenue  
Mississippi State, MS 39762  
(662) 325-8776 - fax

<http://www.orc.msstate.edu>  
[compliance@research.msstate.edu](mailto:compliance@research.msstate.edu)  
(662) 325-3294

July 21, 2010

Philip Mason  
303 B Park Circle  
Starkville, MS 39759

RE: IRB Study #10-037: Religion and Attention Deficit Hyperactivity Disorder

Dear Mr. Mason:

The above referenced project was reviewed and approved via administrative review on 7/21/2010 in accordance with 45 CFR 46.101(b)(4). Continuing review is not necessary for this project. However, any modification to the project must be reviewed and approved by the IRB prior to implementation. Any failure to adhere to the approved protocol could result in suspension or termination of your project. The IRB reserves the right, at anytime during the project period, to observe you and the additional researchers on this project.

**Please note that the MSU IRB is in the process of seeking accreditation for our human subjects protection program. As a result of these efforts, you will likely notice many changes in the IRB's policies and procedures in the coming months. These changes will be posted online at <http://www.orc.msstate.edu/human/aahrpp.php>.**

Please refer to your IRB number (#10-037) when contacting our office regarding this application.

Thank you for your cooperation and good luck to you in conducting this research project. If you have questions or concerns, please contact me at [cwilliams@research.msstate.edu](mailto:cwilliams@research.msstate.edu) or call 662-325-5220.

Sincerely,

[For electronic submissions]

Christine Williams  
IRB Compliance Administrator

cc: Lynne Cossman (Advisor)  
Sarah Brauner-Otto