2014

Temperament and Personality Traits as Predictors of Preschool ODD Symptoms, Longitudinal Course, and Impairment

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TEMPERAMENT AND PERSONALITY TRAITS AS PREDICTORS OF PRESCHOOL ODD SYMPTOMS, LONGITUDINAL COURSE, AND IMPAIRMENT

THESIS

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the College of Arts and Sciences at the University of Kentucky

By

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Lexington, KY

2014

ABSTRACT OF THESIS

TEMPERAMENT AND PERSONALITY TRAITS AS PREDICTORS OF PRESCHOOL ODD SYMPTOMS, LONGITUDINAL COURSE, AND IMPAIRMENT

Oppositional Defiant Disorder (ODD) is commonly conceptualized as a disorder of negative affect and low effortful control. Currently, it is unclear whether temperament and personality traits associated with negative affect and effortful control can be useful assessment tools for identifying ODD early during development**.** This study examined the relationship between temperament and personality traits and ODD in a clinical sample of preschoolers. Results suggest that, at this age, temperament and personality traits of negative affect and neuroticism and effortful control and conscientiousness/agreeableness are not associated with one another. High negative affect, low conscientiousness, and low agreeableness were all specifically associated with the angry/irritable (vs. argumentative/defiant, vindictive) ODD symptom domain; however, the traits did not predict change in symptoms over time. Lastly, low conscientiousness predicted ODD-related impairment, while negative affect and agreeableness interacted to predict impairment such low agreeableness appears to be a primary pathway to impairment, and high negative affect appears to be a secondary pathway. Overall, this study suggests high negative affect, low conscientiousness, and low agreeableness are associated with ODD. Early assessment of these traits may be clinically useful in identifying children at risk for ODD, given that they may be early markers for ODD symptoms and impairment.

KEYWORDS: *child psychopathology; personality traits; temperament; oppositional defiant disorder; longitudinal course*

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July 14, 2014

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Chapter One: Review of the Literature

Introduction

Oppositional Defiant Disorder (ODD) is a common and impairing Disruptive Behavior Disorder (DBD; in DSM-IV-TR; Disruptive, Impulsive-Control, and Conduct Disorders in DSM-5) that has an average prevalence rate of 3.3% in children (American Psychiatric Association [APA], 2013). ODD is characterized by a pattern of angry, hostile, and/or defiant behaviors and interactions with others and is subdivided into three symptom domains: angry/irritable, argumentative/defiant, and vindictive (APA, 2013). It is associated with a number of negative and costly outcomes, such as poor family relations, academic problems, and high comorbidity with other disruptive behavior problems including conduct problems, aggression, and hyperactivity-impulsivity (Spira & Fischel, 2005; Posner et al., 2007; Campbell, Spieker, Burchinal, Poe, & National Institute of Child Health and Human Development Early Child Care Research Network, 2006). ODD is substantially stable over time and can be diagnosed as early as the preschool period (between ages 3 and 6; Lavigne et al., 2001; Pihlakoski et al., 2006; Owens & Shaw, 2003). Although ODD is believed to be caused at least in part by coercive parent-child interactions (Patterson, 1976; Lahey, Moffitt, & Caspi, 2003), it exhibits moderate heritability (Burt, 2009) and is commonly conceptualized as a disorder of negative affect and, secondarily, low effortful control (Stringaris & Goodman, 2009; Stringaris, Maughan, & Goodman, 2010). What remains unclear is whether temperament and personality traits associated with negative affect and effortful control can be useful

assessment tools for identifying and characterizing ODD early during development, particularly since these traits can be reliably and validly measured earlier than psychopathology (Gartstein & Rothbart, 2003).

Temperament and Personality

Temperament is commonly conceptualized as individual differences in self-regulation and reactivity (Rothbart & Derryberry, 1981). Although there are many models of temperament, most recognize at least three temperament traits that are conceptually similar to the model developed by Rothbart (1989): surgency, negative affect, and effortful control (e.g. Eisenberg et al., 1996). Surgency refers to an individual's positive emotions, activity level, and impulsivity. Negative affect includes negative emotions such as anger, fearfulness, discomfort, and sadness. Effortful control refers to an individual's inhibitory control, focus of attention, and sensitivity to perception (Rothbart & Derryberry, 1981). Importantly, individual differences in temperament traits can be reliably measured via questionnaires as early as infancy (Gartstein & Rothbart, 2003).

Similar to temperament, personality refers to an individual's unique pattern of thoughts, feelings, and behaviors (McCrae & Costa, 1987; Tackett, 2006). The most well-established model of personality in adulthood is the Five Factor Model of personality, a model comprised of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (McCrae & Costa, 1987). Neuroticism is the tendency to experience negative emotions and lack of stability in emotions. Extraversion is defined by outgoingness, talkativeness, gregariousness, assertiveness, and positive emotionality. Openness to experience refers to a general openness for a variety of experiences,

imagination and curiosity, and a sense of adventure. Agreeableness is characterized by a general concern for harmony, forgiveness, modesty, and appreciativeness. Conscientiousness refers to an individual's level of self-discipline and self-awareness. Early evidence that the Five Factor Model could be applied to children was provided by Digman and colleagues (Digman & Inouye, 1986; Digman & Takemoto-Chock, 1981), using factor analysis on teacher ratings of children's personality traits. More recent research by van Lieshout and Haselager (1994) using Block and Block's (1980) California Child Q-Sort is also consistent with the idea that the Five Factors are readily identifiable in children. Further, work on trait hierarchies suggests that traits can be well-captured at either a three- (for temperament) or five- (for personality) factor level, depending on the level of analysis; that is, effortful control is a trait that, at lower levels of abstract conceptualization, can be further subdivided into effortful control and agreeableness, or prosocial behavior (Markon, 2009; Nigg, 2006; Shiner & DeYoung, 2011).

Although the debate between whether temperament and personality are synonymous or distinct constructs is ongoing, a growing number of researchers view temperament and personality as highly related constructs, based on their conceptual similarities, as indicated by qualitative reviews (Shiner & Caspi, 2003; Tackett, 2006). Both temperament and personality refer to trait-level individual differences that affect a person's behavior, and both are biologically and environmentally influenced (Silberg et al., 2005; DeYoung et al., 2010; Hopwood et al., 2012). Furthermore, research suggests significant correlations between temperament and personality traits such as negative affect and neuroticism, surgency and extraversion, and effortful control and

conscientiousness (and secondarily, at lower levels of analysis, agreeableness; Digman, 1997; Lahey, 2009; Markon, Krueger, & Watson, 2005). Yet, there remain prominent limitations to this prior empirical work assessing associations between temperament and personality traits. For example, there are relatively few empirical studies examining temperament and personality traits together (for exceptions see Rothbart, Ahadi, & Evans, 2000; Dick et al., 2013; Tackett, Kushner, De Fruyt, & Mervielde, 2013), particularly in young children.

Trait-Psychopathology Associations

Temperament and personality traits exhibit robust associations with psychopathology (reviewed by Nigg, 2006; Tackett, 2006), yet the nature of these associations remains debated. Several models have been put forward which seek to explain how temperament and personality relate to psychopathology (e.g., scar model, pathoplasty/exacerbation model, resiliency model, vulnerability model, spectrum model). The models most supported by research thus far are the vulnerability model and the spectrum model. The vulnerability model suggests that temperament and personality traits are risk factors that may contribute to the development of psychopathology. The spectrum model views psychopathology as the extreme end of the normal range of personality traits, whereby extreme personality traits are conceptualized as synonymous with psychopathology (Tackett, 2006). Yet, these models are similar in suggesting the possible utility of early assessment of temperament and personality traits since both models suggest that extreme, maladaptive traits may predict psychopathology. Thus, extreme temperament and/or personality traits may be useful early markers of psychopathology, possibly accounting for individual differences in ODD symptom

domains and predicting the longitudinal course of the disorder. Additionally, traits may explain impairment associated with psychopathology, although this idea remains untested at present.

Temperament and ODD

Current research on temperament traits and ODD suggests specific associations with high negative emotionality and low effortful control (and secondarily, low agreeableness). As noted above, extant theory (Stringaris & Goodman, 2009) suggests that ODD may be primarily a disorder of negative affect. Providing some empirical validation of this idea, children high in negative emotionality, or emotions such as anger and frustration, exhibit more disruptive behavior problems compared to children low in negative emotionality (Eisenberg et al., 200l; Lahey et al., 2008). Further, Stingaris and Goodman's (2009) theoretical model suggests some specificity of associations between high negative affect and ODD symptom domains such that negative affect may be more strongly associated with the angry/irritable (vs. argumentative/defiant, vindictive) ODD symptom domain, although this idea remains untested. In addition, ODD and other disruptive behavior problems have also been associated with low levels of effortful control (Eisenberg et al., 2001; Kochanska & Knaack, 2003; Martel, Gremillion, & Roberts, 2012). Stringaris and Goodman's (2009) theoretical model suggests that low effortful control may be more specifically associated with the argumentative/defiant and vindictive (vs. angry/irritable) ODD symptom domains, although no empirical studies have examined this. Further, some empirical work suggests that negative emotionality and effortful control may interact, such that low effortful control may be related to disruptive behavior problems primarily in the context of high negative emotionality

(Eisenberg et al., 2009; Martel, Gremillion, & Roberts, 2012; Martel & Nigg 2006). This interaction may be useful for predicting impairment; however, no empirical research has directly examined this idea.

Personality and ODD

Although associations between temperament traits and disruptive behavior problems have been fairly well established and a limited body of work has evaluated associations between temperament traits and ODD specifically, much less is known about associations between personality traits and ODD. Limited prior research suggests a general relationship between the personality traits of high neuroticism, low conscientiousness, and low agreeableness and disruptive behavior problems during childhood (Gjone & Stevenson, 1997; Lahey, 2009). Characteristics similar to neuroticism, such as irritability, difficultness, and resistance, have also been associated with disruptive behavior problems (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Martel, Nikolas, Jernican, Friderici, & Nigg, 2012; Olson, Bates, Sandy, & Lanthier, 2000). Yet, to our knowledge, no work to date has evaluated associations between personality traits and ODD specifically. Further, despite what is known about the association between these traits and disruptive behavior problems, there has been no work done on how personality traits are related to impairment associated with disruptive behavior problems such as ODD.

The Current Study

Gaps in the Literature Addressed

To summarize, limited theoretical and empirical work suggests associations between high negative affect and neuroticism and low effortful control and

conscientiousness (as well as low agreeableness) and disruptive behavior problems such as ODD (Eisenberg et al., 2001; Lahey, 2009), although few studies have examined ODD specifically. Further, limited theoretical and empirical work, mostly conducted in adults, suggests associations between the temperament trait of negative affect and the personality trait of neuroticism and between the temperament trait of effortful control and the personality trait of conscientiousness (Digman, 1997; Lahey, 2009; Markon, Krueger, & Watson, 2005). Yet, few studies to date have utilized an integrated temperament/personality trait approach to evaluate if traits may be useful predictors of early childhood ODD and its short-term longitudinal course, as suggested by the vulnerability and spectrum models of psychopathology. In addition, no work to date has explored whether temperament and personality traits are useful in predicting specific ODD symptom domains and/or associated impairment.

Aims of the Study

This study intends to address these gaps in the existing literature regarding the relationship between temperament traits, personality traits, and ODD in young children. The first aim of the study is to examine the relationship between key temperament and personality traits associated with ODD in an understudied population of young children between ages 3 and 6, over-recruited for DBDs. Based on prior theoretical reviews (Shiner & Caspi, 2003; Tackett, 2006), it is hypothesized that negative affect and neuroticism will be highly associated with one another, and effortful control and conscientiousness will be highly associated with one another in young children, similar to what is seen in older samples (Digman, 1997; Lahey, 2009; Markon, Krueger, & Watson, 2005).

The second aim of the study is to evaluate the specificity of associations between negative affect and effortful control (and secondarily agreeableness) and the ODD symptom domains in young children over-recruited for DBDs. Based on Stringaris and Goodman's theoretical model (2009), it is predicted that high negative affect will be more strongly associated with the angry/irritable (vs. argumentative/defiant, vindictive) symptom domain, whereas low effortful control (and low agreeableness) will be more specifically associated with argumentative/defiant and vindictive (vs. angry/irritable) symptom domains. Further, it is predicted that negative affect and effortful control (and agreeableness) will predict change in these specific symptom domains (as detailed above) over the one-year time course.

The third aim of the study is to explore associations between negative affect, effortful control (and agreeableness), and ODD-related impairment. Based on Eisenberg et al. (2009) and Martel, Gremillion, and Roberts' (2012) work, it is predicted that negative affect and effortful control (or agreeableness) will interact to predict ODD-related impairment in young children. Finally, for completeness and to test Carver's (2009) idea that anger is an approach-related emotion, associations between positive affect traits, and ODD symptom domains, longitudinal course, and impairment will be explored.

Chapter Two: Methods

Participants

Participants were 109 preschoolers between ages three and six (*M*=4.77 years, *SD*=1.11) and their primary caregivers, mostly mothers. Fifty-nine percent of the sample was male; 33% of the sample was ethnic minority. Parental educational level ranged from

unemployed to highly skilled professionals, with incomes ranging from below $20,000 to above $100,000 annually (see Table 1). Based on multistage and comprehensive diagnostic screening procedures, preschoolers were recruited into two groups: ODD children (*n*=60) and non-ODD children (*n*=49). The non-ODD group included preschoolers with subthreshold symptoms to provide a more continuous measure of ODD symptoms. Symptom counts were the focus of analyses, consistent with research suggesting that externalizing behavior may be better captured by continuous dimensions than categorical diagnosis (Krueger, Markon, Patrick, & Iacono, 2005; Markon, Chmielewski, & Miller, 2011) and to be sensitive to the young age of the sample.

Recruitment and Identification

Participants were recruited from the community through direct mailings, postings, advertisements, and flyers designed to over-recruit clinical cases. A telephone screening was conducted to rule out children prescribed psychotropic medication (e.g., antidepressants) and children with neurological impairments, intellectual disability, autism spectrum disorders, psychosis, seizure history, head injury with loss of consciousness, or other major medical conditions. All families screened into the study completed written and verbal informed consent procedures consistent with the Institutional Review Board, the National Institute of Mental Health, and APA guidelines.

Parents and preschoolers attended a campus laboratory visit. Diagnostic information was collected via parent and teacher/caregiver ratings. Parents completed the Kiddie Disruptive Behavior Disorders Schedule (K-DBDS: Leblanc et al., 2008), a semi-structured diagnostic interview administered by a trained graduate student clinician. The K-DBDS demonstrates high test-retest reliability and high inter-rater reliability in the

preschool population (LeBlanc et al., 2008). In the current study, clinician agreement was adequate for ODD symptoms (r=.82 or above, $p < .001$). Parents were contacted one year later by telephone to complete the K-DBDS again. 80% of the sample completed the one-year follow-up.

Measures

Symptom Counts for ODD and Related Impairment

Parent report on ODD symptoms and related impairment at both the initial and one-year time points was available via the clinician-administered Kiddie Disruptive Behavior Disorders Schedule (K-DBDS; LeBlanc et al., 2008), described above. ODD symptoms were measured using a dichotomous scale (0=absent; 1=present). ODD-related impairment (e.g., "How much do the behaviors interfere with the child's ability to play and get along with other kids?") was measured on a 1 (i.e., not very much) to 3 (i.e., a lot) scale of severity. The same parent completed the interview at both time points. A sum score for symptoms and impairment was utilized; higher scores indicate more symptoms and impairment The symptom and impairment scales had acceptable internal reliability of .72 or above.

Temperament Traits

To measure negative affect, effortful control, and surgency parents completed the very short form of the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001; Putnam & Rothbart, 2006). Traits were measured using scales suggested by Rothbart, Ahadi, Hershey, and Fisher (2001). Composite scale scores were generated by reverse-scoring selected items and computing the average. The scales had acceptable internal reliability coefficients of .67 or above in the current sample.

Select paradigms from the *Laboratory Temperament Assessment Battery* (LabTAB; Goldsmith, Reilly, Lemery, & Longley, 1999; Kochanska, Murray, & Harlan, 2000) provided observational ratings of preschool temperament traits. Negative affect (sadness and anger; i.e., "perfect circle"), effortful control (i.e., "gift delay"), and positive affect (i.e. "bubbles") paradigms were used in the present study (see Goldsmith et al., 1999). In order to assess negative affect (sadness and anger), the child was asked to draw a "perfect" circle; the child was corrected and asked to redraw their circle for two minutes. During this time, verbal, facial, and behavioral expressions of sadness and anger, as well as intensity of and latency to sadness and anger were coded in five-second increments. In order to assess effortful control, children were asked to wait with their back turned while the examiner wrapped a present; the child was instructed not to touch the gift while the examiner left to room to retrieve a bow for the present. Extent of peeking for the entire segment was coded on a five-point scale (1 = child peeks the entire time; 5 = child never peeks). To assess positive affect, children played with a bubble gun for one minute. Positive motor activity (e.g., clapping) and verbal expressions of positive affect (e.g., laughter) were coded in ten-second increments. To generate composite scores for positive motor activity and verbal expressions of positive affect, a sum of all tally marks across the one minute was computed. All examiners were blind to the child's diagnosis. Reliability was acceptable for all observational coding composites utilized in the current study (all kappas > .78). Higher scores denote higher levels of traits.

Personality Traits

To examine personality traits, specifically neuroticism, conscientiousness, agreeableness, and extraversion, an examiner who interacted with the child for at least

three hours completed the California Child Q-Sort (CCQ; Block, 2008; Block & Block, 1980), a developmentally sensitive measure appropriate for use with young children in the preschool age range. The CCQ is a typical Q-Sort consisting of 100 cards, which must be placed in a forced-choice, nine-category, rectangular distribution. Scales developed by John, Caspi, Robins, Moffitt, and Stouthamer-Loeber (1994) were used. Composite scale scores were generated by reverse-scoring selected items and computing the average. Reliability was .65 or above.

Data Analysis

Based on a sample size of 109 and an expected medium effect size (d=.3; Martel et al., 2012), power was adequate (.90 for correlations and linear regressions, .99 for hierarchical regressions, and .82 for general linear models).

Chapter Three: Results

Demographics and Diagnostic Group Differences

As noted in Table 1, neither age, gender, ethnicity/race, nor income levels were significantly different across diagnostic groups (ODD vs. non-ODD; all $p > .05$). Point biserial correlations indicated that neither gender nor ethnicity/race were significantly correlated with ODD symptoms (r range -.090-.064, all $p > .05$). Age exhibited no significant correlation with overall ODD symptoms ($r = .177$, $p > .05$). Thus, these variables were not covaried in subsequent analyses. Analysis of variance (ANOVA) revealed significant mean differences in ODD symptoms based on family income ($F[1,98]=2.496$, $p < .05$); thus, the effect of family income on study results was examined in secondary checks. Mean levels of ODD symptoms and ODD impairment were significantly different between the ODD and non-ODD diagnostic groups in the expected

direction (all $p < .001$). Further, negative affect was significantly higher in the ODD group (vs. the non-ODD group; $p < .001$), and effortful control and agreeableness were significantly lower in the ODD group (vs. the non-ODD group; $p < .05$; $p < .01$). Perfect circle sadness, perfect circle anger, gift delay effortful control, neuroticism, and conscientiousness exhibited no significant differences between diagnostic groups (all $p > .05$).

Table 1

Demographics and descriptive information on sample

	Non-ODD n = 49		ODD n = 60	
	M	*(SD)*	*M*	*(SD)*
Age	4.57	(1.08)	4.93	(1.11)
Boys n(%)	27	(55.1)	37	(61.7)
Ethnic minority n(%)	18	(36.7)	18	(30)
Family income (mode)	0, 1		0	
ODD symptoms***	1.78	(1.14)	5.32	(1.26)
ODD impairment***	6.05	(4.05)	10.92	(3.34)
Negative affect***	3.91	(0.97)	4.56	(0.94)
Effortful control*	5.04	(0.77)	4.68	(0.96)
Perfect circle anger	5.75	(6.48)	4.98	(5.77)
Perfect circle sadness	1.09	(1.42)	2.26	(3.42)
Gift delay effortful control	9.56	(2.88)	9.33	(2.60)
Neuroticism	3.39	(1.11)	3.68	(1.19)
Conscientiousness	6.06	(1.25)	5.55	(1.35)
Agreeableness**	6.27	(1.15)	5.46	(1.31)

Family income modes: 0 = annual income less than $20,000, 1 = between $20,000 and $40,000, 2 = between $40,000 and $60,000, 3 = between $60,000 and $80,000, 4 = between $80,000 and $100,000, and 5 = over $100,000 annually. Gift delay composite: higher scores indicate better control.
Subgroup differences based on independent samples t-test comparison of means.
* $p < .05$; ** $p < .01$; *** $p < .001$

Associations between Temperament and Personality Traits

Bivariate correlations were conducted between temperament and personality traits. As shown in Table 2, there were no significant associations between negative

affect, neuroticism, perfect circle sadness, or perfect circle anger (r range -.155-.176, all $p > .05$). Effortful control was not significantly associated with gift delay effortful control or conscientiousness (r range -.012-.183, all $p > .05$), although gift delay effortful control and conscientiousness were significantly associated with one another ($r = .399$, $p < .001$). Agreeableness was significantly associated with effortful control, conscientiousness, and gift delay effortful control ($r = .230$, $p < .05$; $r = .623$, $p < .001$; $r = .307$, $p < .05$).

Thus, negative affect temperament and personality traits do not appear to be associated with one another. Further, effortful control was not associated with gift delay effortful control or conscientiousness, although gift delay effortful control was associated with conscientiousness. Agreeableness was associated with effortful control, conscientiousness, and gift delay effortful control. Based on these correlations, there did not seem to be strong support for generating latent temperament/personality factors.

Table 2

Correlations between temperament and personality traits

	NA	N	Perfect circle anger	Perfect circle sadness
Negative affect (NA)	----	.176	-.155	-.029
Neuroticism (N)		----	-.102	.155
Perfect circle anger			----	-.106
	EC	C	Gift delay effortful control	A
Effortful control (EC)	----	.183	-.012	.230*
Conscientiousness (C)		----	.399***	.623***
Gift delay effortful control			----	.307*

* $p < .05$; *** $p < .001$

Associations between Traits and ODD Symptoms

Next, bivariate correlations between traits and ODD symptom domains were conducted, shown in Table 3. High negative affect was significantly correlated with all

symptom domains (angry/irritable r = .328, argumentative/defiant r = .341, vindictive r = .309, all $p < .001$). Neither neuroticism, nor perfect circle anger, nor perfect circle sadness were significantly associated with any of the symptom domains (r range -.086-.168, all $p > .05$). Neither effortful control nor gift delay effortful control exhibited significant associations with any of the symptom domains (r range -.144-.048, all $p > .05$). Low conscientiousness was significantly correlated with the angry/irritable symptom domain (r = -.288, $p < .01$), but not with the argumentative/defiant or vindictive symptom domains (r range -.077- -.015). Low agreeableness was associated with the angry/irritable and argumentative/defiant symptom domains (r = -.504, $p < .001$; r = -.242 $p < .05$), but not with the vindictive symptom domain (r = -.120, $p > .05$). Overall, high negative affect, low conscientiousness, and low agreeableness exhibited associations with one or more ODD symptom domains. Based on these results, negative affect, conscientiousness, and agreeableness were chosen as the focus of subsequent analyses.

Table 3

Correlations between temperament and personality traits and symptom domains

	Angry/Irritable	Argumentative/Defiant	Vindictive
Negative affect	.382***	.341***	.309***
Neuroticism	.168	-.028	-.011
Perfect circle anger	-.078	-.070	-.086
Perfect circle sadness	.138	-.059	-.088
Effortful control	-.102	-.141	-.091
Conscientiousness	-.288**	-.077	-.015
Agreeableness	-.504***	-.242*	-.120
Gift delay effortful control	-.110	-.144	.048

* $p < .05$; ** $p < .01$; *** $p < .001$

Specificity of Associations between Traits and Symptom Domains

A series of multiple regression analyses were run to examine specificity of trait associations with ODD symptom domains. All three symptom domains were entered

simultaneously as a set of independent variables to partial out their shared covariance (*r* range .333-.513, all $p < .001$), and each trait (i.e., negative affect, conscientiousness, and agreeableness) was entered as a dependent variable in three separate analyses. As noted in Table 4, results indicated that high negative affect, low conscientiousness, and low agreeableness were specifically associated with the angry/irritable symptom domain (β = .272, $p < .01$; β = -.310, $p < .01$; β = -.490, $p < .001$), but not with the argumentative/defiant or the vindictive symptom domains (β range -.095-.146, all $p > .05$). This suggests that high negative affect, low conscientiousness, and low agreeableness are most specifically associated with the angry/irritable (vs. argumentative/defiant, vindictive) ODD symptom domain.

Table 4

Specificity of associations between temperament and personality traits and symptom domains

Regression Analyses (β)	Angry/Irritable	Argumentative/Defiant	Vindictive
DV			
Negative affect	.272**	.146	.139
Conscientiousness	-.310**	.001	.076
Agreeableness	-.490***	-.095	.072

** $p < .01$; *** $p < .001$

Traits as Predictors of Longitudinal Change in Symptoms

Three repeated measures general linear models (GLM) were run to examine whether traits could predict one-year change in ODD symptom domains. Symptoms for each ODD symptom domain were entered as within-subjects variables at the initial and one-year time points, and traits (i.e., negative affect, conscientiousness, and agreeableness) were entered as the covariates. Neither negative affect, conscientiousness, nor agreeableness significantly predicted change in any of the symptom domains over a

one-year period (F[1,75] range .201-1.224; F[1,69] range .007-2.657; F[1,69] range .014-2.371; all $p > .05$). Therefore, none of the traits significantly predicted change in ODD symptoms over a one-year time period.

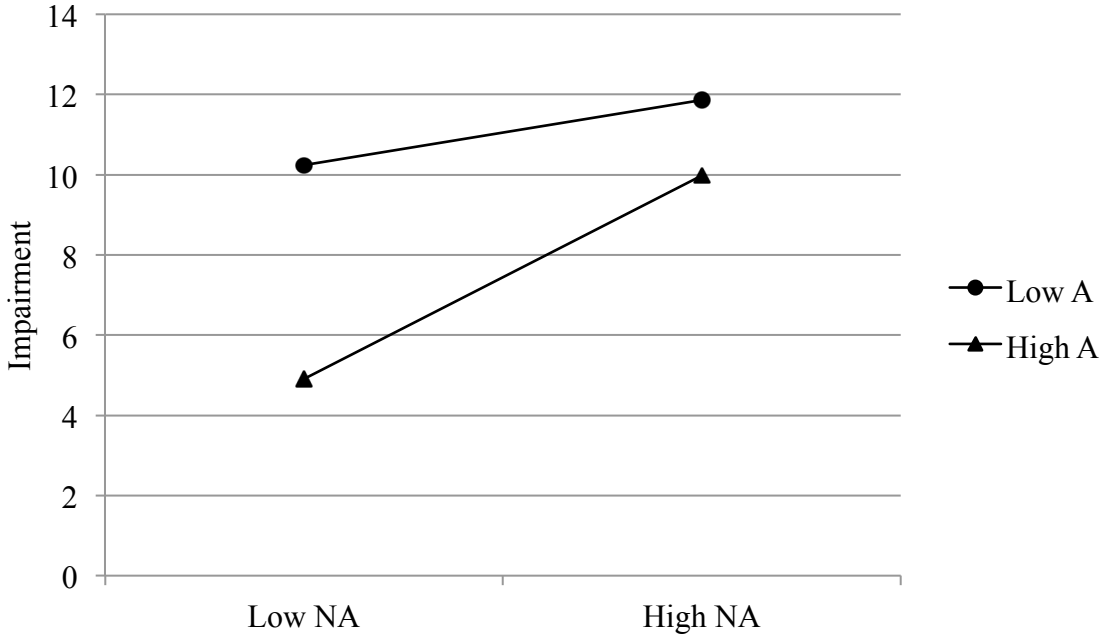
Traits as Predictors of ODD-Related Impairment

In order to examine associations between traits and ODD impairment, bivariate correlations were conducted between traits and ODD-related impairment. High negative affect, low conscientiousness, and low agreeableness were significantly associated with increased ODD-related impairment ($r = .545$, $p < .001$; $r = -.313$, $p < .01$; $r = -.507$, $p < .001$).

Next, hierarchical regression was utilized to examine whether traits interacted in predicting ODD-related impairment. High negative affect, low conscientiousness, and low agreeableness all exhibited significant associations with ODD-related impairment ($\beta = .482$, $p < .001$; $\beta = -.231$, $p < .05$; $\beta = -.507$, $p < .001$). Negative affect and conscientiousness did not significantly interact to predict ODD-related impairment ($\Delta R^2 = .001$, $\beta = .028$, $p > .05$). However, negative affect significantly interacted with agreeableness to predict ODD-related impairment, explaining additional variance in impairment above and beyond negative affect and agreeableness alone ($\Delta R^2 = .052$, $\beta = .233$, $p < .05$). As depicted in Figure 1, low agreeableness was related to increased ODD-related impairment, regardless of the level of negative affect. However, when agreeableness was high, high negative affect (but not low negative affect) was related to increased ODD-related impairment. Therefore, overall, negative affect and agreeableness appear to interact in their prediction of ODD-related impairment.

Figure 1

Interaction between negative affect and agreeableness predicting ODD-related impairment



Secondary Checks

Trait Overlap

Temperament and personality traits and ODD symptoms were examined for item overlap. No items appeared to be overlapping when using a strict verbatim criteria; thus, all items were included in analyses.

Income as a Covariate

Although there were no significant differences in family income based on ODD diagnostic group, there were significant mean differences in ODD symptoms based on family income. Thus, all analyses were conducted a second time covarying income. All significant findings mentioned above survived correction for family income, with the exception of the association between conscientiousness and ODD-related impairment.

When income was covaried, low conscientiousness was no longer significantly associated with ODD-related impairment (β = .006, p = .96).

Positive Affect Traits

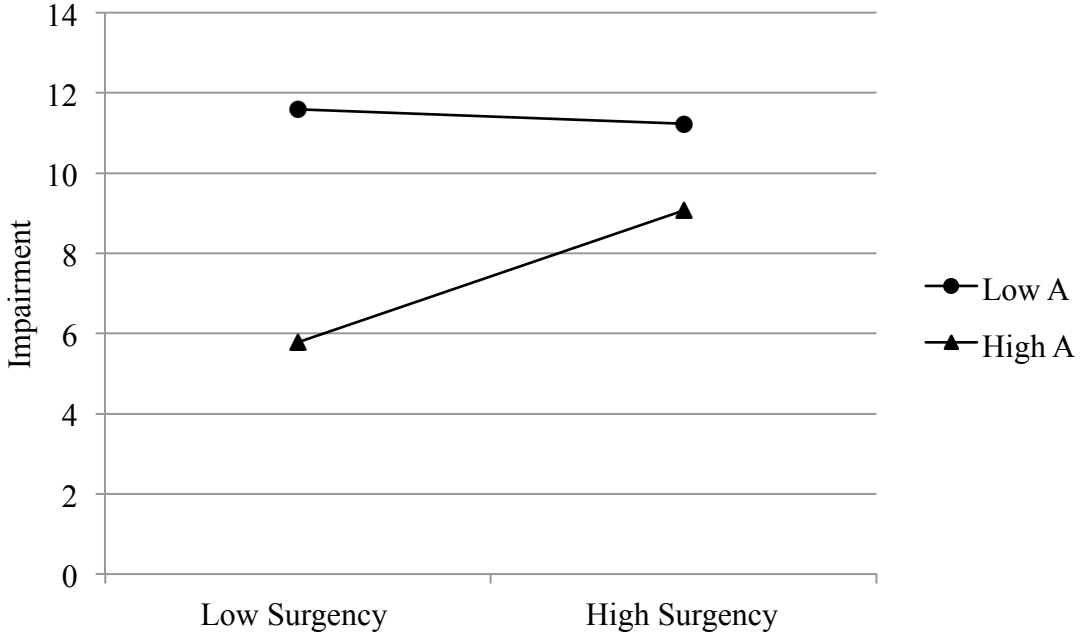
In order to be comprehensive and to test Carver's (2009) idea that anger is an approach-related emotion, associations between positive affect traits and ODD were examined. Bivariate correlations were conducted among temperament and personality traits of surgency, extraversion, and bubbles positive affect. Surgency was significantly associated with extraversion (r = .254, p < .05), but neither surgency nor extraversion was significantly associated with bubbles positive affect (r range .111-.121, p > .05). Extraversion was not significantly correlated with any of the ODD symptom domains (r range = -.026-.059, all p > .05); thus, no further analyses were conducted with extraversion.

Surgency exhibited significant correlations with all three symptom domains (r range .204-.217, all p < .05); however, regression analyses reveal no *specific* significant associations with any of the symptom domains (β range .104-.122, all p > .05). Surgency did not predict change in any of the symptom domains over a one-year time period (F[1,75] range .442-1.109, all p > .05). However, surgency significantly predicted ODD-related impairment (β = .388, p < .001). The interaction between surgency and conscientiousness was not significant (ΔR^2 = .001, β = .024, p > .05), but the interaction between surgency and agreeableness was significant (ΔR^2 = .063, β = .253, p < .05). As depicted in Figure 2, low agreeableness was related to increased ODD-related impairment, regardless of the level of surgency. However, when agreeableness was high, high surgency (but not low surgency) was related to increased ODD-related impairment.

Therefore, surgency and agreeableness appear to interact in their prediction of ODD-related impairment.

Figure 2

Interaction between surgency and agreeableness predicting ODD-related impairment

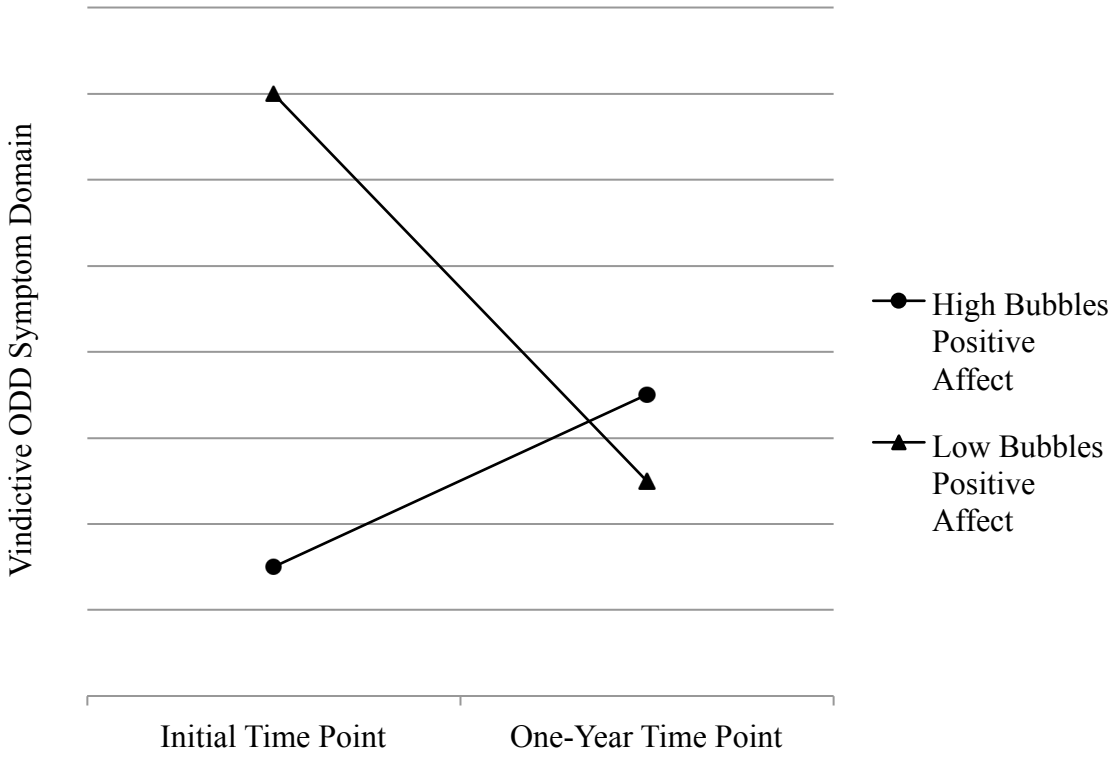


Bubbles positive affect was significantly correlated with the argumentative/defiant symptom domain (r = .279, p < .05), but not with the angry/irritable or vindictive domains (r range -.138- -.065, all p > .05). Regression analyses reveal that there was a specific, significant association between bubbles positive affect and the argumentative/defiant symptom domain (β =-.334, p < .05), but no significant associations with the angry/irritable or vindictive symptom domains (β range .009-.099, all p > .05). As shown in Figure 3, bubbles positive affect predicted change in the vindictive symptom domain over a one-year time period (F[1,55] = 4.393, p < .05), such that lower levels of bubbles positive affect predicted a decrease in the vindictive symptom domain over time, while higher levels of bubbles positive affect predicted an

increase in the vindictive symptom domain over time. Bubbles positive affect did not predict change in the angry/irritable or argumentative/defiant symptom domains over a one-year time period (F[1,55] range .741-3.758, all $p > .05$). Bubbles positive affect significantly predicted ODD-related impairment (β =-.299, $p < .05$), but did not significantly interact with conscientiousness or agreeableness to predict ODD-related impairment (β range ,-.005-.113 $p > .05$). Thus, bubbles positive affect appears to be specifically related to the argumentative/defiant symptom domain, predict changes in the vindictive symptom domain, and predict overall ODD-related impairment.

Figure 3

Bubbles positive affect predicting change in the vindictive ODD symptom domain over a one-year time period



Chapter Four: Discussion

Overall Results of the Study

The goal of this study was to examine the relationship between temperament traits, personality traits, and ODD symptoms in young children to gauge their utility as early assessment tools. Results suggest that temperament and personality traits of negative affect and neuroticism and effortful control and conscientiousness, were – for the most part – not associated with one another in this sample. However, high negative affect, low conscientiousness, and low agreeableness were specifically associated with the angry/irritable (vs. argumentative/defiant, vindictive) symptom domain of ODD. None of these traits were able to explain change in ODD symptoms over a one-year time period. High negative affect, low conscientiousness, and low agreeableness were all significantly associated with ODD-related impairment. Additionally, negative affect and agreeableness interacted to predict more ODD-related impairment above and beyond either of the traits alone, such that when agreeableness was low, impairment was high regardless of the level of negative affect and, when agreeableness was high, high negative affect (but not low negative affect) was associated with higher impairment. Overall, these results suggest that high negative affect, low conscientiousness, and low agreeableness are strongly associated with early ODD symptoms, particularly angry/irritable symptoms, as well as associated impairment, interacting in complex ways.

Temperament and Personality Trait Associations

Although prior research suggests that temperament and personality traits are associated with one another (Digman, 1997; Lahey, 2009; Markon, Krueger, & Watson, 2005), this study did not replicate those associations. In contrast to study hypotheses,

temperament and personality traits associated with negative affect and temperament and personality traits associated with effortful control were not significantly associated with one another in this sample, with the exception of conscientiousness and gift delay effortful control. The lack of associations between related temperament and personality traits may suggest that, in very young children, these constructs are not yet synonymous. Such an idea was borne out by our data that temperament and personality traits often exhibited divergent patterns of associations with ODD symptoms. However, it should be noted that, in the current study, temperament and personality traits were measured using different measures and different raters. Although such multiple-measure, multiple-informant design is considered a study strength, this may have limited our ability to detect associations, particularly with the study's relatively small sample size which may have limited power to detect small effects. Moderate associations between ratings of traits using observational paradigms and questionnaire ratings and between different raters is typical and in line with prior work (Murray & Kochanska, 2002; Valiente et al., 2003). This suggests some cross-situational variability in the manifestation of traits (Mischel & Shoda, 1995). However, these results also suggest that it may be important to look at temperament and personality traits individually, as opposed to viewing them synonymously, particularly in this age range. In line with prior work, effortful control did exhibit significant associations with agreeableness, supporting prior hierarchical models of personality traits that suggest effortful control, or conscientiousness, and agreeableness load together on a higher-level factor (Markon, 2009; Nigg, 2006; Shiner & DeYoung, 2011).

Associations between Traits and ODD Symptom Domains

The results of this study suggest associations between traits and the ODD symptom domains. High negative affect was associated with all three DSM-5 ODD symptom domains, while low conscientiousness was associated with the angry/irritable symptom domain, and low agreeableness was associated with both the angry/irritable and argumentative/defiant symptom domains. These findings support Stringaris and Goodman's (2009) conceptualization of ODD as a disorder of negative affect and, secondarily, low conscientiousness, with a particular role of disagreeableness at lower facet levels of trait hierarchies. This last finding suggests the importance of agreeableness for the development of prosocial behavior and effective management of interpersonal conflict (Eisenberg et al., 1999; Jensen-Campbell et al., 2003), often lacking in ODD.

In line with study hypotheses and consistent with prior theory (Stringaris & Goodman, 2009), high negative affect was more strongly associated with the angry/irritable (vs. argumentative/defiant, vindictive) symptom domain. This is in line with Stringaris and Goodman's (2009) theory, which suggests that ODD may, in fact, be a disorder of negative affect. Results of this study do not support the idea that the argumentative/defiant symptom domain is more strongly associated with effortful control, as there were no associations between effortful control and this ODD symptom domain. However, there were significant associations between low conscientiousness and low agreeableness and the angry/irritable domain, suggesting that anger/irritability may be multiply determined, in line with the concept of equifinality.

Traits as Predictors of Longitudinal Change in Symptoms

Although traits predicted initial levels and perhaps the onset of ODD symptoms, contrary to study hypotheses, neither negative affect, conscientiousness, nor agreeableness significantly predicted one-year change in angry/irritable, argumentative/defiant, or vindictive ODD symptoms. Again, this finding may be explained by a relative lack of power to detect small effects with the current sample size. However, this finding might also be viewed as in line with spectrum models of trait-psychopathology associations, which might suggest that traits would predict initial onset of psychopathology, but not subsequent change (see Martel et al., 2014). Additional studies with larger samples in this age range would be useful for addressing this question.

Traits as Predictors of ODD-Related Impairment

Finally, this study suggests there is an interaction between negative affect and agreeableness in relation to ODD-related impairment. Partially in line with hypotheses, agreeableness, but not conscientiousness, moderated the association between high negative affect and ODD-related impairment. When agreeableness was low, ODD-related impairment was high regardless of the level of negative affect; when agreeableness was high, impairment was higher in the context of negative affect. These results are similar to work by Eisenberg et al. (2009) and particularly Martel, Gremillion, and Roberts (2012), which suggested low effortful control is a primary route to ADHD and negative affect is a secondary pathway. In regard to ODD, current findings suggest that low agreeableness is a primary pathway to increased ODD-related impairment and high negative affect is a secondary pathway.

Positive Affect Traits

Exploratory analyses examining Carver's (2009) idea that anger/irritability is an approach-related emotion suggests that surgency may be related to ODD as well. Study results suggest that surgency was associated with the angry/irritable, argumentative/defiant, and vindictive symptom domain. However, somewhat counterintuitively, a laboratory measure of positive affect, bubbles, was most strongly and specifically associated with the argumentative/defiant (vs. angry/irritable, vindictive) ODD symptom domains. Further, bubbles positive affect predicted change in the vindictive symptom domain over a one-year time period and was able to predict ODD-related impairment. Finally, surgency interacted with agreeableness in the same way as negative affect to predict ODD-related impairment. These results suggest that there may not only be an association between negative affect and ODD, but also between surgency/positive affect and ODD. Surgency/positive affect may help explain risk for the argumentative/defiant and vindictive ODD symptom domains in a way that other traits do not, in line with Carver's (2009) conception. These findings are also in line with prior work on positive affect associations with the hyperactive-impulsive ADHD symptom domain (Martel, 2009; Martel & Nigg, 2006), suggesting that high positive affect may be part of what distinguishes externalizing from internalizing disorders (Kotov, Gamez, Schmidt, & Watson, 2010).

Limitations

It should be noted that, although family income exhibited an association with ODD symptoms, controlling for income did not – for the most part – change study results. The study had a number of strengths, including a well-characterized sample of

children over-recruited for DBD and multiple measures, ratings of traits and clinical symptoms, but it also had several salient limitations. In particular, the relatively small sample size may have limited the ability to detect associations of small effect size between temperament traits, personality traits, and longitudinal change in ODD symptoms. Importantly, since this sample was a community-recruited sample, over-recruited for DBD symptoms in an urban setting, the results may not generalize to other populations; these results should be replicated using other samples. An additional limitation was that a graduate student, and not the child's caregiver, completed the Q-Sort. Although the Q-Sort correlated with other measures completed by parents, research validating the Q-Sort does so under the pretense that the parents are completing it; thus, this could be considered a study limitation. Finally, additional longitudinal follow-up of trait-symptom associations could have been useful.

Clinical Utility

Yet, study results may have clinical utility. For example, study results suggest that it may be useful for clinicians to conduct early assessment of maladaptive variants of negative affect, conscientiousness, and agreeableness in young children at risk for ODD. Since these traits can be reliably identified earlier than ODD itself (Gartstein & Rothbart, 2003), identification of children with extreme traits may be able to lead to earlier identification of children at risk for a disorder with severe public health outcomes, including poor family relations, academic problems, and high comorbidity with other disruptive behavior problems including conduct problems, aggression, and hyperactivity-impulsivity (Spira & Fischel, 2005; Posner et al., 2007; Campbell, Spieker, Burchinal, Poe, & National Institute of Child Health and Human Development Early Child Care

Research Network, 2006). Further, study results suggest that high negative affect and low agreeableness may be useful for predicting the amount of impairment the child is likely to experience, which has real-world implications for the quality of his/her social relationships (Eisenberg et al., 1999; Jensen-Campbell et al., 2003). All in all, early assessment of these traits could be helpful for determining which children are most in need of early intervention for ODD.

Summary

Overall, this study addressed the relationship between temperament traits, personality traits, and ODD symptoms in young children. Study results support Stringaris and Goodman's (2009) theory of ODD by suggesting that it is a disorder of high negative affect and low conscientiousness, but also advance work in this area by additionally highlighting the important roles of low agreeableness and high surgency. While high negative affect and low conscientiousness (and low agreeableness) appear to be particularly associated with angry/irritable ODD symptoms, high surgency appears to be particularly associated with argumentative/defiant and vindictive ODD symptoms. Further, negative affect and surgency appear to interact with agreeableness to predict ODD-related impairment. Collectively, this suggests the importance of the early assessment of these traits in young children in order identify children at high risk for ODD symptoms and impairment in order to guide targeted early intervention.

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Publications

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Presentations

Zastrow, B. L., & Martel, M. M. (2014, May). *ADHD and Risk-Taking Behavior in Young Adults.* Association of Psychological Sciences (APS). San Francisco, CA.

Gremillion, M. L., Tichenor, D., Roberts, B. A., Zastrow, B. L., & Martel, M. M. (2014, May). *Trait Impulsivity Explains the Association between Conscientiousness and ADHD in Young Adults*. Associations of Psychological Sciences (APS). San Francisco, CA.

Mink, S., Tichenor, D. C., Zastrow, B. L, Gremillion, M. L, & Martel, M. M. (2014, April). *Sex Differences in the Association Between Positive Affect and ADHD Symptoms in Young Adults*. National Conference on Undergraduate Research, Lexington, KY.

Tichenor, D. C., Mink, S., Zastrow, B. L., Gremillion, M. L., & Martel, M. M. (2014, April) *Gender Differences in the Association Between Negative Affect and ADHD Symptoms in Young Adults.* National Conference on Undergraduate Research, Lexington, KY.

Zastrow, B. L. (2013, May). *Examining the Compensation Effect in Judgments of Attractive and Unattractive Female Political Candidates*. Midwestern Psychological Association (MPA), Chicago, IL.

Zastrow, B. L. (2013, April). *Depth versus Breadth: The Impact of Differences in Undergraduate Research Experiences on Graduate School Admissions Decisions*. Honors Day at Creighton University, Omaha, NE.

Zastrow, B. L. (2013, March). *Feelings-as-Information Theory and Mood Disorders*. Great Plains Students' Psychological Convention, Omaha, NE.

Zastrow, B. L., Simpson, L. P., Halsey, T. A., & Danielson, J. N. (2012, November). *Effect of Mood on Memory and Self-Esteem*. Psychology Day at Creighton University, Omaha, NE.

Scholastic Honors

Honors Certification in Psychology, Creighton University	May 2013
Honors Seminar in Psychology, Creighton University	August 2012-Dec 2012
Dean's List, Creighton University	Dec 2010-May 2013
Creighton University Honors Program	August 2009-May 2013

Society Memberships

Association of Psychological Science, Graduate Student Affiliate	March 2014-present
Association for Behavioral and Cognitive Therapies, Student Member	Nov 2013-present
Phi Beta Kappa	April 2013-present
Psi Chi	April 2012-present
Order of Omega	Nov 2011-present