

THE IMPACT OF PERSONALITY TRAITS ON OUTCOMES OF CAREGIVERS OF
INDIVIDUALS WITH AUTISM SPECTRUM DISORDER IN THE TRANSITION
PERIOD

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For my parents.

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ABSTRACT

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The study examined the impact of the “big 5” personality traits on caregiver burden during the period when individuals with ASD transition from high school. Participants (N = 117) were caregivers of individuals with ASD who either will graduate within two years or graduated from high school within the past two years. Participants completed questionnaires measuring study variables predicted to be associated with caregiver burden as guided by the Double ABCX model of family adaptation, i.e., autism symptom severity, problem behaviors, pile-up of life demands, personality traits, social support, cognitive appraisals, and coping strategies. Primary caregivers reported moderate burden in the transition period. Specifically, although caregivers experienced stress in the transition period, they were less overwhelmed than the period when one’s child first receive the ASD diagnosis. Increased problem behaviors, higher neuroticism, lower extraversion, conscientiousness, and agreeableness, lower levels of social support, fewer use of challenge appraisals, and greater use of threat appraisals and passive-avoidance coping strategies predicted greater caregiver burden. Passive-avoidance coping mediated the relationship between caregiving stress and four personality traits respectively (i.e., neuroticism, extraversion, conscientiousness, and agreeableness). The results support the potential importance of personality traits in explaining differences in caregiver stress in families of those with ASD and further indicated that the association between personality and burden was mediated by caregivers’ use of maladaptive coping strategies, i.e., passive-avoidance coping. The findings also have potential applicability for interventions to reduce caregiver burden. Several factors were identified that could help alleviate the stress. For example, parents should be encouraged to avoid

using threat appraisals and passive-avoidance coping strategies. In addition, interventions could be developed to provide support or strategies to parents to handle child's behavioral problems and thus reduce stress.

1. INTRODUCTION

According to the Center for Disease Control and Prevention, one in 68 children in the United States has been identified with autism spectrum disorder (ASD; Centers for Disease Control and Prevention, 2014). Raising children with ASD is a challenge for families, especially for the primary caregivers. Caregivers of individuals with ASD report increased psychological distress and negative emotions (e.g., fear, anger, and resentment), and poorer health-related outcomes (Benson & Kersh, 2011; Hayes & Watson, 2013). This constellation of experiences has been characterized as caregiver burden, “the extent to which caregivers perceive that caregiving has had an adverse effect on their emotional, social, financial, physical, and spiritual functioning” (Adelman, Tmanova, Delgado, Dion, & Lachs, 2014, p. 1053). Moreover, compared to caregivers of typically developing children (Dunn & Burbine, 2001) and caregivers of individuals with other disabilities (e.g., fragile X syndrome, Down syndrome, Attention Deficit Hyperactive Disorder), caregivers of individuals with ASD experience greater burden (Abbeduto et al., 2004). Several factors contribute to the increased burden. These factors can be roughly divided into three general areas: child characteristics (e.g., autism symptom severity, problem behaviors), family-related factors (e.g., number of children with ASD in the family, marital quality, social support), and caregiver characteristics (e.g., locus of control, optimism, coping strategies, appraisal styles) (Bekhet, Johnson, & Zauszniewski, 2012; Ekas, Lickenbrock, & Whitman, 2010; Karst & van Hecke, 2012; Tobing & Glenwick, 2006).

A variety of child characteristics have been associated with increased burden and stress. These characteristics have in common that they make caring for the child more difficult. Such characteristics include greater autism symptom severity (Abbeduto et al., 2004; Hastings & Johnson, 2001; Stuart & McGrew, 2009; Vogan et al., 2014), increased problem behaviors (Davis & Carter, 2008; Hastings et al., 2005; Manning, Wainwright, & Bennett, 2011), psychological comorbidities (e.g., depression and anxiety) (Cadman, et al., 2012; Vo-

gan et al., 2014), lower adaptive functioning level (Hall & Graff, 2011), poor self-regulation (e.g., eating, sleeping, and emotion regulation) (Davis & Carter, 2008), older age (Smith, Seltzer, Tager-Flusberg, Greenberg, & Carter, 2008), and lower IQ (e.g., Koegel et al., 1992; Kring et al., 2008).

For example, autism symptom severity (e.g., social and communication abilities) has been shown to be related to caregiver burden in several studies. Stuart and McGrew (2009) examined caregiver burden in 78 primary caregivers of children with ASD shortly after receiving the initial diagnosis of ASD and found that greater symptom severity was related to higher levels of both individual and family burden. Autism symptom severity also has been associated with poorer maternal adjustment and increased depression and anxiety (Pakenham, Samios, & Sofronoff, 2005) in mothers of children with Asperger syndrome and associated with increased parenting stress and depression (Ingersoll & Hambrick, 2011).

The child characteristic with the most consistent impact on stress is problem behaviors (Davis & Carter, 2008; Hastings et al., 2005; Manning et al., 2011). Problem behaviors such as noncompliance, hyperactivity, self-injury, aggression, ritualism, irritability, and tantrums pose particularly difficult challenges for the caregivers. For example, Abbeduto and colleagues (2004) examined maternal well-being in mothers of adolescents and young adults with Down syndrome, fragile X syndrome, and autism. Mothers of adolescents and young adults with autism were more likely to report depressive symptoms, and problem behaviors predicted greater maternal pessimism and maternal depressive symptoms. Similarly, Lecavalier, Leone, and Wiltz (2006) studied parents and teachers of children and adolescents with ASD found that problem behaviors, such as disruptive and rule-breaking behaviors, were strongly associated with parent and teacher stress. Problem behaviors also tend to be the strongest predictors of caregiver stress. For example, Hastings and colleagues (2005) examined three child characteristics (adaptive skills, autism symptoms, problem behaviors) and reported that only child problem behavior was a predictor of maternal stress in parents of pre-school children with autism. Similarly, Manning and colleagues (2011) noted that child problem behaviors may be the strongest independent predictor of parenting

stress, “explaining” the impact of other predictors such as life stress and autism symptom severity on parent stress.

Another area influencing caregiver burden concerns family-related factors, such as marital quality, number of children with ASD in the family, and resources. For instance, parents of adolescents and adults with ASD who express less marital satisfaction also tend to report greater burden (Barker et al., 2011). Poor marital quality also has been negatively related to caregivers’ ability to cope with stress (Siman-Tov & Kaniel, 2011). Similarly, families having more than one child with ASD are likely to have lower life satisfaction and report lower levels of well-being (Ekas & Whitman, 2010). Raising a child with ASD also requires a substantial financial commitment from the family. “... [The] recent estimates of economic impact on families of raising a child with an ASD [are] at approximately three to five million dollars more than a typically developing child” (Karst & van Hecke, 2012, p. 254). Not surprisingly, then, inability to afford services can be a significant predictor of caregiver burden in parents of individuals with ASD (Vogan et al., 2014).

One particularly important family-related factor is social support. Social support refers to emotional and instrumental assistance from others. It has been well studied as a stress buffer and has consistently been shown to be related to caregiver burden (Bristol, 1987; Dunn & Burbine, 2001; Gill & Harris, 1991; Stuart & McGrew, 2009). Higher levels of perceived social support and higher satisfaction with social support have been shown to predict better mental health-related quality of life and lower maternal distress among caregivers of individuals with ASD (Bekhet et al., 2012; Ekas et al., 2010; Khanna et al., 2011; Smith, Greenberg, & Seltzer, 2012; Tobing & Glenwick, 2006). For example, greater social support from family (e.g., children, own and partner’s parents, relatives), friends, and partners was related to lower levels of parenting and maternal stress, increased life satisfaction, and better psychological well-being (Bromley, Hare, Davison, & Emerson, 2004; Ekas et al., 2010). Social support that is specific to autism may also be helpful (e.g., support from physicians, therapists, or others within the autism-community). For example, Stuart and McGrew (2009) reported that both increased general social support and autism-specific social support were associated with lower levels of caregiver burden.

With respect to caregiver characteristics, several factors have been shown to be related to burden, including parent's gender, education, parenting self-efficacy, appraisal styles, coping strategies, and personality traits (e.g., locus of control, sense of coherence, optimism) (Abbeduto et al., 2004; Davis & Carter, 2008; Dunn & Burbine, 2001; Ekas et al., 2010; Hastings, Kovshoff, Brown, et al., 2005; Siman-Tov & Kaniel, 2011; Stuart & McGrew, 2009). For example, in parents of children with ASD, mothers have reported higher levels of stress than fathers (Hasting, Kovshoff, Brown, et al., 2005); lower maternal education has been related to mothers' pessimism (Abbeduto et al., 2004); and greater parenting involvement has been associated with higher levels of maternal stress (Tehee, Honan, & Hevey, 2009). Before discussing other caregiver characteristics related to burden (i.e., appraisal styles, coping strategies, and personality factors) and to provide a theoretical framework for the discussion, first I will introduce the Lazarus and Folkman's Stress and Coping Model.

1.1 Lazarus and Folkman's Stress and Coping Model (1984)

Two caregiver characteristics of particular concern to the current study are cognitive appraisal styles and coping strategies. Lazarus and Folkman's stress and coping model (1984) provides the fundamental theoretical basis for the exploration of these two factors (Mackay & Pakenham, 2012). According to Lazarus and Folkman (1984), individuals' experience of stress is not based solely on the stressor (the event) but on how they evaluate or appraise the stressor. Lazarus and Folkman (1984) identified two forms of appraisal: primary appraisal and secondary appraisal. Primary appraisal refers to an individual's evaluation of a situation as personally relevant or not (i.e., will it impact me), as well as whether they view a relevant situation more positively (challenging) or negatively (threatening). Secondary appraisal is the judgment individuals make about the resources required to minimize or tolerate a relevant stressor and the stress it produces. In other words, secondary appraisal identifies what coping options might be available to use and influence the situation. Primary appraisal works together with secondary appraisal. For example, in the case of a situation

judged as threatening (primary appraisal), if the individual believes that sufficient resources are available to mitigate the threat (secondary appraisal), the person will experience little subjective stress, whereas if the person believes that resources are not available, (s)he may experience high subjective stress.

1.1.1 Cognitive Appraisal

As noted above, stress is an interactive and subjective process that develops from individuals' appraisals of available resources and environmental stressors. When individuals determine that environmental demands exceed their resources and threaten their well-being, stress results (Lazarus & Folkman, 1984; Mackay & Pakenham, 2012). According to Lazarus and Folkman (1984), for a relevant stressor, in general, a challenge appraisal (e.g., viewing the stressor as an opportunity) should reduce perceived stress and thus be related to reduced stress (e.g., caregiver burden), whereas a threat appraisal (e.g., viewing the stressor as potentially threatening) should increase perceived stress and lead to increased stress (e.g., caregiver burden) (Lazarus & Folkman, 1984; Stuart & McGrew, 2009).

Consistent with Lazarus and Folkman's theory, previous research in ASD has demonstrated that parental cognitive appraisal styles are related to caregiver burden (Manning et al., 2011; Pakenham, Samios, & Sofronoff, 2005; Stuart & McGrew, 2009). For example, higher levels of challenge appraisal have been associated with lower levels of parent stress in families of school-aged children with ASD (Manning et al., 2011). Similarly, parents who appraised the ASD diagnosis more negatively reported higher levels of individual, marital, and family burden (Stuart & McGrew, 2009), and maternal adjustment was poorer in mothers of children with Asperger syndrome with higher levels of stress appraisal (Pakenham et al., 2005).

1.1.2 Coping Strategies

Coping, the other main factor in the Lazarus and Folkman model (1984), refers to the thoughts and behaviors people use to manage the internal and external demands of stressful

events. When individuals conclude that environmental stressors have overwhelmed their resources, they engage in coping mechanisms to restore well-being. If coping mechanisms are helpful, they mitigate stress. However, if the individual's coping mechanisms are either maladaptive or cannot meet the new demands, the outcome is stress (Hayes & Watson, 2013). Coping methods can be grouped into two general categories, problem-focused coping and emotion-focused coping. Individuals who engage in problem-focused coping aim at problem solving or initiate actions to alter the situation, such as planning or taking action to address the problem, whereas individuals who engage in emotion-focused coping aim at reducing or managing feelings of distress associated with the stressor, such as denying or delaying focus on the problem, focusing on and venting of emotions associated with the stressor, or using other means to reduce the effects of the stressor (Abbeduto et al., 2004). In general, problem-focused coping tends to be associated with lower levels of psychological distress (Abbeduto et al., 2004; Benson, 2010; Dunn & Burbine, 2001). For example, Abbeduto and colleagues (2004) found that mothers of adolescents and young adults with ASD who used problem-focused coping (e.g., planning) reported less depressive symptoms than mothers who practiced emotion-focused coping (e.g., denial, avoidance).

However, findings relate to the impact of emotion-focused coping have been mixed. For instance, in the ASD literature, certain emotion-focused coping strategies, such as positive reframing, have been shown to be unrelated to maternal depressed mood (Benson, 2010) or to predict lower levels of parenting stress (Manning et al., 2011), whereas other emotion-focused coping strategies, such as avoidance, have been shown to be associated with more anxiety and depression symptoms in caregivers of children with ASD (Hastings et al., 2005). As a result, emotion-focused coping is often further subdivided into emotional approach (e.g., positive reappraisal) and passive avoidance coping strategies (e.g., substance use, behavioral disengagement, denial, or avoidance) (Stuart & McGrew, 2009). Caregivers who positively restructure or reframe their perceptions about the stressors tend to report lower levels of burden. For example, Hastings et al. (2005) found that parents of children with ASD who used more positive reframing and humor reported less depressive symptoms. In contrast, caregivers who use passive avoidance coping tend to report greater burden. For

instance, Stuart and McGrew (2009) found that caregivers who used problem-focused or emotional approach coping reported lower levels of marital burden than caregivers who employed passive avoidance coping.

1.2 Gaps in the Literature

1.2.1 Personality Traits

Lazarus and Folkman (1984) also note that personality factors can impact appraisal, coping, and thus stress. They note that a range of personal characteristics, such as values, commitments, goals, and beliefs about oneself and the world, helps define individuals' interpretation of stressful encounters. Moreover, the appraisal styles and coping strategies individuals choose are often related both to environmental conditions and personality characteristics. In this regard, several "positive" personality traits (e.g., locus of control, sense of coherence, optimism) have been examined and found to be influential in caregiver burden in ASD. For example, Ekas et al. (2010) found that higher levels of optimism were related to lower levels of maternal depression, life satisfaction, and psychological well-being. Similarly, internal locus of control has been reported to be related to lower levels of depression and social isolation (Dunn & Burbine, 2001). Also, Pisula and Kossakowska (2010) reported that compared to parents of typically developing children, parents of children with ASD had a weaker sense of coherence, which was related to lower levels of positive reframing.

Although the above provides some insight into the impact of personality on burden, surprisingly, to my knowledge, no research has examined the impact of the "big 5" personality traits (Costa & McCrae, 1992; Goldberg, 1999) on stress appraisal, coping, or stress outcomes in this population. The "big 5" personality traits include neuroticism, extraversion, conscientiousness, openness, and agreeableness (Goldberg, 1990). Neuroticism refers to individuals whose negative emotions and feelings are easily overwhelmed by stressful experiences. Extraversion refers to persons with high levels of activity, sociability, and a greater tendency to experience positive emotion. Conscientiousness identifies individ-

uals who tend to follow social norms for impulse control, task, and goal direction, who are planful, engage in more health promoting behaviors, and report a sense of competence and confidence. Openness refers to persons who are able to adjust to novel situations, and agreeableness refers to those with interpersonal tendencies towards altruism and a willingness to cooperate with others (Bogg & Roberts, 2004; Löckenhoff, Duberstein, Friedman, & Costa, 2011).

As noted above, studies of the impact of the “big 5” personality traits on caregiver burden in ASD literature are absent. However, studies that have examined burden in caregivers of people with other disabilities have shown that some of these “big 5” personality traits, especially neuroticism, extraversion, and conscientiousness, are predictive of stress. For example, several studies have found that Dementia caregivers high in neuroticism report poorer outcomes, including greater caregiver burden, depression, poor mental health, and more health complaints (Campbell et al., 2008; Van Der Lee & Bakker, 2014; Melo, Maroco, & De Mendonça, 2011; Reis, Gold, Andres, Markiewicz, & Gauthier, 1994; Shurgot & Knight, 2005). In contrast, both extraversion and conscientiousness have been related to improved outcomes. Specifically, studies have found that Dementia caregivers high in extraversion report better health, more satisfaction from social support, decreased burden, and higher use of adaptive coping strategies (Löckenhoff et al., 2011; Melo et al., 2011; Reis et al., 1994). Similarly, caregivers of older adults with multiple functional impairments high in conscientiousness have reported better physical and mental health (Löckenhoff et al., 2011). In contrast, little to no evidence supports the relationship between traits of agreeableness and openness and either positive or negative caregiver outcomes. As a result, the current study focused on only three of the five personality traits: neuroticism, extraversion, and conscientiousness.

Although, the relationships between caregiver burden and personality traits are well supported in the dementia literature (Lee et al., 2012; Melo et al., 2011; Reis et al., 1994; Shurgot & Knight, 2005), this relationship has not been examined in caregivers of individuals with ASD. However, there has been one study of the “big 5” personality traits in caregivers of individuals with developmental disabilities, of which ASD is one example.

Jobe and Glidden (2008) examined caregivers of children with developmental disabilities in the transition period and found that neuroticism predicted more transition-related worries and fewer transition-related rewards, whereas extraversion predicted fewer worries and more rewards. However, because this study did not focus on ASD, its relevance for ASD is limited. In addition to being noteworthy for its focus on personality, the study by Jobe and Glidden (2008) is also noteworthy for its focus on the transition period, which is often a time of increased stress.

1.2.2 The Transition Period

The literature on caregiver burden has focused mainly on parents of young children with ASD, particularly school-aged children (Casey et al., 2012; Hayes & Watson, 2013; Hoffman, Sweeney, Hodge, Lopez-Wagner, & Looney, 2009) when examining burden or adjustment of the family. However, ASD is a life-long neurodevelopmental disorder that persists into adolescence and adulthood. “Approximately 96% of those diagnosed with an ASD as children still warrant diagnosis in young adulthood” (Cadman, Eklund, et al., 2012, p. 879). Moreover, the level of impairment in adulthood tends to reflect the same severity as found in childhood (Ballaban-Gil, Rapin, Tuchman, & Shinnar, 1996; Cadman, Eklund, et al., 2012). Importantly, adult individuals with ASD still require help and care and typically have poor outcomes. For example, Howlin and colleagues (2004) followed individuals with autism from seven years old to adulthood. Although a minority of adults had relatively high levels of independence, most individuals remained very dependent on their family or other support services. Few lived alone, had close friends, or found permanent employment (Howlin, Goode, Hutton, & Rutter, 2004). Adult individuals with ASD also often report high unemployment rate, frequent job losses, and underachievement in education (Cadman, Eklund, et al., 2012; Howlin et al., 2004). Therefore, it is reasonable to posit that caregiver burden is likely to continue to be elevated across the lifespan.

Stress is not constant but tends to wax and wane. Starting from the time of diagnosis, the family and child with ASD will face a series of critical transitioning points during

which burden may be particularly high (e.g., receiving a formal diagnosis, starting school, finishing high school, transitioning from school-based services to adult services) (Cadman, Eklund, et al., 2012; Stuart & McGrew, 2009). Accordingly, transition periods present unique and challenging times with potentially increased caregiver stress. For example, Stuart and McGrew (2009) examined caregiver burden and family functioning shortly after children were formally diagnosed with ASD and concluded that caregivers reported high individual, marital, and family burden during this period and that burden continued to be high one year later (McGrew & Keyes, 2014). Nevertheless, few studies have explored caregiver burden during other critical transition periods. The current study seeks to examine caregiver burden during the transition period when individuals with ASD graduate from mandated public educational services and move to adult living.

This transition period “is of particular developmental significance because it encompasses the launching phase into young adulthood” (Blacher, 2001, p. 173). Moreover, the transition out of high school can be an especially stressful time for caregivers. Children may seek increased independence but still exhibit dysfunctional behaviors, caregivers as well as the person with ASD are facing increased uncertainties and challenges (Blacher, 2001), and parents may be asked to take on multiple roles (e.g., collaborators, decision makers, evaluators, and role models), yet they often do not feel well equipped to deal with these heightened levels of responsibility (Bianco, Garrison-Wade, Tobin, & Lehmann, 2009; Jobe & Glidden, 2008). Moreover, caregivers often must cope with limited resources and extra demands, with increased intensity relating to time, effort, and complexity of their involvement (Bianco et al., 2009; Cadman, Eklund, et al., 2012; Chambers & Hughes, 2004; Hanley-maxwell, Whitney-thomas, & Pogoloff, 1995).

There is a developing literature exploring the experiences of parents of those with disabilities during the transition to adulthood. For example, Chambers and Hughes (2004) interviewed eight parents of high school students with cognitive disability regarding their perspectives on the transition to adulthood. Parents reported that their children would most likely live with them and that parents would be very involved in decision-making regarding future residential placement and assisting with daily activities. However, there also was

great uncertainty. All eight parents interviewed mentioned that they were not familiar with the post-secondary education options for people with disabilities. In one of the few studies of caregiver burden during the transition period to adulthood, Lounds et al. (2007) examined maternal well-being in mothers of children with ASD aged 13 to 22 in a longitudinal study and found that declines in problem behaviors predicted subsequent declines in maternal anxiety and depressive symptoms. In contrast to predictions, depression was reduced for mothers whose children transitioned out of high school during the study period. Lounds and colleagues (2007) speculated that the successful transitions (i.e., receiving postsecondary education, employment, sheltered vocational services) in most of the young adults in the sample contributed to the surprising results, which could hardly be generalized to all the families undergoing the transition period. More recently, Cadman and colleagues (2012) recruited 192 families of individuals aged 14 to 24 diagnosed with either ASD or ADHD and reported that caregiver burden was greater in ASD than ADHD, and that comorbid psychiatric symptoms and problem behaviors were associated with greater caregiver burden. Parents' appraisals of children's unmet care needs (e.g., child's social relationship, mental health problems, safety of self, and communication) were also associated with greater caregiver burden. In addition, as noted earlier, Jobe and Glidden (2008) reported increased transition-related worries and decreased transition-related rewards among parents who were high in neuroticism and low in extraversion.

In summary, there are very few studies investigating the potential impact of the critical adolescence to adult transition period on burden of caregivers of individuals with ASD. In addition, as noted earlier, no studies have examined the impact of "big 5" personality traits on caregivers of those with ASD. The current study attempted to address these gaps by examining the role of personality traits (i.e., neuroticism, extraversion, conscientiousness) on caregiver burden during the period when their children with ASD transition out of high school.

1.3 The Current Study

1.3.1 The Double ABCX Model (McCubbin & Patterson, 1983)

One widely used model for investigating family functioning/adaptation to stressful circumstances is the Double ABCX model of family adaptation (McCubbin & Patterson, 1983). Hill (1949) developed the original ABCX family crisis model, which proposes that three components, A, a stressor, B, existing resources, and C, perception of the stressor, interact together to determine whether there will be X, a crisis. McCubbin and Patterson (1983) modified the model with application to family adaptations for managing stressful situations (Manning et al., 2011; McStay, Trembath, & Dissanayake, 2014). The Double ABCX model begins with the stressor: an initial life event or transition that impacts the family (a major stressor) (A) and adds the pile-up of demands, including other stressors and strains such as hardships created by the initial stressor (aA). The next component in the model is the existing and expanded family resources for meeting the demands and needs. Both internal resources (B) (e.g., characteristics of family members, personality traits), and external resources (bB) are included (e.g., social support or finances). The meaning the family or family member assigns to the situation is the next main factor, including the family's appraisal of the situation (e.g., threatening or challenging) (C) and coping strategies (cC). Lastly, the outcome variable indexes the level of family adaptation/functioning resulting from the interaction of the other factors (X).

Several studies of caregiver burden have used the Double ABCX model to examine family functioning in raising children with ASD (Bristol, 1987; Hall & Graff, 2012; Manning et al., 2011; McStay et al., 2014; Pakenham, Samios, & Sofronoff, 2005; Pozo, Sarriá, & Brioso, 2013; Stuart & McGrew, 2009). For example, Manning and colleagues (2011) examined the impact of severity of autism symptoms, problem behaviors, social support, coping strategies, and appraisal styles on parental distress and family functioning, applying the Double ABCX model as the framework. The results indicated that more problem behaviors and lower levels of challenge appraisal predicted higher levels of parental distress. Similarly, Stuart and McGrew (2009) examined caregiver burden shortly after children were

diagnosed with ASD, utilizing the Double ABCX model. Greater child symptom severity, pile-up of demands, passive avoidance coping, negative appraisal style, and reduced social support were associated with greater burden.

The current study adopted the Double ABCX model (McCubbin & Patterson, 1983) as a framework (see Figure 1). The primary research question was to examine the potential impact of caregivers' personality traits on caregiver burden during the transition period. The sections below discuss the four areas of the Double ABCX model (i.e., the stressors and the pile-up of demands, internal and external resources, caregiver appraisals and coping strategies, and the outcome), and the specific variables that were included in the study.

Symptom Severity and Problem Behaviors (A)

Recall that A in the Double ABCX Model refers to the stressor. As reviewed earlier, the key factors impacting caregiver perceptions of stress when caring for children with ASD are symptom severity and problem behaviors. For example, a variety of studies have shown that caregiver burden is greatest in children with higher levels of symptom severity and more problem behaviors, e.g., aggressive and self-injurious behaviors, lack of verbal communication, or impairment in social activities (Abbeduto et al., 2004; Bekhet et al., 2012; Ekas et al., 2010; Manning et al., 2011; Stuart & McGrew, 2009). Accordingly, in the current study, I assessed autism symptom severity and problem behaviors and hypothesized that burden in the transition period would be higher for caregivers of children with severe autism symptoms and more problem behaviors (DH1 & 2).

Pile-up of Demands (aA)

The Double ABCX model suggests that families do not experience a single general stressor, but also experience the pile-up of life demands. Specific to the transition period, caregivers may be confronted with increased financial demands, increased health concerns both of the child and of the caregivers themselves, and of the need to take more time off from work. Greater pile-up of demands has been associated with poor outcomes in caregivers of

individuals with ASD (Pakenham et al., 2005; Stuart & McGrew, 2009). Accordingly, in the current study, I measured additional life stressors and hypothesized that caregivers with higher pile-up of demands would also report greater caregiver burden (DH3).

Personality (B)

This section of the Double ABCX model refers to internal resources. Recall that personality was included as an internal resource. Specifically, I focused on examining caregivers' "big 5" personality traits as the internal resources factor. As mentioned earlier, studies examining the effect of personality traits on caregiver burden in ASD are scarce. However, the literature addressing caregiver burden in other populations has shown that neuroticism, extraversion, and conscientiousness are related to burden. Therefore, in the current study, I assessed neuroticism, extraversion and conscientiousness and hypothesized that caregivers who exhibit high levels of neuroticism would report greater burden (DH4), whereas caregivers who are high in extraversion or conscientiousness would report lower levels of burden (DH5 & 6).

Social Support (bB)

This section of the model refers to external resources that support caregivers in adapting to the stressor. An important external resource is social support. Social support has been studied extensively as a stress buffer. As noted earlier, for caregivers of children with ASD, higher levels of perceived social support have predicted better mental health-related quality of life and lower maternal distress (Barker et al., 2011; Bekhet et al., 2012; Ekas et al., 2010; Khanna et al., 2011; Smith et al., 2012; Tobing & Glenwick, 2006). Moreover, autism-specific support also has been related to decreased caregiver burden (Stuart & McGrew, 2009). In the current study, I assessed both general and autism-specific social support and hypothesized that greater levels of perceived social support would predict lower levels of caregiver burden (DH7).

Cognitive Appraisal (C)

This section of the model refers to the meaning assigned to the stressor by the family or caregivers. As discussed earlier, in assessing meaning making, I would focus on the primary stress appraisal: an individual's evaluation of a situation as challenging (challenge appraisal) or threatening (threat appraisal). Recall that prior studies of caregivers of those with ASD reported that a challenge appraisal was related to reduced caregiver burden, whereas a threat appraisal was associated with increased caregiver burden (Manning et al., 2011; Pakenham et al., 2005; Stuart & McGrew, 2009). Accordingly, in the current study I measured types of primary appraisal (challenge vs. threat) and hypothesized that challenge appraisal would lead to less caregiver burden (DH8), whereas threat appraisal would lead to greater caregiver burden (DH9).

Coping Strategies (cC)

This section of the model refers to what the caregiver does in response to the stressor. As noted earlier, problem-focused coping and emotion-focused coping (emotional approach and passive avoidance) were examined in this study. Consistent with previous studies (Abbeduto et al., 2004; Benson, 2010; Dunn & Burbine, 2001; Hastings et al., 2005; Manning et al., 2011), I hypothesized that caregivers who tend to use problem-focused coping or emotional approach coping would report less caregiver burden (DH10 & 11), whereas those who tend to use passive avoidance coping would report greater caregiver burden (DH12).

Caregiver Burden (X)

This section of the model refers to the adaptational outcomes for the caregiver and family. Raising a child with ASD could influence several aspects of caregivers' lives. For example, the high demands and stressors may impact at the individual level, such as burden, sickness, mental health problems, embarrassment, stigma, or less investment in other

personal roles. Stress also may impact on the family level, such as the marital relationship. The main outcome of the current study were on the individual level examining caregiver burden.

1.3.2 Hypotheses

Direct Hypotheses (DH)

Direct hypotheses refer to those that predict a direct bivariate relationship between one of the predictors from the Double ABCX Model and the primary outcome. To summarize, the direct hypotheses posit that caregiver burden would be higher: 1) when autism symptom severity, problem behaviors, and pile-up of demands are greater, 2) for individuals high in neuroticism and low in extraversion or conscientiousness, 3) for individuals with lower levels of perceived social support, 4) for individuals who tend to use more threat appraisals and fewer challenge appraisals, and 5) for individuals who tend to use more passive avoidance coping and less problem-focused coping or less emotional approach coping (DH1 – DH12).

Indirect Exploratory Hypotheses (IH)

I was also interested in how personality might impact outcomes indirectly. For example, Mak, Ho, and Law (2007) found that sense of coherence, a “healthy” trait or personality style, moderated the relationship between child’s autism symptoms and mothers’ parenting stress. Specifically, mothers with a stronger sense of coherence perceived lower levels of stress even when their children presented with more severe autism symptoms. Similarly, in the current study, an exploratory moderation analysis was conducted to determine if neuroticism, extraversion, and conscientiousness moderate the relationship between the stressors and caregiver burden. Specifically, I hypothesized that the relationship between stressor severity and burden would be moderated by trait strength. That is, the direct association between stressor severity (i.e., autism symptom severity, problem behaviors, or

pile-up of demands) and burden would be moderated (decreased) only for those with high levels of extraversion or conscientiousness or low levels of neuroticism traits. Caregivers low in neuroticism or high in extraversion or conscientiousness would exhibit a decreased association between stressor severity and burden (IH1).

I was also interested in potential mediators of the relationships between personality traits and burden. For example, according to studies of the role of personality traits in caregiver burden in dementia, social support is a potential mediator. Specifically, neuroticism is related to less perceived social support, as well as to greater burden (Shurgot & Knight, 2005), whereas extraversion is related to greater social support satisfaction and to better outcomes (Reis et al., 1994). Although mediation was not formally tested, it is plausible that the association between personality and burden was mediated by perceived differences in social support. Therefore, I tested the exploratory hypotheses that neuroticism and extraversion affect caregiver burden through perceived social support.

Specifically, I hypothesized that decreased social support would mediate the relationship between high levels of neuroticism and increased caregiver burden (IH2). Second, I predicted that increased social support would mediate the relationship between high levels of extraversion and decreased caregiver burden (IH3). Because there are no reliable studies of the relationship between conscientiousness and social support, I did not make a prediction concerning a potential mediation effect of social support on conscientiousness and caregiver burden.

Studies also have shown that individuals with high levels of neuroticism tend to practice passive avoidance coping and threat appraisal, whereas individuals high in extraversion are more likely to use problem-focused coping (Connor-Smith & Flachsbart, 2007; David & Suls, 1999; Penley & Tomaka, 2002; Schneider, Rench, Lyons, & Riffle, 2012). Additionally, conscientiousness is related to increased use of problem-focused coping and decreased use of threat appraisal (Connor-Smith & Flachsbart, 2007; Penley & Tomaka, 2002). Accordingly, I hypothesized that coping strategies and appraisal styles also would mediate the relationship between personality traits and caregiver burden. Specifically, I hypothesized that increased use of passive avoidance coping or threat appraisal would mediate the rela-

tionship between high levels of neuroticism and increased caregiver burden (IH4 & IH5). I also hypothesized that increased use of problem-focused coping, emotional approach coping, or challenge appraisal would mediate the relationship between decreased burden and high levels of extraversion (IH6, 7, & 8) and conscientiousness (IH9, 10, & 11).

2. METHOD

2.1 Participants

A total of 171 caregivers of individuals with ASD transitioning from high school were recruited for the study. Participants were recruited using a variety of methods, including contacting state and national organizations, advertising on listservs, or distributing flyers to local events. I also utilized Amazon Mechanical Turk (MTurk), an increasingly popular website that researchers use to conduct online experiments and to recruit participants. Those recruited through MTurk were paid five dollars for their participation. Participants were the parent of an individual with ASD who either (1) will graduate within two years or (2) has graduated from high school within the past two years. The child's ASD status was confirmed both by a formal diagnosis from a licensed psychologist or a psychiatrist and by scores on the Social Communication Questionnaire (SCQ) consistent with the presence of ASD (SCQ score >11). The demographics for the final participant sample is presented in the Results.

2.2 Design

This was a cross-sectional observational study. The primary caregivers of individuals with ASD completed questionnaires online through an electronic survey program, Qualtrics, and data were analyzed using SPSS. The dependent variable was caregiver burden, and the independent variables were ASD symptom severity, problem behaviors, transition-related demands, pile-up of demands, caregivers' personality traits, social support, caregivers' appraisal styles, and coping strategies.

2.3 Measures

Demographic information was collected from participants (i.e., child's age and gender, diagnosis, comorbid disorders, and graduation date; caregiver's relationship to the child, gender, age, ethnicity, level of education, employment status, marital status, and income, number of children in the family, number of children with ASD in the family, and services the child with ASD is receiving).

Measures for the independent and dependent variables are described next. Letters within parentheses following the measure names refer to the elements of the Double ABCX Model (see Figure B.1). Table A.1 lists the variables, the corresponding elements of the Double ABCX Model, the measures used to assess each element, and the current sample internal consistency Cronbach's alpha for each measure.

2.3.1 Independent Variables

Symptom Severity and Problem Behaviors (A)

The Social Communication Questionnaire (SCQ; Rutter et al., 2003) was a parent self-report measure, used to confirm the diagnosis of ASD and to provide an overall indication of the severity of autism symptoms. SCQ comes in two forms, the Current and the Lifetime forms. The Current form, which examines a child's behavior over the most recent three-month period, was used. The SCQ consists of 40 yes-or-no questions. Questions are summed to obtain a total score. Higher scores indicate greater autism symptom severity with scores greater than 11 indicating that the individual is likely to have a diagnosis of ASD (Norris & Lecavalier, 2010). The scale has good sensitivity and specificity in identifying autism (sensitivity = .85, specificity = .75; Norris & Lecavalier, 2010) and shows good internal consistency reliability (Cronbach's α = .80) (Manning et al., 2011; McStay et al., 2014). In the current study, Cronbach's α was .73.

The 30-item Problem Behavior Rating Scale (PBRS; Stone et al., 2010), a parent self-report was used to measure problem behaviors in individuals with ASD. Items were rated

on a four-point Likert scale (1 = not at all problematic to 4 = very problematic). The scale has been shown to have high internal consistency reliability (Cronbach's $\alpha = .88$) (Stone et al., 2010) and had even higher reliability in the current sample (Cronbach's $\alpha = .93$).

File-up of Demands (aA)

Two measures of pile-up of demands were used. A modified version of the Social Readjustment Rating Scale (SRRS) (Holmes & Rahe, 1967) was used to assess general stressful life events. Participants were asked to rate each of the 43 items on a six-point Likert scale (0 = not experienced to 5 = experienced with extreme distress). A total score was calculated. The internal consistency reliability has been good (Cronbach's $\alpha = .87$) (Stuart & McGrew, 2009). The current study obtained similar reliability, Cronbach's $\alpha = .86$.

To measure demands specific to transition, a five-item Transition Stress Questionnaire (TSQ) designed for the current study was used. The five items addressed transition-related demands in the following domains: time/effort spent on planning and worrying about children's transition, degree to which normal family/social/work activities were disrupted. Items were rated using a five-point Likert scale (1 = none to 5 = a lot). The internal consistency reliability was good, Cronbach's $\alpha = .81$.

Personality Traits (B)

The 60-item NEO Five Factor Index (NEO-FFI; Costa & McCrae, 1992) was used to measure the five factors of personality. Each of the five personality factors were measured using a 12-item subscale. Items were rated using a five-point Likert scale (1=strongly disagree to 5=strongly agree). The scale has good criterion validity when compared against the 240-item NEO Personality Inventory (NEO-PI) (McCrae & Costa, 2004). In prior studies, test-retest and internal consistency reliability of the five subscales has been good (test-retest reliability = .86 to .90; internal consistency reliability = .68 to .86) (Costa & McCrae, 1992; Robins, Fraley, Roberts, & Trzesniewski, 2001). The internal consistency reliability for the five subscales was similar in the current sample, Cronbach's $\alpha = .70$ to .91.

Social Support (bB)

The 12-item Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, 1998) was used to measure social support. The eight-item Contextual Perceived Social Support (CPSS; Stuart & McGrew, 2009) was used to assess support from the autism community and providers. Items on the two scales were rated on a seven-point Likert scale (1 = very strongly disagree to 7 = very strongly agree). A mean score was calculated for each scale; higher scores indicated greater social support. Internal consistency reliability for the MSPSS in prior studies has been good (Cronbach's $\alpha = .92$) (Zimet, 1998), similar reliability was found in the current sample, $\alpha = .95$. Internal consistency reliability for CPSS was good when used in a sample of parents of children with ASD (Cronbach's $\alpha = .88$) (Stuart & McGrew, 2009); it was even higher in the current sample, Cronbach's $\alpha = .93$.

Cognitive Appraisal (C)

The 12-item Stress Appraisal Measure (SAM; Peacock & Wong, 1990) was used to measure cognitive appraisal styles. The SAM measures primary and secondary appraisals, including seven appraisal dimensions (i.e., threat, challenge, centrality, control-self, control-others, uncontrollable, and stressfulness). The current study examined two dimensions: threat and challenge appraisals. Items were rated on a five-point Likert scale (1 = not at all to 5 = extremely). Subscale scores were calculated from the item means. Internal consistency reliability in prior studies has been good (Cronbach's $\alpha = .71$ to $.90$) (Kausar & Powell, 1999). Cronbach's α ranged from $.68$ to $.69$ in the current sample.

Coping Strategies (cC)

The 28-item Brief COPE (Carver, 1997) was used to assess coping strategies. Items were rated on a four-point Likert scale (1 = I haven't been doing this at all to 4 = I've been doing this a lot) and were coded into 14 coping strategies, which were then categorized into problem-focused, emotional approach, or passive-avoidance coping. Problem-focused cop-

ing was calculated as the mean score of the active coping, seeking instrumental support, and planning items. Emotional approach coping was calculated as the mean score of the seeking emotional support, positive reframing, humor, acceptance, and turning to religion items. Passive-avoidance coping was calculated as the mean score of the self-distraction, denial, substance use, behavioral disengagement, venting of emotions, and self-blame items. Internal consistency reliability for the subscales when used in a sample of parents of children with ASD ranged from adequate to good (Cronbach's $\alpha = .60$ to $.81$) (Stuart & McGrew, 2009), which was comparable to the current sample (Cronbach's $\alpha = .76$ to $.83$).

2.3.2 Dependent Variable

Caregiver Burden (X)

The 21-item Caregiver Strain Questionnaire (CGSQ; Brannan & Heflinger, 1997) was used to measure caregiver burden. Items were rated using a five-point Likert scale (1 = not at all a problem to 5 = very much a problem). Higher scores indicated greater caregiver burden. Internal consistency reliability is good (Cronbach's $\alpha = .94$) (Stuart & McGrew, 2009). Similar reliability was found in the current sample (Cronbach's $\alpha = .95$). The average score has been used extensively in prior research (McGrew & Keyes, 2014; Stuart & McGrew, 2009) and was the primary dependent variable in the current study. To explore additional aspects of burden, three subscales, based on work from prior studies (Branna et al., 1997; Khanna et al., 2012), were also calculated: objective strain (i.e., observable, negative occurrences of caregiving; Cronbach's $\alpha = .87$), internalized subjective strain (i.e., expediting negative feelings such as sadness; Cronbach's $\alpha = .87$), and externalized subjective strain (i.e., negative feelings toward the child; Cronbach's $\alpha = .85$). The subscales are used in some supplemental analyses.

2.3.3 Attention Check

As a validity check for the data, to ensure participants' attentiveness while completing the survey, three attention-check items were inserted at various points within the overall survey. Attention-check items are questions easy to answer so that all individuals should answer in the same way. The following attention-check items were used: Please respond to this item by selecting "Neutral"; Respond to this item by selecting "8"; Please select "Disagree."

2.4 Procedures

2.4.1 Data Collection

The study information was posted on MTurk. Interested participants were given the link to the survey packet posted on a secure server (i.e., Qualtrics). Participants recruited through state and national organizations, fliers, email advertisements, parent support groups, and autism listservs were sent the link via email once they indicated interest in the study. All participants were informed of the study's purpose and asked to give their electronic consent prior to completing the survey. Participants were told they could withdraw from the study at any time. The estimated time to complete the survey packet was 30 to 50 minutes. Participants were paid five dollars in MTurk credit if they were recruited through MTurk. Those recruited through other sources received a five-dollar e-gift card upon completing the survey. The majority of the data came from MTurk ($n = 156$), and the rest came from other sources (e.g., organizations, listservs, etc.) ($n = 15$).

2.5 Statistical Design and Data Analysis

Data collected online were transferred to an SPSS database on a secure server. All study variables were examined for outliers, normality, linearity, and homoscedasticity. Missing data were analyzed using pairwise deletion. Overall, the missing data rate was minimal (see Table A.1). At the survey-item level, 230 of the 259 survey items (89%) had no missing

data; 26 items (10%) had missing data from one participant; and three survey items (1%) had missing data from two participants. At the participant level, 99 participants recorded no missing data; 10 participants recorded missing data for a single item; five participants recorded missing data for two items; and another three reported missing data for three, four, and five items respectively out of 259.

Demographic information was analyzed using general descriptives (e.g., mean, standard deviations, and frequencies) in SPSS. Descriptive statistics also were used to characterize whether the sample of caregivers reported stress during the transition period (see preliminary analyses). Bivariate correlation was used to test the direct hypotheses by examining the relationships between each independent variable and the dependent variable (DH1 – DH12). Hierarchical regression was used to examine the overall predictive ability of the Double ABCX model in describing burden. The order of entering independent variables in the hierarchical regression proceeded through seven steps following the outline of the Double ABCX model: (1) caregivers' gender, age, education level, income, services receiving, (2) symptom severity and problem behaviors (A), (3) pile-up of demands and transition-related demands (aA), (4) personality traits (B), (5) social support (bB), (6) appraisal styles (C), and (7) coping strategies (cC).

To test the indirect hypotheses (moderation and mediation effects), multiple regressions were used and analyzed with the PROCESS modules developed by Hayes (2013). Personality traits (i.e., neuroticism, extraversion, and conscientiousness) were examined as potential moderators of the association between the stressors and caregiver burden (IH1). Social support, cognitive appraisals (challenge, threat), and coping strategies (problem-focused, emotional approach, passive-avoidance) were each examined as potential mediators of the associations between personality traits and caregiver burden (IH2-IH11).

2.6 Statistical Power Analysis

I used G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) to calculate power. In respect to the bivariate correlations between independent and dependent variables, assum-

ing a medium effect size ($r = .30$), a one-tailed test, a power of .80, and a p-level of .05, the sample size needs to be 67. Thus, the current sample is adequately powered for these analyses. For the test of the overall Double ABCX Model, a large effect size is expected (Bristol, 1987; Jones & Passey, 2004; Pakenham et al., 2005). Assuming a p-level of .05, a two-tailed test, a power of at least .80, and a large effect size (Cohen, 1992), a sample of 100 participants is needed to detect an overall effect in a multiple regression, and again the current sample is adequately powered for these analyses. The moderation and mediation effects were analyzed using a SPSS macro provided by Hayes (2013) which calculates indirect effects using a bootstrap strategy recommended for small samples (Ekas et al., 2010; Preacher & Hayes, 2004). Assuming a p-level of .05, a two-tailed test, a power of at least .80, and a medium effect size, a sample of 78 is needed (Fritz & MacKinnon, 2007). Thus, the study is sufficiently powered to test the hypotheses, with a maximum needed sample size of 100.

3. RESULTS

3.1 Participants

A total of 171 participants completed the survey packet; 156 individuals were recruited via MTurk and 15 were recruited via other methods (e.g., fliers, email advertisements, parent support groups, and autism listservs). Of these 171 participants, 120 were initially retained for the final data analysis (see Table A.2). Forty-eight of those recruited using MTurk were excluded. Fifteen people did not meet the inclusion criteria (e.g., have graduated more than two years, SCQ score did not meet the cutoff for ASD, or did not have an official ASD diagnosis). Ten participants missed one or more of the three attention-check questions, which were used to ensure valid responses. In addition, after cross checking participants' responses, 23 participants were excluded because their responses appeared to be either invalid (e.g., selected same response on the Likert scale for all items on a questionnaire, took the survey more than once) or inconsistent (e.g., graduation date did not match with the current academic status). Of those recruited via other methods, two participants were excluded for missing one attention-check question, and one participant was excluded for not meeting the inclusion criteria ($SCQ < 11$). All data were obtained via Qualtrics.

The data were then examined for outliers, normality, linearity, and homogeneity. Three participants recorded responses on at least one study variable that were categorized as outliers ($>3SD$), one of whom was an outlier for three variables. Because including these individuals resulted in problematic skewness and kurtosis for one or more of the study variables, their responses were removed. Therefore, a total of 117 participants were included in the final data analyses.

The average age of the participants was 43.05 ($SD = 5.26$). Slightly more participants were fathers (53.8%, $n = 63$) than mothers of individuals with ASD (46.2%, $n = 54$). Over half of the participants were white (84.6%, $n = 99$), married (73.5%, $n = 86$), working full

time (77.8%, $n = 91$), and had a college degree or above (58.6%, $n = 68$). About half of participants' incomes were above 60,000 (47.9%, $n = 56$). Demographic information on participants' children with ASD was also collected. According to parents' reports, the average age of their child with ASD was 17.36 ($SD = 1.48$). The great majority of children were male (81.2%, $n = 95$), with a gender ratio of 4.32:1, which is consistent with the gender ratio in the population of individuals with ASD (Fombonne, 2009). Most individuals had not yet graduated. Specifically, about three-quarters were scheduled to graduate within two years at the time of data collection (72.6%, $n = 85$) and about one quarter had already graduated from high school within the past two years (27.4%, $n = 32$). Over half of the individuals with ASD will be or are going to college/university or vocational school after graduating from high school (61.5%, $n = 72$), and the majority of them will be or are living with parents after graduating from high school (80.3%, $n = 94$). Table A.3 provides descriptive information about the participants and their children.

3.2 Preliminary Analyses

3.2.1 Descriptives and Correlations between Study Variables

Table A.4 displays the means, standard deviations, and confidence intervals for each of the study variables. Overall, the means were similar to those reported in prior studies using these measures (Stuart & McGrew, 2009). Table A.5 displays the correlations between the study variables. The hypothesized correlations between study variables are discussed in a later section.

3.2.2 Demographic Predictors of Caregiver Burden

Before examining the hypotheses, correlations were conducted to see if there were significant relationships between caregiver burden and the demographic variables for parents and their children. The results indicated that caregiver burden was unrelated to each of the demographic variables, i.e., parents' gender, age, education level, annual income, child's

gender, age, current academic status, and whether the child was receiving therapy or special services ($ps > .05$). Fathers ($M = 2.09, SD = .72$) and mothers ($M = 2.01, SD = .79$) reported similar levels of caregiver burden, $t(115) = .56, p = .91$.

3.3 Are Caregivers Stressed?

An initial question concerned whether caregivers report being stressed during the transition period. Three measures of “stress” were obtained, pile-up of demands, transition-related demands, and caregiver burden. As mentioned above, the means and standard deviations for each are displayed in Table A.4. The mean for pile-up of demands was 16.7 ($SD = 13.13$), which indicates mild levels of overall stress. To place this number into context, the results were compared to another period viewed as high stress, when one’s child first received the ASD diagnosis ($M = 19.71, SD = 17.68$; Stuart & McGrew, 2009). Although, parents reported relatively less pile-up of demands during the transition period, $t(193) = 1.37, p = .17$, the difference was not significant.

With respect to transition-related demands (TSQ), which focused on demands specific to transition, e.g., time/effort spend on planning and worrying about children’s transition, participants reported moderate to high transition-related demands ($M = 2.91, SD = .87$). Using the midpoint of the scale as an indicator of significant stress (i.e., requiring at least some amount of time/effort planning transition), 91% of the participants reported scores of three or higher (i.e., some to a lot) for the effort they and their family have put into planning for their child’s transition out of school, 84% for the time and energy they have spent thinking about, actively pursuing answers about, or discussing with others about the child’s transition, 47% for changing family activities for transition planning, 38% for changing social activities, and 35% for changing work activities.

With respect to caregiver burden, overall, parents reported moderate stress in the transition period ($M = 2.06, SD = .75$), indicating that on average participants endorsed each of the 21 items on the scale as being a little bit of a problem. However, 27% of the participants scored 2.5 or higher on the overall caregiver burden scale, indicating that on average every

item on the scale was rated as being somewhere between a little of problem and very much a problem. To better understand these results, I also examined the three subscales of Caregiver Strain Questionnaire separately. Parents reported the highest stress in the internalized subjective strain dimension ($M = 2.46, SD = .92$), and lower stress in the objective caregiver strain ($M = 1.99, SD = .87$), and externalized subjective caregiver strain ($M = 1.82, SD = .78$) (see Table A.4). In addition, on an item level, parents' highest score was for the item "feeling worried about child's future" ($M = 3.25, SD = 1.24$). Finally, to provide further context, scores were compared once again to the period shortly after one's child received the ASD diagnosis. Parents during the transition period reported significantly less burden ($M = 2.54, SD = .90$; Stuart & McGrew, 2009), $t(193) = 4.07, p < .001$.

3.4 Test of the Hypotheses (Direct Hypotheses 1-12)

One-tailed Pearson correlations were conducted to examine the relationship between each hypothesized independent variable and caregiver burden. Table A.6 displays the results for the twelve direct hypotheses. As shown in the table, eight of the twelve hypotheses were supported. Consistent with the hypotheses, greater caregiver burden was associated with increased problem behaviors ($r = .48, p < .001$), higher neuroticism scores ($r = .52, p < .001$), greater use of threat appraisals ($r = .45, p < .001$) and of passive-avoidance coping ($r = .67, p < .001$).

Also as predicted, lower caregiver burden was related to higher scores on extraversion ($r = -.31, p < .001$) and conscientiousness ($r = -.32, p < .001$), greater use of challenge appraisals ($r = -.18, p = .03$), and higher levels of social support ($r = -.34, p < .001$). Moreover, when examined separately, caregiver burden was negatively correlated with both general social support ($r = -.36, p < .001$) and contextual social support ($r = -.21, p = .01$).

In contrast to the hypotheses, caregiver burden was unrelated to ASD symptom severity ($r = -.04, p = .33$), greater pile-up of demands ($r = .13, p = .08$), and use of either problem-focused coping ($r = .08, p = .18$) or emotional approach coping ($r = .06, p = .26$).

3.5 Regression

Hierarchical regression was used to examine the overall predictive validity of the Double ABCX model in describing caregiver burden during the transition period. Overall, the model accounted for 63% of the variance in caregiver burden, $R = .80$, $F(19, 90) = 8.11$, $p < .001$ (see Table A.7). In the final model, three variables were retained, predicting over half of the total variance in caregiver burden, problem behaviors ($\beta = .22$, $p = .006$), general social support ($\beta = -.21$, $p = .027$), and passive-avoidance coping ($\beta = .40$, $p < .001$).

3.6 Moderation and Mediation (Indirect Hypotheses 1-11)

3.6.1 Moderation

It was hypothesized that personality traits would moderate the impact of stressors (problem behaviors, symptom severity, pile-up of demands, transition-related demands) on caregiver burden (IH1). Variables tested for the moderation analyses were limited to those indicating significant associations with caregiver burden bivariately. Because ASD symptom severity and pile-up of demands were not significantly correlated with caregiver burden, moderation analyses were not conducted for those variables. Therefore, using the PROCESS module one by Hayes (2013), the three hypothesized personality traits (i.e., neuroticism, conscientiousness, and extraversion) were examined respectively for possible moderation effects in understanding the significant associations between caregiver burden and both problem behaviors and transition-related demands. As shown in Table A.8, none of the moderation hypotheses were supported. That is, in each case, the confidence interval for the moderation effects included zero.

3.6.2 Mediation

It was also hypothesized that social support, cognitive appraisal styles, and coping strategies would mediate the relationships between personality traits and caregiver burden. These relationships were also examined using the PROCESS module by Hayes (2013),

module 4. A parallel mediation model with multiple mediators was used rather than using multiple simple mediation models because doing so allows the ability to compare the size of indirect effects among mediators and also results in a power boost for tests of indirect effects (Hayes, 2013). The mediation analyses were conducted separately for each of the three personality traits (i.e., neuroticism, extraversion, conscientiousness). See Figure B.2, B.3, and B.4.

Two mediation analyses were conducted for each personality trait. The first analysis examined the hypothesized mediation effects, and a second exploratory analysis examined both the hypothesized mediation variables and additional potential but non-hypothesized mediators that demonstrated significant Pearson correlations with the personality traits.

Neuroticism

It was hypothesized that passive-avoidance coping, threat appraisals, and social support would mediate the relationship between neuroticism and caregiver burden (IH 2, 4, 5). All three variables were entered into the model as parallel mediators. As hypothesized, passive-avoidance coping (Indirect effect = .02, $SE = .01$, 95% CI = .01, .04) helped explain the association between neuroticism and caregiver burden. Contrary to predictions, neither threat appraisals (95% CI = -.0005, .01) nor social support (95% CI = -.002, .01) mediated the relationship between neuroticism and caregiver burden.

Because greater neuroticism was also related to decreased use of challenge appraisals, decreased problem-focused coping, and decreased emotional approach coping, exploratory analyses were conducted to examine the potential mediation effects of those variables. The three hypothesized mediators plus the three exploratory mediators were entered as parallel mediators in the mediation analysis (i.e., threat appraisals, passive-avoidance coping, social support, challenge appraisals, problem-focused coping, and emotional approach). As before, passive-avoidance coping (Indirect effect = .02, $SE = .01$, 95% CI = .01, .03) was a significant mediator. Problem-focused coping (indirect effect = -.004, $SE = .00$, 95% CI = -.01, -.001) emerged as an additional significant mediator. That is, participants who

were high in neuroticism tended to use less problem-focused coping, which was associated with lower caregiver burden, and increased use of passive-avoidance coping, which was associated with higher caregiver burden.

Extraversion

Social support, problem-focused coping, emotional approach, and challenge appraisals were hypothesized mediators of extraversion and caregiver burden (IH 3, 6, 7, 8). Consistent with the hypotheses, social support (Indirect effect = $-.29$, $SE = .08$, 95% CI = $-.45, -.13$), challenge appraisals (Indirect effect = $-.21$, $SE = .10$, 95% CI = $-.40, -.13$), problem-focused coping (Indirect effect = $.32$, $SE = .14$, 95% CI = $.04, .59$), and emotional approach (Indirect effect = $.01$, $SE = .004$, 95% CI = $.0001, .02$) all significantly mediated the relationship between extraversion and caregiver burden. That is, individuals high in extraversion tended to perceive high social support and used more challenge appraisals, which was related to decreased burden; individuals high in extraversion also tended to use more problem-focused coping and emotional approach, which were related to a higher level of caregiver burden.

With respect to the exploratory analyses, bivariately, passive-avoidance coping was an additional variable significantly related to extraversion. As before, this exploratory mediator was then added to the hypothesized mediators in the parallel mediation to examine its potential mediation effect. Similar to the exploratory findings for neuroticism, the results indicated that problem-focused coping (Indirect effect = $.01$, $SE = .00$, 95% CI = $.001, .01$) and passive-avoidance coping (Indirect effect = $-.02$, $SE = .01$, 95% CI = $-.04, -.01$) were now the only significant mediators between extraversion and caregiver burden. Participants who scored high in extraversion reported increased use of problem-focused coping, which was associated with greater caregiver burden, and decreased use of passive-avoidance coping, which was related to less burden.

Conscientiousness

Problem-focused coping, emotional approach, and challenge appraisals were hypothesized to mediate the relationship between conscientiousness and caregiver burden (IH 9, 10, 11). As hypothesized, problem-focused coping (Indirect effect = .02, $SE = .01$, 95% CI = .01, .03) mediated the relationship between conscientiousness and caregiver burden. However, in contrast to predictions, neither challenge appraisals (95% CI = -.02, .00) nor emotional approach (95% CI = -.01, .01) mediated the relationship.

With respect to the exploratory analyses, the bivariate correlations between conscientiousness and both social support and passive-avoidance coping were significant, so they were then included in the parallel mediation analysis. Once again, similar to the findings for extraversion and neuroticism, the results indicated that problem-focused coping (Indirect effect = .01, $SE = .01$, 95% CI = .002, .02) and passive-avoidance coping (Indirect effect = -.03, $SE = .01$, 95% CI = -.05, -.01) were the only significant mediators. Participants high in conscientiousness reported increased use of problem-focused coping, which was associated with greater caregiver burden, and decreased use of passive-avoidance coping, which was related to lower levels of caregiver burden.

3.7 Supplementary Analyses

3.7.1 Agreeableness/Openness

Few studies have examined the potential links between agreeableness/openness and caregiver burden. Thus, the significance and direction of any potential relationships were not clear, and no specific predictions for these two personality traits were made. However, correlation analyses were conducted to explore the potential relationships with caregiver burden. The results showed that agreeableness was negatively correlated with burden ($r = -.22$, $p = .02$), whereas openness was not significantly related to caregiver burden ($r = -.10$, $p = .30$). Specifically, caregivers high in agreeableness reported lower levels of burden.

3.7.2 Construct Overlap

Because individuals high in neuroticism tend to experience and report more negative affect (e.g., sadness, anger) (McCrae & Costa, 1987; Melo et al., 2011), theoretically, there might be construct overlap between neuroticism and measures of negative outcomes (e.g., stress, depression, burden). That is, regardless of actual objective level of caregiver burden, participants high in neuroticism might report artifactually higher levels of burden. To test for this possibility, correlation analyses were run between neuroticism and the three subscales of the CGSQ (i.e., objective strain, internalized subjective strain, and externalized subjective strain) respectively. Higher correlations between neuroticism and subjective vs. objective measures of strain would indicate that correlational indicators of the relationship are artifactually increased when burden is measured using subjective indicators. However, in contrast to concerns about construct overlap, there was no evidence that neuroticism was more strongly related to subjective vs. objective burden. That is, neuroticism was significantly and moderately related to all three subscales, internalized subjective strain ($r = .53, p < .001$), objective strain ($r = .45, p < .001$), and externalized subjective strain ($r = .41, p < .001$). Fisher's z tests to examine for differences between correlations were not significant.

3.7.3 Gender Differences

Most prior studies of caregiver burden report a preponderance of female caregivers, often as high as 70 or 80%, limiting the potential generalizability of the findings (Hamlyn-Write, Draghi_Lorenz, & Ellis, 2007; Lee et al., 2009; Rao & Beidel, 2009). The current study not only was able to recruit a substantial number of male caregivers, but also produced a sample with a nearly equal number of male and female caregivers. This nearly 1:1 gender ratio affords a potentially important opportunity to examine directly whether male and female caregivers differ in their responses to the study variables. Accordingly, female and male caregiver responses were compared on each of the Double ABCX model variables. As shown in Table A.9, there were no gender differences for most of the study variables.

However, female caregivers ($M = 31.65$, $SD = 9.79$) scored significantly higher than male caregivers ($M = 28.10$, $SD = 9.10$) in neuroticism, $t(115) = -2.03$, $p = .04$, and lower than male caregivers ($M = 41.62$, $SD = 6.85$) in extraversion ($M = 38.67$, $SD = 7.16$), $t(115) = 2.28$, $p = .03$. In addition, fathers ($M = 5.50$, $SD = 1.05$) perceived higher social support from the ASD community and providers than mothers ($M = 5.04$, $SD = 1.24$), $t(116) = 2.16$, $p = .03$.

I also examined the direct hypotheses separately by gender. When comparing the correlations between the independent variables and burden in fathers and mothers, respectively, the results showed that for fathers', but not mothers' ($ps > .05$), perceived contextual social support ($r = -.37$, $p = .003$) and agreeableness ($r = -.25$, $p = .05$) were significantly correlated with caregiver burden. Specifically, male caregivers who perceived higher social support and scored higher in agreeableness tended to report lower levels of burden, whereas the patterns were not seen in female caregivers. In addition, extraversion was negatively related to burden in mothers ($r = -.50$, $p < .001$), but not fathers ($p = .20$). That is, female caregivers high in extraversion reported lower levels of burden, whereas male caregivers' burden was not associated with their extraversion scores. A Fisher's z test was then conducted to examine if the gender differences in correlations reported above for male and female caregivers were significant. The results indicated that the obtained correlations between extraversion and burden were significantly different for male and female caregivers, $z = 2.04$, $p = .04$.

To better understand the significant gender difference in the relationship between extraversion and caregiver burden, additional analyses were run to examine gender differences in the mediation effects. The results showed that in mothers, but not fathers, decreased use of passive-avoidance coping mediated the relationship between extraversion and caregiver burden (Indirect effect = $-.03$, $SE = .01$, 95% CI = $-.06$, $-.01$). That is, females high in extraversion tended to use less passive-avoidance coping, which was related to decreased burden. There was no significant mediation effect in fathers.

3.7.4 Path Models

In an effort to provide a more robust test of the adequacy of the ABCX model in explaining variation in caregiver burden, a path model was developed (see Figure B.5), in which hypothetical direct effects between the three personality traits (neuroticism, extraversion, conscientiousness) and burden were tested as well as indirect, mediated effects of cognitive appraisals and coping strategies.

The sample size ($N = 117$) satisfied the criterion of a minimum of 100 participants to conduct a path analysis with sufficient power (Hoyle, 1995). The hypothesized model were tested with LISEREL 9.2_Student Version (Joreskog & Sorbom, 2015). To maximize the power of the path analyses with the current sample size, problem-focused coping and emotional approach strategies were combined into positive coping strategies. Internal consistency reliability of the combined positive coping subscale was good (Cronbach's $\alpha = .83$). The path analyses were run separately for each of the three hypothesized personality traits with 16 path estimates respectively (i.e., conscientiousness, neuroticism, and extraversion). The results showed that the hypothesized path model had a poor model fit for all three personality traits, neuroticism ($\chi^2(8) = 54.46$, $RMSEA = .22$, $p < .001$, $CFI = .84$), extraversion ($\chi^2(8) = 53.44$, $RMSEA = .22$, $p < .001$, $CFI = .82$), and conscientiousness ($\chi^2(8) = 54.97$, $RMSEA = .22$, $p < .001$, $CFI = .82$). In an attempt to find a better fitting model, modifications were made in the proposed model. Specifically, only personality traits, threat appraisal, and passive-avoidance coping were included with nine path estimates. However, the results again showed a poor model fit for all personality traits, neuroticism ($\chi^2(4) = 24.55$, $RMSEA = .21$, $p < .001$, $CFI = .90$), extraversion ($\chi^2(4) = 29.78$, $RMSEA = .24$, $p < .001$, $CFI = .85$), and conscientiousness ($\chi^2(4) = 28.40$, $RMSEA = .23$, $p < .001$, $CFI = .86$).

4. DISCUSSION

There is now considerable literature demonstrating that caregivers of individuals with ASD report greater stress than caregivers of other disabilities and of typically developing children (Abbeduto et al., 2004; Dunn & Burbine, 2001). However, stress is not constant; it may be particularly high during critical transition periods, in which unique challenges are presented (Blacher, 2001; Jobe & Glidden, 2008). To investigate this possibility, the current study examined caregiver burden during the transition period from high school and the factors that may influence the level of burden in this period. In addition, the study examined the potential impact of caregiver personality on burden. Previous studies have identified child (e.g., number of problem behaviors) and parent factors (e.g., social support) related to caregiving stress (Stuart & McGrew, 2009), however, few have examined the impact of the “big 5” personality traits (i.e., neuroticism, extraversion, conscientiousness, agreeableness, openness; Costa & McCrae, 1992) on caregiver burden. Therefore, this study also examined whether personality traits influence burden and how they may impact burden. Below I discuss my findings in response to these research questions in more detail.

4.1 Caregiver Burden in the Transition Period

One primary goal of the current study was to examine caregiver burden specifically during the period when individuals with ASD transition out of high school. Overall parents reported experiencing moderate stress during the transition period. Examined closely, on the subscale level, parents reported the highest burden in the internalized subjective dimension, which indicates that parents are experiencing negative feelings, such as worry, guilt, and unhappiness that are internal to a caregiver (Kirby, White, & Baranek, 2015; Khanna et al., 2012). In addition, around a third of the participants reported experiencing high demands in the transition period (i.e., transition-related demands). Specifically, the majority of the

participants indicated they experienced increased demands from planning for the transition, thinking about and gathering information about the transition. Family activities also had to be adjusted due to transition planning in nearly half of the participants. On an item level, the single most burdensome item was related to parents worry about their child's future, which seems largely consistent with the demands of the transition period. However, comparatively, overall burden was smaller than the stress parents report during the period when one's child first receives a diagnosis of ASD (Stuart & McGrew, 2009). That is, even though caregivers continue experiencing stress in the transition period, they seem less overwhelmed than when first confronted with the reality that their child has ASD.

When reflecting on these findings, the period when one's child receives a diagnosis of ASD is a highly stressful time, but families manage to develop strategies and adapt to the stressful situation over time. Barkers et al., (2011) have found indicatives of resilience in mothers of adolescents and adults with ASD that their depressive symptoms has not escalated and the anxiety has declined across the 10-year period in their longitudinal study. Although caregivers reported great demands from transition planning, by the time that the child with ASD is going through transition, families now have relatively more strategies and resources to handle the stress, possibly resulting in less caregiver stress reported (Manning et al., 2011; Smith et al., 2008).

Nevertheless, ASD is a lifelong neurodevelopmental disorder. As discussed below, child factors (i.e., problem behaviors) that have affected parents' wellbeing previously are still impactful during the transition period with the distinctive challenges peculiar to this developmental milestone, including spending time thinking, planning, and worrying about the transition, and now the future of their child. These transition specific elements collectively contribute to the ongoing stress parents' experience.

4.2 Predictors in the Double ABCX Model

The current study used the Double ABCX model to organize and understand the potential predictors of caregiver burden in parents of individuals with ASD during the transition

period (McCubbin & Patterson, 1983). Based on the model, a series of twelve direct hypotheses detailing specific predictors of burden were proposed. The great majority of the hypotheses were supported. Specifically, problem behavior, transition-related demands, neuroticism, extraversion, conscientiousness, general and contextual social support, challenge and threat appraisals, and passive-avoidance coping strategies all were related to caregiver burden as predicted. Below I discuss these findings in more detail.

Consistent with past studies, caregivers tend to report greater burden if their children with ASD presents more problem behaviors (e.g., aggressive and self-injurious behaviors) (Abbeduto et al., 2004; Bekhet et al., 2012; Ekas et al., 2010; Manning et al., 2011). This finding is consistent both with theory (Lazarus & Folkman, 1984) and with prior empirical research. From the aspect of theory, the greater the objective demands represented by the stressor (i.e., the child with ASD), the greater the subjective stress (i.e., caregiver burden). In this case then, problem behaviors provide a good overall proxy for the total objective stressor demands, and caregiver burden is a measure of the subjective stress. Empirically too, problem behavior is the most consistent predictor of caregiver burden (Davis & Carter, 2008; Hastings et al., 2005; Manning et al., 2011). In addition, problem behaviors in persons with ASD have been related to other negative impacts, including maternal pessimism, depressive symptoms, and parent and teacher stress (Lecavalier et al., 2006). Moreover, problem behavior has been shown to be the strongest independent predictor of parent stress and mothers' quality of life multivariately, for example, when adjusting for autism symptom severity (Allik et al., 2006; Hasting et al., 2005; Manning et al., 2011; Suzumura, 2015).

In contrast to predictions, there was no significant association between symptom severity and caregiver burden. Results from studies examining the relationship between stress and symptom severity from prior research are variable, some indicating a significant relationship between symptom severity and stress (Pakenham et al., 2005; Stuart & McGrew 2009) and others indicating no relationship between the two (Barker et al., 2011; Hasting et al., 2005; Manning et al., 2011). The lack of relationship in the current sample is most likely due to the relative lack of symptom severity variation in the sample. Because the study inclusion criteria required that all participants have an official ASD diagnosis as well

as a minimum SCQ score (which is an index of overall autism severity), the resulting sample was both skewed and largely similar on ASD symptoms. In contrast, problem behaviors, which are not a requirement for the ASD diagnosis nor for participating the study, showed greater sample variation as well as a strong and significant relationship to burden.

Also in contrast to predictions, pile-up of demands was unrelated to burden, although there was a trend finding. Overall, parents reported slightly lower pile-up of demands in this transition period than the period when one's child first received the ASD diagnosis (Stuart & McGrew, 2009). This lower level of pile-up demands may be related to the failure to find a significant association. Greater transition-related demands, on the other hand, predicted caregiver burden bivariately. This suggests that transition-related demands may be a more proximal measure of pile-up of demands during the transition period.

Social support has been studied as a stress buffer and has been shown to be related to caregiver burden in prior studies (Bristol, 1987; Dunn & Burbine, 2001; Gill & Harris, 1991; Stuart & McGrew, 2009). Consistent with previous studies, individuals reporting greater levels of general social support also reported less burden. Also consistent with some prior studies, contextual support (i.e., from autism community and providers) was related to decreased caregiver burden in the transition period. That is, similar to findings during the period when a child was first diagnosed with ASD (Stuart & McGrew, 2009), both support from families and friends and support from autism community and providers are helpful in alleviating the stress parents experience during the transition period. However, it is worth noting that general social support from families and friends evidenced a larger correlation with burden both in the current and prior studies. Moreover, only general support emerged as an independent predictor of caregiver burden, multivariately. That is, actual or perceived supports from families and friends could help predict and reduce parent stress in caring for a child with ASD, not only in the day-to-day family functioning, also in the highly demanded transition period.

Lazarus and Folkman (1984) proposed that interpreting a difficult situation as a challenge (i.e., challenge appraisal) should be related to reduced stress, whereas interpreting the situation as threatening (i.e., threat appraisal) should lead to increased stress. Consis-

tent with the literature (Manning et al., 2011; Pakenham et al., 2005; Stuart & McGrew, 2009), in the current study, when parents viewed the stressors (i.e., caring for a child with ASD, transitioning out of high school) as opportunities, they tended to experience a lower level of burden; if they viewed the stressors as threatening to their wellbeing, they experienced greater burden. It is noteworthy that threat appraisal predicted caregiver burden nearly as strongly as problem behaviors, and it was a far stronger predictor than challenge appraisal. That is, similar to the findings from some prior studies, negative appraisals appear to be more strongly predictive than positive appraisals (Stuart & McGrew, 2009). In multivariate analysis, however, neither challenge nor threat appraisals emerged as significant predictors. This is likely due to the strong positive relationship between threat appraisal and passive-avoidance coping. That is, passive-avoidance coping emerged as a more proximate predictor of caregiver burden. This latter finding is consistent with the idea that what you do (i.e., coping) may be more critical in predicting burden than your attitudes or behavioral tendencies (i.e., traits) or your interpretation of the stressful situation (i.e., appraisals).

Contrary to predictions, neither problem-focused coping nor emotional approach coping strategies were directly related to burden, bivariate and multivariate. The relationships between problem-focused/emotional approach coping strategies and caregiver burden have not received consistent support in the literature (Bundy, 1996; Pakenham et al., 2005; Sivberg, 2002). For example, using a similar instantiation of the Double ABCX model, problem-focused coping was not related to caregiver burden when children were first diagnosed with ASD (Stuart & McGrew, 2009). Similarly, Hastings et al. (2005) did not find an association between problem-focused coping and stress, anxiety, and depression levels in parents of children with autism. Problem-focused/emotional approach coping strategies are relatively commonly used, and based on previous findings, they do not strongly differentiate between those with high and low levels of burden. This may partially explain their failure to predict burden.

Passive-avoidance coping, on the other hand, has been universally related to poor outcomes across a variety of conditions as well as to stress in general (Holahan, Moos, Kolahan, Brennan, & Schutte, 2005; Penley, Tomaka, & Wiebe, 2002). In the current study,

passive-avoidance coping strategies, bivariately and multivariately, were strong predictors of increased caregiver burden. Moreover, it had the largest correlation with burden among all the predictors tested. Prior studies with ASD caregivers have also reported that increased use of passive-avoidance coping was related to greater perception of stress and poor mental and physical health (Hasting et al., 2005; Stuart & McGrew, 2009). Additionally, as noted above, in general nonclinical adults, longitudinal studies, and meta-analyses of coping and stress have indicated that the most consistent and strongest predictor is avoidance coping and that it is always negative (Holahan, Moos, Kolahan, Brennan, & Schutte, 2005; Penley, Tomaka, & Wiebe, 2002). Moreover, from a theoretical perspective, Lazarus and Folkman (1984) noted that avoidance is a poor substitute for coping because neither the problem nor the emotional reaction to the stressors are addressed and posited that it would be related to increased negative outcomes. Therefore, both from a theoretical and empirical perspective, using maladaptive coping strategies, such as self-distraction, denial, substance use, behavioral disengagement, venting, or self-blame, will negatively impact parents' outcomes. In contrast, as mentioned before, using adaptive behaviors will help alleviate stress in caregivers.

4.3 Do Personality Traits Impact Burden

The second main research question was to examine the potential impact of caregivers' personality traits on caregiver burden, and how those personality traits impact burden. The results clearly support the idea that individual differences, as measured by personality traits, explain, at least in part, differences in caregiver burden in families of those with ASD. In particular, the results indicated that parents high in neuroticism tend to report greater burden, whereas caregivers high in conscientiousness, extraversion, and agreeableness report a lower level of burden.

Very few studies have examined the impact of personality traits on caregiver burden in the autism literature (Eapen & Guan, 2016; Yamada et al., 2012). With respect to neuroticism, prior studies have shown some limited evidence that neuroticism is associated with

poor mental-related quality of life in caregivers of children with Pervasive Developmental Disorders (PDDs) (Yamada et al., 2012) and is associated with more stress and transition-related worries in caregivers of children with developmental disabilities generally (Jobe & Glidden, 2008). As reviewed in the introduction, there is more evidence for the association between neuroticism and burden among dementia caregivers, where neuroticism has been consistently related to poor mental and physical outcomes (Campbell et al., 2008; Van Der Lee & Bakker, 2014; Shurgot & Knight, 2005). In particular, individuals with higher levels of neuroticism have a tendency towards negative affect (e.g., fear, sadness, anger, guilt) and tend to engage in poor coping efforts (McCrae & Costa, 1987; Melo et al., 2011). Furthermore, the strength of the relationship between neuroticism and caregiver burden in the current study is similar to prior studies (Shurgot & Knight, 2005; Yamada et al., 2012). For example, neuroticism was the second strongest predictor of burden following passive-avoidance coping. Taking care of a child with ASD in general places high psychological and physical demands on caregivers. If they frequently engage in negative emotionality and maladaptive coping strategies, it will intensify the difficulties for caregivers to adapt to the situation, and consequently caregiving stress is likely to increase.

Extraversion and conscientiousness, as predicted, were also associated with caregiver burden in the current study, but negatively. This is consistent with prior studies showing a relationship between extraversion and conscientiousness and better physical and mental outcomes in caregivers of children with PDDs and developmental disabilities (Jobe & Glidden, 2008; Yamada et al., 2012). In dementia caregivers, similar findings have been reported (Melo et al., 2011). People high in extraversion tend to be active, sociable, and optimistic, so they may seek social support in their environment and initiate and persist in coping efforts. Similarly, people high in conscientiousness tend to be reliable, hardworking, well-organized, and purposeful, and they are more likely to seek social support and less likely to use maladaptive coping strategies (Connor-Smith & Flachsbart, 2007; McCrae & Costa, 1987; O'Brien & DeLongis, 1996). As a result, they may perceive a lower level of burden.

Although not hypothesized, the current results also indicated that caregivers high in agreeableness tend to report a lower level of burden, which is similar to findings in Yamada et al. (2012) that agreeableness is associated with better quality of life in PDDs caregivers. Furthermore, in dementia caregivers, agreeableness has been related to decreased burden (Melo et al., 2011) and better mental health outcomes (Lockenoff et al., 2011). This suggests that being trusting, altruistic, compliant, and tender-minded could help alleviate the stress of caring for a child with ASD. Finally, little to no evidence has supported that relationship between openness and caregiver burden in previous studies, which is consistent with the current finding. In previous studies, openness has not been predictive of quality of life in parents of children with PDDs (Yamada et al., 2012) or stress in parents of children with developmental disabilities (Jobe & Glidden, 2008).

In summary, personality traits were found to be related to burden in expected ways. Neuroticism, which is generally reviewed as a “negative” trait, exhibited the strongest and the only positive association with burden, whereas extraversion, conscientiousness, and agreeableness, which are all typically viewed as “positive” traits, exhibited somewhat weaker, inverse or negative association with burden. These findings in turn lead to the second major research question, how might personality traits impact caregiver burden? That is, what factors could help explain the relationship between the personality traits and caregiver burden.

4.4 How Do Personality Traits Impact Caregiver Burden

Within stress and coping models (e.g., Lazarus & Folkman, 1984), several factors have been identified impacting stress, such as one’s appraisal process, coping strategies, and social support. Moreover, as Lazarus and Folkman (1984) have noted, personality factors can be viewed as affecting stress by their influence on social, cognitive and behavioral processes. Accordingly, I proposed several indirect hypotheses to explore the potential moderation and mediation roles of the study variables between personality traits and burden.

The potential moderation effect of personality traits on the relationships between the study variables and burden was unsupported. Contrary to predictions, there was no inter-

action between personality traits and the independent variables in explaining variation in burden. This lack of significance in moderation analyses may possibly due to the small sample size in the current study. In addition, the results may also indicate that the impact of problem behaviors and transition-related demands on burden does not depend on any of the personality traits, and the “positive” personality traits do not seem to buffer the stressors. Thus, it seems that caregiver burden is impacted by other proximal factors. For example, as mentioned before, social support is a significant stress buffer (Bristol, 1987; Dunn & Burbine, 2001; Gill & Harris, 1991; Stuart & McGrew, 2009). In addition, coping strategies have been shown to buffer autism symptoms (Smith et al., 2008). This is consistent with the idea that what people do (i.e., coping) may have more buffering effect against burden than their attitudes or behavioral tendencies (i.e., traits).

The tests of mediation were more promising. Recall that two sets of analyses were run, first restricted to predictions, and second expanded to include additional variables that were found to be significant predictors bivariately. The latter results seemed to be more illuminating and were remarkably consistent across the traits examined.

Consistent with the hypotheses, coping strategies helped explain the links between personality and caregiver burden. In particular, the use of passive-avoidance coping strategies was consistently found to mediate the link between personality and burden. Specifically, neuroticism was found to have a direct impact on caregiver burden and also an indirect impact through passive-avoidance coping (e.g., refuse to believe it, give up the attempt to cope). Caregivers high in neuroticism tend to use more passive-avoidance coping strategies, which was in turn related to greater burden. Consistent with these results, previous studies have shown that neuroticism is related to the use of problematic coping strategies, such as wishful thinking and withdrawal (Connor-Smith & Flachsbart, 2007). The current study takes this one step further and indicates that the link between neuroticism and poor outcomes in caregivers can be explained partially by the maladaptive coping strategies individuals use.

Similar results were found for extraversion and conscientiousness. Passive-avoidance coping accounted for the most variance in explaining the links between extraversion and

caregiver burden. That is, high extraversion/conscientiousness appeared to be related to decreased burden through decreased use of passive-avoidance coping. Similar to the findings for neuroticism, these results suggest that the individual differences seen in caregiver burden can be explained by the different levels of the maladaptive coping strategies individuals use. Moreover, in general, extraversion and conscientiousness have been found to predict greater use of problem solving and cognitive restructuring and less use of maladaptive coping efforts (Connor-Smith & Flachsbart, 2007). Additionally, consistent with our predictions, higher levels of extraversion were found to affect decreased caregiver burden indirectly through high perceived social support and increased use of challenge appraisals. Previous studies have also shown that extraversion is related to greater social support satisfaction and to better outcomes in dementia caregivers (Reis et al., 1994).

In addition, neuroticism was also linked to lower caregiver burden through a tendency to use less problem-focused coping. That is, people high in neuroticism use less problem-focused coping strategies, which in turn is related to a lower level of caregiver burden. Also, high problem-focused coping strategies mediated the relationship between high extraversion/conscientiousness and decreased caregiver burden. Surprisingly, the direction of the relationship was contrary to the original prediction.

However, the literature is mixed concerning the direction of the relationship between problem-focused coping and stress. Some studies have found problem-focused coping to be associated with less distress and fewer depressive symptoms (Abbeduto et al., 2004; Folkman et al., 1988), whereas others have found little effect of problem-focused coping on emotional distress (Baum, Fleming, & Singer, 1983), depressive symptoms, mastery of job skills, and job performance (Nelson & Sutton, 1990), and others have found a positive association between problem-focused coping and stress. For example, Pottie and Ingram (2008) examined daily psychological distress and well-being in parents of children with ASD and found that increased use of problem-focused coping predicted higher levels of daily negative mood. In part, these disparate findings may be explained by the matching hypothesis (Folkman & Moskowitz, 2004; McGrew & Keyes, 2014). That is, the usefulness of a coping style may depend on the type of problem (Pearlin & Schooler, 1987). For ex-

ample, unsolvable problems may be better approached through use of emotional approach strategies. It is likely that when facing high demands, such as taking care of a child with ASD and helping him/her through the transition period, it is impossible to fix the source of the problem using problem-focused coping, and the use of problem-focused coping may be contraindicated. In addition, the direction of the causal arrow between stress and coping does not necessarily proceed from coping to stress. High stress situations may demand greater efforts to cope, and lower use of problem-focused coping may simply be an indication of lower levels of demand or stress. That is, it may not be that less coping “leads” to less stress, rather, decreased stress may require a more minimal coping response.

In sum, the results indicated that the relationships between burden and personality traits in general are mediated by caregivers’ coping strategies, with the strongest mediator being maladaptive coping strategies. The “negative” personality trait (i.e., neuroticism) affected increased burden indirectly through the increased use of passive-avoidance coping, whereas the “positive” personality traits (i.e., extraversion, conscientiousness) impacted decreased burden indirectly through the decreased use of passive-avoidance coping. When considered as a whole, the results suggest that personality traits did not add substantially to the overall predictiveness of the Double ABCX model. That is, none of the traits emerged as independent predictors in the regression, and more proximal predictors (e.g., coping strategies) largely explained the associations with burden. Thus, as first described and explained by Lazarus and Folkman (1984), more proximal predictors such as coping behavior largely explained the relationship between traits and burden.

4.5 The Double ABCX Model

As has been true in prior studies, the Double ABCX Model proved to be very useful in describing and explaining factors related to burden (Manning et al., 2011; Pakenham et al., 2005; Stuart & McGrew, 2009). This is one of the very first studies that has examined the relationships between personality traits in caregivers of individuals with ASD and caregiver burden, and the first study examining parent stress in the transition period, using the Double

ABCX model. Impressively, the Double ABCX model explained over half of the variance in caregiver burden. In prior studies with ASD, the model has done similarly well, explaining as much as 81% of the variance in caregiver burden (Stuart & McGrew, 2009). Overall, the model seems to have robust generalizability and provides an overall framework for understanding family outcomes for many diagnoses and conditions. For example, it has been used successfully with different populations, e.g., parents of children with intellectual disability, parents of children with tracheostomy (Joseph et al., 2014; Soloviita, Italinna, & Leinonen, 2003) and in other periods of life. The model is also flexible, allowing for the testing of new predictors.

4.6 Supplemental Results

Unlike many of the studies in the ASD literature (Cadman et al., 2012; Dunn et al., 2011; Lovell et al., 2014; Pakenham et al., 2005; Seltzer et al., 2001), the current study recruited relatively equal amount of fathers and mothers, which provided the opportunity to compare results across the two genders. For the most part, male and female caregivers were not different on the study variables. Interestingly, however, there was a significant gender difference in the associations between extraversion and burden. Specifically, being high in extraversion was related to reduced burden in mothers only, not in fathers. Yamada et al. (2012) presented similar findings. In particular, in parents of children with PDDs, high extraversion was related to better physical and mental health in mothers, but not in fathers. Similarly, extraversion in mothers, but not fathers, of children with spina bifida has been found to explain lower levels of parenting stress (Vermaes et al., 2008). These studies seem to suggest that being extraverted may help alleviate stress only in female caregivers. To help understand this gender difference in the current study, mediation analyses were conducted. The results indicated that being high in extraversion was associated with reduced caregiver burden through decreased use of passive-avoidance coping in mothers of individuals with ASD, but not in fathers. It is not clear if use of passive-avoidance coping would similarly explain the gender differences in the other studies cited. However, preliminar-

ily, it is speculated that extraversion may serve as a protective factor in female caregivers through decreased use of maladaptive coping strategies. Clearly, further studies are needed both to replicate the gender difference and to more carefully isolate the potential reasons for and implications of the difference for caregiver adjustment.

4.7 Study Limitations

The study has several limitations. First, the majority of the participants in the study were white, highly educated, and less reliant on public assistance. Although these characteristics are often seen in the autism literature (Manning et al., 2011; McStay et al., 2014; Stuart & McGrew, 2009), it could potentially affect the validity of the results and may limit the ability to generalize the results to different populations. In addition, over half of the individuals with ASD in the study are going to college, indicating higher functioning in the children of the current participants, which could potentially limit the generalizability of the results. However, as has already been noted, unlike past studies (Pakenham et al., 2005; Seltzer et al., 2001), this study recruited relative equal amount of fathers and mothers, which, in addition to giving the study the power to compare gender similarities and differences in male and female caregivers, suggests that the study findings may be generalizable to both genders.

Another limitation is that the majority of the participants were recruited through Amazon Mechanical Turk. First, participants must have access to computers to complete the survey online. Therefore, caregivers who participated in the study might have been more computer savvy or have higher socioeconomic status (SES) than non-participants. As a result, the generalizability of the results might be limited. Furthermore, the rate of unusable responses from MTurk was relatively high, equaling 30% of the participants recruited on MTurk. Of those participants who needed to be excluded from the study, 31% did not meet the study inclusion criteria, 21% missed at least one validity check question, and 48% provided invalid or inconsistent responses. In the current study, several layers of validity check had to

be conducted. These high rates of unusable responses from participants poses some doubts on the usefulness of recruitment and data collection on MTurk, at least for clinical samples.

Further limitations include the study design. Because the study was cross-sectional, it is not possible to make inferences about causation. In addition, family adjustment is a process that changes over time (McCubbin & Patterson, 1983), so a longitudinal study is necessary to examine family adaptation over time and unravel the causalities among the variables in the model. The study also relied exclusively on caregivers' self-report. The accuracy of self-report might be affected by recall bias, social desirability bias, and self-observation errors. For example, the two main inclusion criteria of the study (i.e., SCQ score and professional diagnosis) depended on participants' self-report rather than independent evaluation verifying the ASD diagnosis, which is ideally preferred. Moreover, as further evidence of the potential problems with self-report, as noted above, the sample displayed a high rate of invalid data. Therefore, the current study and similar studies might be vulnerable to inaccurate self-report. Future studies should employ multiple assessment techniques (e.g., interviews, observation).

This study also only focused on a single measure of family outcomes, which makes it harder to examine the overall family functioning in different domains, such as physical or psychological quality of life, and to compare which domain is impacted the most. Future studies should use multiple measures of adjustment. Lastly, the study had a relatively small sample size, which limits the study's power to conduct some statistical analyses, such as path analyses.

4.8 Summary, Implications, and Future Directions

To my knowledge, no prior studies have examined the impact of personality traits on caregiver burden in parents of children with ASD in general, or during the transition period, specifically. The study found that caregivers' personality traits are related to burden, and the association works primarily through the maladaptive coping strategies parents adopt. Therefore, in designing parent interventions, professionals should consider caregivers' per-

sonality traits and the cognitive appraisal styles and coping strategies they tend to engage in and adjust the treatment plan accordingly to help parents reduce stress more effectively. Several other factors also were identified in this study that could help alleviate burden, such as social support from families, friends, ASD community, and providers, increased use of positive cognitive appraisal styles, decreased use of negative appraisals, and decreased use of passive-avoidance coping strategies. Problem behaviors in particular were related to increased caregiver burden during the transition period. This suggests that parent interventions, parent support services, or programs in the community could provide support or strategies to parents to handle behavioral problems and reduce burden. In addition, given that contextual support was related to reduced burden, providers of families raising children with ASD should be sensitive to parents' stress and open to provide support. Furthermore, in interventions, parents should be encouraged to use challenge appraisals and avoid using threat appraisals and passive-avoidance coping strategies.

Future studies should examine long term adaptation in families after their children finish transition. The findings in this study could also be applied in future longitudinal studies to examine whether changes in coping strategies could alleviate caregiver burden over time. It would be interesting to examine if parent activation strategies could help decrease the use of passive-avoidance coping and in turn decrease burden. Furthermore, the gender differences in personality traits and burden found in this study need to be replicated and examined carefully for potential reasons and implications of the difference for caregiver adjustment.

Future studies should also use multiple outcome measures to provide a more holistic conceptualization of the functioning in families of individuals with ASD. In addition to negative outcome measures, positive outcomes, such as benefit finding, could also be added to the measures to explore further whether "positive" personality traits, coping strategies, and appraisals are more predictive of positive outcomes. Also, a larger sample size is preferred in future studies because it will grant additional power to run path analyses and further explore the connections among stressors, personality traits, appraisal styles, coping strategies, social support, and parent stress.

REFERENCES

REFERENCES

- Abbeduto, L., Seltzer, M. M., Shattuck, P., Krauss, M. W., Orsmond, G., & Murphy, M. M. (2004). Psychological well-being and coping in mothers of youths with autism, Down syndrome, or fragile X syndrome. *American Journal of Mental Retardation : AJMR*, *109*, 237–254. doi: 10.1352/0895-8017
- Adelman, R. D., Tmanova, L. L., Delgado, D., Dion, S., & Lachs, M. S. (2014). Caregiver burden: a clinical review. *JAMA : The Journal of the American Medical Association*, *311*, 1052–60. doi: 10.1001/jama.2014.304
- Allik, H., Larsson, J. O., & Smidge, H. (2006). Health-related quality of life in parents of school-age children with Asperger syndrome or high-functioning autism. *Health and quality of life outcomes*, *4*, 1.
- Ballaban-Gil, K., Rapin, I., Tuchman, R., & Shinnar, S. (1996). Longitudinal examination of the behavioral, language, and social changes in a population of adolescents and young adults with autistic disorder. *Pediatr Neurol*, *15*, 217–223. doi: 10.1016/S0887-8994(96)00219-6
- Barker, E. T., Hartley, S. L., Seltzer, M. M., Floyd, F. J., Greenberg, J. S., & Orsmond, G. I. (2011). Trajectories of emotional well-being in mothers of adolescents and adults with autism. *Developmental Psychology*, *47*, 551–561. doi: 10.1037/a0021268
- Baum, A., Fleming, R., & Singer, J. E. (1983). Coping with victimization by technological disaster. *Journal of Social Issues*, *39*, 117-138.

- Bekhet, A. K., Johnson, N. L., & Zauszniewski, J. a. (2012). Resilience in family members of persons with autism spectrum disorder: A review of the literature. *Issues in Mental Health Nursing, 33*, 650–656. doi: 10.3109/01612840.2012.671441
- Benson, P. R. (2010). Coping, distress, and well-being in mothers of children with autism. *Research in Autism Spectrum Disorders, 4*, 217–228. doi: 10.1016/j.rasd.2009.09.008
- Benson, P. R., & Kersh, J. (2011). Marital quality and psychological adjustment among mothers of children with ASD: Cross-sectional and longitudinal relationships. *Journal of Autism and Developmental Disorders, 41*, 1675–1685.
- Bianco, M., Garrison-Wade, D. F., Tobin, R., & Lehmann, J. P. (2009). Parents' perceptions of postschool years for young adults with developmental disabilities. *Intellectual and Developmental Disabilities, 47*, 186–196. doi: 10.1352/1934-9556-47.3.186
- Blacher, J. (2001). Transition to adulthood: mental retardation, families, and culture. *American Journal of Mental Retardation : AJMR, 106*, 173–188. doi: 10.1352/0895-8017
- Bogg, T., & Roberts, B. (2004). Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin, 130*, 887–919. doi: 10.1037/0033-2909.130.6.887
- Brannan, A. M., & Heflinger, C. A. (1997). The caregiver strain questionnaire: Measuring the impact on the family of living with a child with serious emotional disturbance. *Journal of Emotional & Behavioral Disorders, 5*, 212-222.

- Bristol, M. M. (1987). Mothers of children with autism or communication disorders: Successful adaptation and the double ABCX model. *Journal of Autism and Developmental Disorders*, *17*, 469–486. doi: 10.1007/BF01486964
- Bromley, J., Hare, D. J., Davison, K., & Emerson, E. (2004). Mothers supporting children with autistic spectrum disorders: social support, mental health status and satisfaction with services. *Autism : The International Journal of Research and Practice*, *8*, 409–423. doi: 10.1177/1362361304047224
- Cadman, T., Eklund, H., Howley, D., Hayward, H., Clarke, H., Findon, J., ... Glaser, K. (2012). Caregiver burden as people with autism spectrum disorder and attention-deficit/hyperactivity disorder transition into adolescence and adulthood in the United Kingdom. *Journal of the American Academy of Child and Adolescent Psychiatry*, *51*, 879–888.
- Campbell, P., Wright, J., Oyebode, J., Job, D., Crome, P., Bentham, P., ... Lendon, C. (2008). Determinants of burden in those who care for someone with dementia. *International Journal of Geriatric Psychiatry*, *23*, 1078–85. doi: 10.1002/gps.2071
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. *International Journal of Behavioral Medicine*, *4*, 92-100.
- Casey, L. B., Zanksas, S., Meindl, J. N., Parra, G. R., Cogdal, P., & Powell, K. (2012). Parental symptoms of posttraumatic stress following a child's diagnosis of autism spectrum disorder: A pilot study. *Research in Autism Spectrum Disorders*, *6*, 1186–1193. doi: 10.1016/j.rasd.2012.03.008

- Chambers, C., & Hughes, C. (2004). Parent and sibling perspectives on the transition to adulthood. *Education and Training in*, 39, 79–94.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159.
- Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: a meta-analysis. *Journal of Personality and Social Psychology*, 93, 1080–1107.
doi: 10.1037/0022-3514.93.6.1080
- Costa, P. T., & McCrae, R. R. (1992). Four ways five factors are basic. *Personality and Individual Differences*, 13, 653–665. doi: 10.1016/0191-8869(92)90236-I
- David, J. P., & Suls, J. (1999). Coping efforts in daily life: Role of big five traits and problem appraisals. *Journal of Personality*, 67, 265–294. doi: 10.1111/1467-6494.00056
- Davis, N. O., & Carter, A. S. (2008). Parenting stress in mothers and fathers of toddlers with autism spectrum disorders: Associations with child characteristics. *Journal of Autism and Developmental Disorders*, 38, 1278–1291. doi: 10.1007/s10803-007-0512-z
- Developmental, D. M. N. S. Y., & 2010 Principal Investigators. (2014). Prevalence of autism spectrum disorder among children aged 8 years-autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *Morbidity and mortality weekly report. Surveillance summaries (Washington, DC: 2002)*, 63, 1.
- Dunn, M. E., Burbine, T., Bowers, C. A., & Tantleff-Dunn, S. (2001). Moderators of stress in parents of children with autism. *Community mental health journal*, 37, 39-52.

- Eapen, V. (2016). Parental quality of life in autism spectrum disorder: Current status and future directions. *Acta Psychopathologica*, 2.
- Ekas, N., & Whitman, T. L. (2010). Autism symptom topography and maternal socioemotional functioning. *American Journal on Intellectual and Developmental Disabilities*, 115, 234–249. doi: 10.1352/1944-7558-115.3.234
- Ekas, N. V., Lickenbrock, D. M., & Whitman, T. L. (2010). Optimism, social support, and well-being in mothers of children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 40, 1274–1284. doi: 10.1007/s10803-010-0986-y
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41, 1149–1160. doi:10.3758/BRM.41.4.1149
- Fombonne, E. (2009). Epidemiology of pervasive developmental disorders. *Pediatric research*, 65, 591-598.
- Fritz, M. S., & MacKinnon, D. P. (2007). Required sample size to detect the mediated effect. *Psychological Science*, 18, 233–239. doi:10.1111/j.1467-9280.2007.01882.x
- Gill, M. J., & Harris, S. L. (1991). Hardiness and social support as predictors of psychological discomfort in mothers of children with autism. *Journal of Autism and Developmental Disorders*, 21, 407–416.
- Goldberg, L. R. (1990). An alternative “description of personality”: The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59, 1216–1229. doi: 10.1037/0022-3514.59.6.1216

- Hall, H. R., & Graff, J. C. (2011). The relationships among adaptive behaviors of children with autism, family support, parenting stress, and coping. *Issues in Comprehensive Pediatric Nursing, 34*, 4–25. doi: 10.3109/01460862.2011.555270
- Hall, H. R., & Graff, J. C. (2012). Maladaptive behaviors of children with autism: parent support, stress, and coping. *Issues in Comprehensive Pediatric Nursing, 35*, 194–214. doi: 10.3109/01460862.2012.734210
- Hamlyn-Wright, S., Draghi-Lorenz, R., & Ellis, J. (2007). Locus of control fails to mediate between stress and anxiety and depression in parents of children with a developmental disorder. *Autism, 11*, 489-501.
- Hanley-maxwell, C., Whitney-thomas, J., & Pogoloff, S. M. (1995). The second shock: A qualitative study of parents' perspectives and needs during their child's transition from school to adult life. *Research and Practice for Persons with Severe Disabilities, 20*, 3–15.
- Hastings, R. P., & Johnson, E. (2001). Stress in UK families conducting intensive home-based behavioral intervention for their young child with autism. *Journal of Autism and Developmental Disorders, 31*, 327–336. doi: 10.1023/A:1010799320795
- Hastings, R. P., Kovshoff, H., Brown, T., Ward, N. J., Espinosa, F. D., & Remington, B. (2005). Coping strategies in mothers and fathers of preschool and school-age children with autism. *Autism : The International Journal of Research and Practice, 9*, 377–391. doi: 10.1177/1362361305056078

- Hastings, R. P., Kovshoff, H., Ward, N. J., Degli Espinosa, F., Brown, T., & Remington, B. (2005). Systems analysis of stress and positive perceptions in mothers and fathers of pre-school children with autism. *Journal of autism and developmental disorders*, *35*, 635-644.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Press.
- Hayes, S. A., & Watson, S. L. (2013). The impact of parenting stress: A meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *43*, 629–642. doi: 10.1007/s10803-012-1604-y
- Hill, R. (1949). *Families under stress: Adjustment to the crises of war separation and reunion*. New York, Harper & Brothers.
- Hoffman, C. D., Sweeney, D. P., Hodge, D., Lopez-Wagner, M. C., & Looney, L. (2009). Parenting stress and closeness mothers of typically developing children and mothers of children with autism. *Focus on Autism and Other Developmental Disabilities*, *24*, 178-187. doi: 10.1177/1088357609338715
- Holahan, C. J., Moos, R. H., Holahan, C. K., Brennan, P. L., & Schutte, K. K. (2005). Stress generation, avoidance coping, and depressive symptoms: A 10-year model. *Journal of consulting and clinical psychology*, *73*, 658.
- Holmes, T. H., & Rahe, R. H. (1967). The social readjustment rating scale. *Journal of Psychosomatic Research*, *11*, 213–218. doi: 10.1016/0022-3999(67)90010-4
- Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcome for children with autism. *Journal of Child Psychology and Psychiatry*, *45*, 212–229.

- Hoyle, R. H. (Ed.). (1995). *Structural equation modeling: Concepts, issues, and applications*. Sage Publications.
- Ingersoll, B., & Hambrick, D. Z. (2011). The relationship between the broader autism phenotype, child severity, and stress and depression in parents of children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 5*, 337–344. doi: 10.1016/j.rasd.2010.04.017
- Jobe, B. M., & Glidden, L. M. (2008). Predicting maternal rewards and worries for the transition to adulthood of children with developmental disabilities. *Journal on Developmental Disabilities, 14*, 73–84.
- Jones, J., & Passey, J. (2004). Family adaptation, coping and resources: Parents of children with developmental disabilities and behaviour problems. *Journal on Developmental Disabilities, 11*, 31–46.
- Jöreskog, K.G. & Sörbom, D. (2015). LISREL 9.20 for Windows [Computer software]. Skokie, IL: Scientific Software International, Inc.
- Joseph, R. A., Goodfellow, L. M., & Simko, L. C. (2014). Double ABCX model of stress and adaptation in the context of families that care for children with a tracheostomy at home: Application of a theory. *Advances in Neonatal Care, 14*, 172-180.
- Karst, J. S., & van Hecke, A. V. (2012). Parent and family impact of autism spectrum disorders: A review and proposed model for intervention evaluation. *Clinical Child and Family Psychology Review, 15*, 247–277. doi: 10.1007/s10567-012-0119-6

- Kausar, R., & Powell, G. E. (1999). Coping with caring: Cognitive appraisal of post onset personality and physical changes in patients with neurological disorders. *Asia Pacific Disability Rehabilitation Journal (India)*, *10*, 58-63.
- Khanna, R., Madhavan, S. S., Smith, M. J., Patrick, J. H., Tworek, C., & Becker-Cottrill, B. (2011). Assessment of health-related quality of life among primary caregivers of children with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, *41*, 1214–1227. doi: 10.1007/s10803-010-1140-6
- Kirby, A. V., White, T. J., & Baranek, G. T. (2015). Caregiver strain and sensory features in children with autism spectrum disorder and other developmental disabilities. *American journal on intellectual and developmental disabilities*, *120*, 32-45.
- Koegel, R. L., Schreibman, L., Loos, L. M., Dirlich-Wilhelm, H., Dunlap, G., Robbins, F. R., & Plienis, A. J. (1992). Consistent stress profiles in mothers of children with autism. *Journal of Autism and Developmental Disorders*, *22*, 205–216. doi: 10.1007/BF01058151
- Kring, S. R., Greenberg, J. S., & Seltzer, M. M. (2008). Adolescents and adults with autism with and without co-morbid psychiatric disorders: Differences in maternal well-being. *Journal of Mental Health Research in Intellectual Disabilities*, *1*, 53-74.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lecavalier, L., Leone, S., & Wiltz, J. (2006). The impact of behavior problems on caregiver stress in young people with autism spectrum disorders. *Journal of Intellectual Disability Research*, *50*, 172-183.

- Lee, G. K., Lopata, C., Volker, M. A., Thomeer, M. L., Toomey, J. A., Rodgers, J. D., ... McDonald, C. A. (2012). Stress, resiliency factors, quality of life among caregivers of children with high functioning autism spectrum disorders (HFASDs). *The Australian Journal of Rehabilitation Counselling, 18*, 25–36. doi: 10.1017/jrc.2012.5
- Löckenhoff, C. E., Duberstein, P. R., Friedman, B., & Costa, P. T. (2011). Five-factor personality traits and subjective health among caregivers: The role of caregiver strain and self-efficacy. *Psychology and Aging, 26*, 592–604. doi: 10.1037/a0022209
- Lounds, J., Seltzer, M. M., Greenberg, J. S., & Shattuck, P. T. (2007). Transition and change in adolescents and young adults with autism: longitudinal effects on maternal well-being. *American Journal of Mental Retardation : AJMR, 112*, 401–417. doi: 10.1352/0895-8017
- Lovell, B., Elliot, H., Liu, C. C. S., & Wetherell, M. A. (2014). Memory failures for everyday tasks in caregivers of children with autism. *Research in developmental disabilities, 35*, 3057-3061.
- Mak, W. W., Ho, A. H., & Law, R. W. (2007). Sense of coherence, parenting attitudes and stress among mothers of children with autism in Hong Kong. *Journal of Applied Research in Intellectual Disabilities, 20*, 157-167.
- McCubbin, H. I., & Patterson, J. M. (1983). The family stress process: The double ABCX model of adjustment and adaptation. *Marriage & Family Review, 6*, 7-37.

- Mackay, C., & Pakenham, K. (2012). A stress and coping model of adjustment to caring for an adult with mental illness. *Community Mental Health Journal, 48*, 450–462. doi: 10.1007/s10597-011-9435-4
- Manning, M. M., Wainwright, L., & Bennett, J. (2011). The double ABCX model of adaptation in racially diverse families with a school-age child with autism. *Journal of Autism and Developmental Disorders, 41*, 320–331. doi: 10.1007/s10803-010-1056-1
- McCrae, R. R., & Costa, P. T. (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences, 36*, 587–596. doi: 10.1016/S0191-8869(03)00118-1
- McCubbin, H. I., & Patterson, J. M. (1983). The family stress process: The double ABCX model of adjustment and adaptation. *Marriage & Family Review, 6*, 7-37.
- McGrew, J. H., & Keyes, M. L. (2014). Caregiver stress during the first year after diagnosis of an Autism Spectrum Disorder. *Research in Autism Spectrum Disorders, 8*, 1373–1385. doi: 10.1016/j.rasd.2014.07.011
- McStay, R. L., Trembath, D., & Dissanayake, C. (2014). Stress and family quality of life in parents of children with autism spectrum disorder: parent gender and the double ABCX model. *Journal of Autism and Developmental Disorders, 44*, 3101–3118. doi: 10.1007/s10803-014-2178-7
- Melo, G., Maroco, J., & De Mendonça, A. (2011). Influence of personality on caregiver's burden, depression and distress related to the BPSD. *International Journal of Geriatric Psychiatry, 26*, 1275–1282. doi: 10.1002/gps.2677

- Nelson, D. L., & Sutton, C. (1990). Chronic work stress and coping: A longitudinal study and suggested new directions. *Academy of Management Journal*, 33, 859-869.
- Norris, M., & Lecavalier, L. (2010). Screening accuracy of Level 2 autism spectrum disorder rating scales. A review of selected instruments. *Autism : The International Journal of Research and Practice*, 14, 263–284. doi: 10.1177/1362361309348071
- O'Brien, T. B., & DeLongis, A. (1996). The interactional context of problem-, emotion-, and relationship-focused coping: The role of the big five personality factors. *Journal of personality*, 64, 775-813.
- Pakenham, K. I., Samios, C., & Sofronoff, K. (2005). Adjustment in mothers of children with Asperger syndrome: an application of the double ABCX model of family adjustment. *Autism : The International Journal of Research and Practice*, 9, 191–212. doi: 10.1177/1362361305049033
- Peacock, E., & Wong, P. (1990). The stress appraisal measure (SAM): A multidimensional approach to cognitive appraisal. *Stress Medicine*, 6, 227-236.
- Penley, J. A., & Tomaka, J. (2002). Associations among the Big Five, emotional responses, and coping with acute stress. *Personality and Individual Differences*, 32, 1215–1228. doi: 10.1016/S0191-8869(01)00087-3
- Pisula, E., & Kossakowska, Z. (2010). Sense of coherence and coping with stress among mothers and fathers of children with autism. *Journal of autism and developmental disorders*, 40, 1485-1494.

- Pottie, C. G., & Ingram, K. M. (2008). Daily stress, coping, and well-being in parents of children with autism: a multilevel modeling approach. *Journal of Family Psychology, 22*, 855.
- Pozo, P., Sarriá, E., & Brioso, A. (2013). Family quality of life and psychological well-being in parents of children with autism spectrum disorders: A double ABCX model. *Journal of Intellectual Disability Research, 58*, 442–458. doi: /10.1111/jir.12042
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers : A Journal of the Psychonomic Society, Inc, 36*, 717–731. doi: 10.3758/BF03206553
- Reis, M. F., Gold, D. P., Andres, D., Markiewicz, D., & Gauthier, S. (1994). Personality traits as determinants of burden and health complaints in caregiving. *International Journal of Aging & Human Development, 39*, 257–271.
- Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality, 69*, 617–640. doi: 10.1111/1467-6494.694157
- Rutter, M., Bailey, A., & Lord, C. (2003). SCQ. *The Social Communication Questionnaire. CA: Western Psychological Services.*
- Saloviita, T., Itälina, M., & Leinonen, E. (2003). Explaining the parental stress of fathers and mothers caring for a child with intellectual disability: A double ABCX model. *Journal of Intellectual Disability Research, 47*, 300-312.

- Schneider, T. R., Rench, T. a., Lyons, J. B., & Riffle, R. R. (2012). The influence of neuroticism, extraversion and openness on stress responses. *Stress and Health, 28*, 102–110. doi: 10.1002/smi.1409
- Shurgot, G. R., & Knight, B. G. (2005). Influence of neuroticism, ethnicity, familism, and social support on perceived burden in dementia caregivers: pilot test of the transactional stress and social support model. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 60*, P331–P334.
- Siman-Tov, A., & Kaniel, S. (2011). Stress and personal resource as predictors of the adjustment of parents to autistic children: A multivariate model. *Journal of Autism and Developmental Disorders, 41*, 879–890. doi: 10.1007/s10803-010-1112-x
- Sivberg, B. (2002). Family system and coping behaviors: A comparison between parents of children with autistic spectrum disorders and parents with non-autistic children. *Autism, 6*, 397-409.
- Smith, L. E., Greenberg, J. S., & Seltzer, M. M. (2012). Social support and well-being at mid-life among mothers of adolescents and adults with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 42*, 1818–1826. doi: 10.1007/s10803-011-1420-9
- Smith, L. E., Greenberg, J. S., & Seltzer, M. M. (2012). Social support and well-being at mid-life among mothers of adolescents and adults with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 42*, 1818–1826. doi: 10.1007/s10803-011-1420-9

- Smith, L. E., Seltzer, M. M., Tager-Flusberg, H., Greenberg, J. S., & Carter, A. S. (2008). A comparative analysis of well-being and coping among mothers of toddlers and mothers of adolescents with ASD. *Journal of Autism and Developmental Disorders, 38*, 876–889. doi: 10.1007/s10803-007-0461-6
- Stone, W., Ruble, L., Coonrod, E., Hepburn, S., Pennington, M., Burnette, C., Brigham, N. B. (2010). *TRIAD Social Skills Assessment manual*. Nashville, TN: Treatment and Research Institute for Autism Spectrum Disorders.
- Stuart, M., & McGrew, J. H. (2009). Caregiver burden after receiving a diagnosis of an autism spectrum disorder. *Research in Autism Spectrum Disorders, 3*, 86–97. doi: 10.1016/j.rasd.2008.04.006
- Suzumura, S. (2015). Quality of life in mothers of preschoolers with high-functioning pervasive developmental disorders. *Pediatrics International, 57*, 149-154.
- Tehee, E., Honan, R., & Hevey, D. (2009). Factors contributing to stress in parents of individuals with autistic spectrum disorders. *Journal of Applied Research in Intellectual Disabilities, 22*, 34–42. doi: 10.1111/j.1468-3148.2008.00437.x
- Tobing, L. E., & Glenwick, D. S. (2006). Predictors and moderators of psychological distress in mothers of children with pervasive developmental disorders. *Journal of Family Social Work, 10*, 1–23. doi: 10.1300/J039v10n04
- Van der Lee, J., Bakker, T. J., Duivenvoorden, H. J., & Dröes, R. M. (2014). Multivariate models of subjective caregiver burden in dementia: A systematic review. *Ageing Research Reviews, 15*, 76-93.

- Vermaes, I. P. R., Janssens, J. M. A. M., Mullaart, R. A., Vinck, A., & Gerris, J. R. M. (2008). Parents' personality and parenting stress in families of children with spina bifida. *Child: Care, Health and Development*, 34, 665-674.
- Vogan, V., Lake, J. K., Weiss, J. a., Robinson, S., Tint, A., & Lunsy, Y. (2014). Factors associated with caregiver burden among parents of individuals with ASD: Differences across intellectual functioning. *Family Relations*, 63, 554–567. doi: 10.1111/fare.12081
- Yamada, A., Kato, M., Suzuki, M., Suzuki, M., Watanabe, N., Akechi, T., & Furukawa, T. A. (2012). Quality of life of parents raising children with pervasive developmental disorders. *BMC psychiatry*, 12, 1.
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52, 30-41.

APPENDICES

A. TABLES

Table A.1. Double ABCX Model Elements, Measures to Assess Elements, and Internal Consistency of Study Measures.

Double ABCX Model	Variables	Measures	Internal Consistency	Number of Items Showing Missing Data
Independent Variables:				
Stressor (A)	Autism symptom severity	SCQ	0.73	3
	Problem behaviors	PBRS	0.93	2
Pile-up demands (aA)	Recent life events	Modified SRRS	0.86	3
	Transition related demands	TSQ	0.81	1
Internal Resources (B)	Big Five Personality Traits	NEO-FFI	0.72	9
	<i>Neuroticism</i>		0.91	
	<i>Extraversion</i>		0.82	
	<i>Conscientiousness</i>		0.83	
	<i>Agreeableness</i>		0.70	
	<i>Openness</i>		0.75	
External Resources (bB)	General Social Support	Modified MSPSS	0.95	2
	Contextual Social Support	CPSS	0.93	2
Cognitive Appraisal (C)	Caregiver appraisals	SAM		2
	<i>Challenge Appraisals</i>		0.69	
	<i>Threat Appraisals</i>		0.68	
Coping Strategies (cC)	Coping strategies	Brief Cope		5
	<i>Problem-focused coping</i>		0.83	
	<i>Passive-avoidance coping</i>		0.82	
	<i>Emotional Approach</i>		0.76	
Dependent Variables:				
Outcome (X)	Individual caregiving burden	CGSQ	0.95	0
	<i>Objective Strain</i>		0.87	
	<i>Internalized Subjective Strain</i>		0.87	
	<i>Externalized Subjective Strain</i>		0.85	

Note. SCQ: The Social Communication Questionnaire; PBRS: Problem Behavior Rating Scale; SRRS: Social Readjustment Rating Scale; TSQ: Transition Stress Questionnaires; NEO-FFI: Neo Five Factor Index; MSPSS: Multidimensional Scale of Perceived Social Support; CPSS: Contextual Perceived Social Support; SAM: The Stress Appraisal Measure; CGSQ: Caregiver Strain Questionnaire.

Table A.2. Excluded Participants and Reasons for Exclusions

Reasons Being Excluded	Sources	
	MTurk	Non MTurk
1. Not Meeting study inclusion criteria (n = 16)		
SCQ < 11	0	1
Non US residents	6	
Graduated from high school more than two years ago	10	
More than two years until graduation from high school	5	
Does not have an official ASD diagnosis	1	
Participant was not the caregiver	2	
2. Missed one or more validity check questions (n = 12)	10	2
3. Invalid/Inconsistent Answers (n = 23)		
Took the survey more than once	13	
The age difference between the biological parent and child is smaller than 16	4	
Current academic status is inconsistent with graduation date	3	
Selected same response on the Likert scale for all items on a questionnaire	3	

Note. Mturk= Amazon Mechanical Turk.

Table A.3. Demographic Information of Caregivers and Their Children with ASD

Parent Variables	Categories of Variables	Mean (SD)	N	%
Age		43.05 (5.26)		
Gender	Male		63	53.8
	Female		54	46.2
Race	White		99	84.6
	Black or African American		7	6.0
	Asian		2	1.7
	Hispanic or Latino		8	6.8
	Other: Black and White		1	.9
Current Relationship Status	Married		86	73.5
	Single		11	9.4
	Divorced		8	6.8
	Widowed		2	1.7
	Separated		2	1.7
	Cohabiting		8	6.8
Employment Status	Working Full Time (35 + Hours a Week)		91	77.8
	Working Part Time		11	9.4
	Homemaker		12	10.3
	Unemployed, Looking for Work		2	1.7
	Unemployed, Not Looking for Work		0	0

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Table A.3.: continued

Disabled	2	1.7
Retired	1	0.9
Student, Full Time	0	0
Student, Part Time	0	0
Other: Self-Employed	1	0.9
Education Level	1	.9
High School Graduate or GED	18	15.4
Some College	21	17.9
Technical or Trade School	8	6.8
College Graduate	56	47.9
Advanced Graduate or Professional Degree	12	10.3
Annual Income	6	5.1
Less Than or Equal to \$20,000	20	17.1
\$20,001 - \$40,000	35	29.9
\$40,001 - \$60,000	23	19.7
\$60,001 - \$80,000	33	28.2
More Than \$80,000		
Children With ASD	N	%
Child's Age		17.36 (1.48)
Gender	95	81.2
Male		
Female	22	18.8
Child's Status After Graduating From High School	16	13.7
Work/Employment		

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Table A.3.: continued

College/University	30	25.6
Vocational School	9	7.7
Community College	33	28.2
Day Program	8	6.8
Stay Home	15	12.8
Other: Undecided (N = 5), Military (N = 1)	6	5.1
Child's Living Situation After Graduating From High School	6	5.1
Living Independently	14	12.0
Living Independently but With Assistance	1	.9
Residential Placement	94	80.3
Live with Parents	2	1.7
Other: Undecided, Dorm and Home		

Table A.4. Study Variables Means, Standard Deviations, and Confidence Intervals

Variables	Mean	SD	95% Confidence Interval	
<i>Independent Variables</i>				
Symptom Severity	24.24	5.58	23.22	25.26
Problem Behavior	1.96	0.50	1.87	2.05
Pile up of Demands	16.68	13.13	14.28	19.09
Transition-Related Demands	14.50	4.33	13.71	15.30
Personality Traits				
Neuroticism	29.74	9.55	27.99	31.48
Extraversion	40.26	7.12	38.95	41.56
Conscientiousness	47.66	6.12	46.54	48.78
Openness	40.40	6.93	39.13	41.67
Agreeableness	42.98	5.52	41.97	43.99
Social Support				
General Social Support	5.70	1.03	5.51	5.89
Contextual Social Support	5.29	1.16	5.07	5.50
Cognitive Appraisal Styles				
Threat Appraisal	2.22	0.74	2.08	2.35
Challenge Appraisal	3.30	0.72	3.17	3.43
Coping Strategies				
Problem-focused Coping	2.90	0.63	2.78	3.01
Emotional Approach coping	2.44	0.52	2.34	2.54
Passive-avoidance Coping	1.57	0.43	1.50	1.65
<i>Dependent Variables</i>				
Caregiver Burden	2.06	0.75	1.92	2.19
Objective Strain	1.99	.87	1.85	2.14
Internal Subjective Strain	2.46	.92	2.29	2.63
External Subjective Strain	1.82	.82	1.47	1.77

Table A.5. Pearson Correlations between Study Variables

Study Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Symptom Severity	1																
2. Problem Behavior	0.04	1															
3. Pile up of Demands	0.10	.27**	1														
4. Transition-related Demands	0.14	.34**	.32**	1													
5. General Social Support	0.09	-0.05	-0.05	0.09	1												
6. Contextual Social Support	.28**	-0.04	0.03	0.12	.57**	1											
7. Threat Appraisal	-0.02	.29**	.21*	.34**	-.20*	-0.16	1										
8. Challenge Appraisal	.30**	0.05	0.14	.21*	.26**	.33**	-0.17	1									
9. Problem-focused Coping	.19*	.19*	0.15	.41**	.44**	.35**	0.09	.40**	1								
10. Emotional Approach coping	.30**	.31**	.23*	.39**	.36**	.42**	0.12	.47**	.68**	1							
11. Passive-avoidance Coping	0.05	.39**	0.16	0.12	-.37**	-.26**	.46**	-.22*	0.03	0.09	1						
12. Neuroticism	-0.13	.27**	0.14	0.05	-.48**	-.40**	.34**	-.23*	-.25**	-.23*	.58**	1					
13. Openness	-0.09	-0.17	-0.13	-0.11	-0.05	-0.10	0.03	-.20*	-0.13	-.32**	-0.09	0.08	1				
14. Agreeableness	0.04	-.22*	-0.10	-0.02	.40**	.34**	-.21*	.19*	.35**	0.17	-.36**	-.45**	0.15	1			
15. Conscientiousness	0.11	-.19*	-0.12	0.13	.40**	.38**	-0.14	.37**	.44**	.26**	-.41**	-.58**	0.09	.48**	1		
16. Extraversion	.28**	-0.17	0.03	0.17	.53**	.39**	-0.14	.28**	.32**	.29**	-.37**	-.55**	0.02	.50**	.44**	1	
17. Caregiver Burden	-0.04	.48**	0.13	.25**	-.36**	-.21*	.45**	-0.18	0.08	0.06	.67**	.52**	-0.10	-.22*	-.32**	-.31**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table A.6. List of Direct Hypotheses and Results of Correlation Analyses between Caregiver Burden and Independent Variables

	Direct Hypotheses (DHs)	Pearson <i>r</i>	P value
1	More severe autism symptoms relate to greater caregiver burden	-.04	.33
2	More problem behaviors relate to greater caregiver burden	.48**	.000
3	Higher pile-up of demands relate to greater caregiver burden	.13	.08
4	High in neuroticism relates to greater burden	.52**	.000
5	High in extraversion relates to lower levels of burden	-.31**	.000
6	High in conscientiousness relates lower levels of burden	-.32**	.000
7	Greater perceived social support relates to lower levels of burden	-.34**	.000
8	Challenge appraisal relates to lower levels of burden	-.18*	.03
9	Threat appraisal relates to higher levels of burden	.45**	.000
10	Problem-focused coping relates to lower levels of burden	.08	.18
11	Emotional approach relates to lower levels of burden	.06	.26
12	Passive-avoidance coping relates to greater caregiver burden	.67**	.000

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

*Table A.7. Test of Double ABCX Model: Regression Analysis of Variables
Predicting Caregiver Burden*

Variable	B	P	R	R²	F
Step 1			0.21	0.04	0.95
Parents Gender	-0.01	.898			
Parents Age	0.08	.443			
Education Level	0.07	.543			
Income	-0.12	.291			
Receiving Service	0.18	.067			
Step 2			0.51	0.26	5.08**
Parents Gender	-0.01	.885			
Parents Age	0.05	.564			
Education Level	0.06	.526			
Income	-0.09	.385			
Receiving Service	0.14	.108			
Symptom Severity	-0.08	.381			
Problem Behavior	0.46	.000			
Step 3			0.52	0.27	4.01**
Parents Gender	-0.01	.882			
Parents Age	0.04	.627			
Education Level	0.06	.574			
Income	-0.08	.413			
Receiving Service	0.14	.133			
Symptom Severity	-0.09	.338			
Problem Behavior	0.44	.000			
Pile up of demands	-0.03	.747			
Transition-related Demands	0.09	.357			
Step 4			0.67	0.45	6.72**
Parents Gender	-0.09	.246			
Parents Age	-0.02	.815			
Education Level	0.11	.240			
Income	-0.06	.530			
Receiving Service	0.15	.065			
Symptom Severity	-0.02	.765			
Problem Behavior	0.31	.001			
Pile up of demands	-0.07	.374			
Transition-related Demands	0.13	.142			

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Table A.7.: continued

Neuroticism	0.41	.000			
Extraversion	-0.11	.262			
Conscientiousness	0.00	.991			
Step 5			0.70	0.49	6.50**
Parents Gender	-0.08	.305			
Parents Age	-0.04	.659			
Education Level	0.12	.167			
Income	-0.04	.671			
Receiving Service	0.16	.050			
Symptom Severity	-0.04	.614			
Problem Behavior	0.33	.000			
Pile up of demands	-0.09	.299			
Transition-related Demands	0.13	.127			
Neuroticism	0.36	.001			
Extraversion	-0.02	.822			
Conscientiousness	0.02	.811			
General Social Support	-0.23	.025			
Contextual Social Support	0.00	.971			
Step 6			0.73	0.53	6.45**
Parents Gender	-0.07	.404			
Parents Age	-0.05	.518			
Education Level	0.15	.091			
Income	-0.05	.552			
Receiving Service	0.14	.074			
Symptom Severity	-0.03	.685			
Problem Behavior	0.31	.000			
Pile up of demands	-0.10	.234			
Transition-related Demands	0.08	.372			
Neuroticism	0.29	.006			
Extraversion	-0.03	.782			
Conscientiousness	0.01	.901			
General Social Support	-0.22	.031			
Contextual Social Support	0.02	.844			
Threat Appraisal	0.22	.013			
Challenge Appraisal	-0.03	.744			
Step 7			0.80	0.63	8.11**

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Table A.7.: continued

Parents Gender	-0.12	.105			
Parents Age	-0.06	.439			
Education Level	0.09	.237			
Income	-0.04	.602			
Receiving Service	0.13	.068			
Symptom Severity	-0.09	.236			
Problem Behavior	0.22	.006			
Pile up of demands	-0.10	.172			
Transition-related Demands	0.06	.429			
Neuroticism	0.16	.121			
Extraversion	0.00	.968			
Conscientiousness	-0.01	.915			
General Social Support	-0.21	.027			
Contextual Social Support	0.02	.838			
Threat Appraisal	0.11	.179			
Challenge Appraisal	0.01	.904			
Problem-focused coping	0.19	.066			
Passive-avoidance coping	0.40	.000			
Emotional Approach	-0.10	.365			

Table A.8. Moderation Analysis of the Association between Caregiver Burden and Indicators of Family Stress

Indicator of Family Stress	Moderators	95% CI
Problem Behavior	Neuroticism	-.02, .03
	Extraversion	-.05, .02
	Conscientiousness	-.05, .04
Transition-Related Demands	Neuroticism	-.002, .003
	Extraversion	-.01, .003
	Conscientiousness	-.004, .01

Note. CI = Confidence Interval.

Table A.9. Mean, Standard Deviation and Comparison by Gender of Study Variables

Variables	Male (n = 63) Mean (SD)	Female (n = 54) Mean (SD)	t	p	SE Differences
Symptoms severity	24.75 (5.61)	23.65 (5.53)	1.06	0.29	1.03
Problem behavior	1.97 (0.48)	1.94 (0.54)	0.31	0.75	0.09
Pile up demands	16.43 (13.65)	16.98 (12.63)	-0.23	0.82	2.45
Transition-related Demands	14.62 (4.33)	14.37 (4.38)	0.31	0.76	0.81
Neuroticism	28.10 (9.1)	31.65 (9.79)	-2.03	0.04	1.75
Extraversion	41.62 (6.85)	38.67 (7.16)	2.28	0.03	1.30
Openness	39.79 (6.87)	41.11 (6.99)	-1.03	0.31	1.28
Agreeableness	43.08 (5.66)	42.87 (5.4)	0.20	0.84	1.03
Conscientiousness	47.84 (5.87)	47.44 (6.45)	0.35	0.73	1.14
General social support	5.79 (0.93)	5.59 (1.15)	1.02	0.31	0.19
Community social support	5.50 (1.05)	5.04 (1.24)	2.16	0.03	0.21
Average social support	5.67 (0.88)	5.37 (1.03)	1.70	0.09	0.18
Threat appraisal	2.20 (0.67)	2.24 (0.81)	-0.25	0.81	0.14
Challenge appraisal	3.21 (0.66)	3.40 (0.79)	-1.38	0.17	0.13
Problem-focused coping	2.89 (0.64)	2.91 (0.62)	-0.21	0.84	0.12
Emotion approach coping	2.50 (0.53)	2.37 (0.51)	1.30	0.20	0.10
Passive-avoidance coping	1.53 (0.39)	1.63 (0.48)	-1.18	0.24	0.08
Caregiver burden	2.09 (0.72)	2.01 (0.79)	0.56	0.58	0.14

B. FIGURES

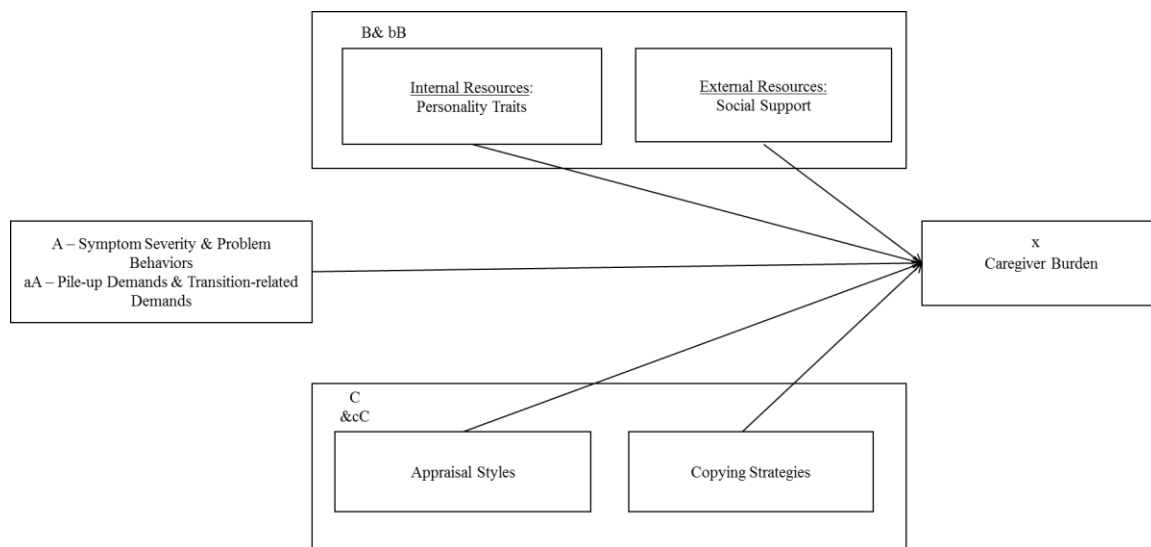


Figure B.1. The double ABCX model.

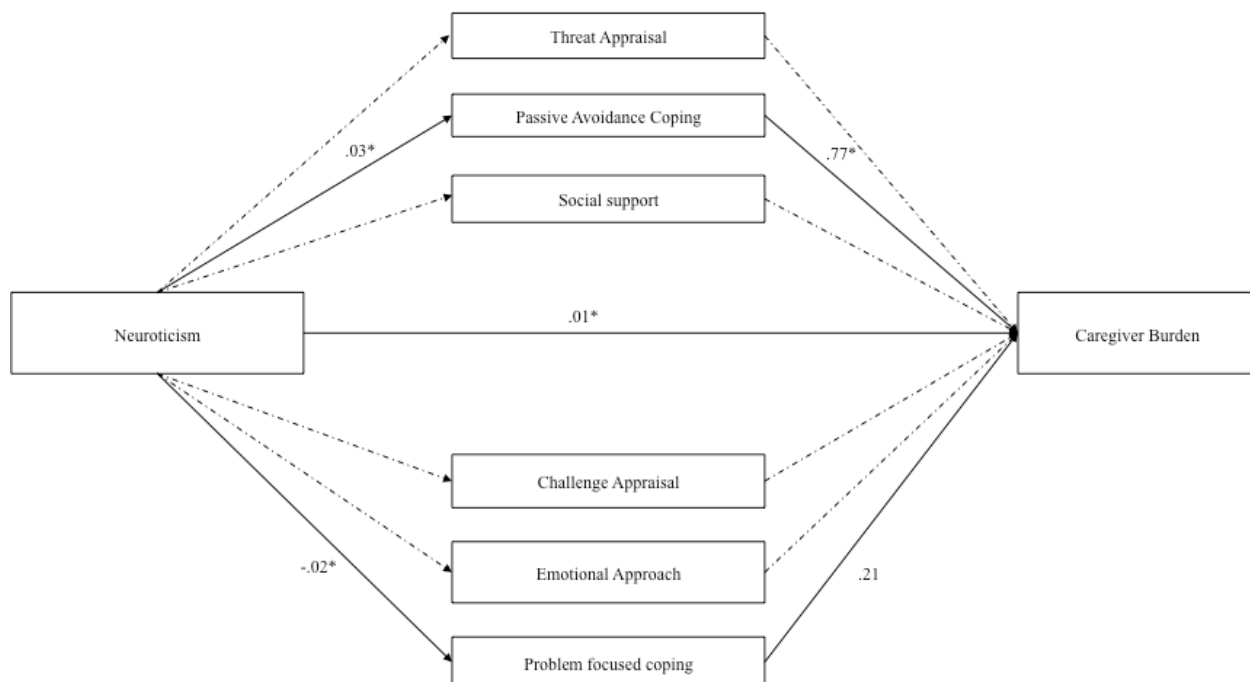


Figure B.2. Parallel mediation analyses between neuroticism and caregiver burden.

Dashed lines represented nonsignificant mediations. Solid lines represented significant mediations.

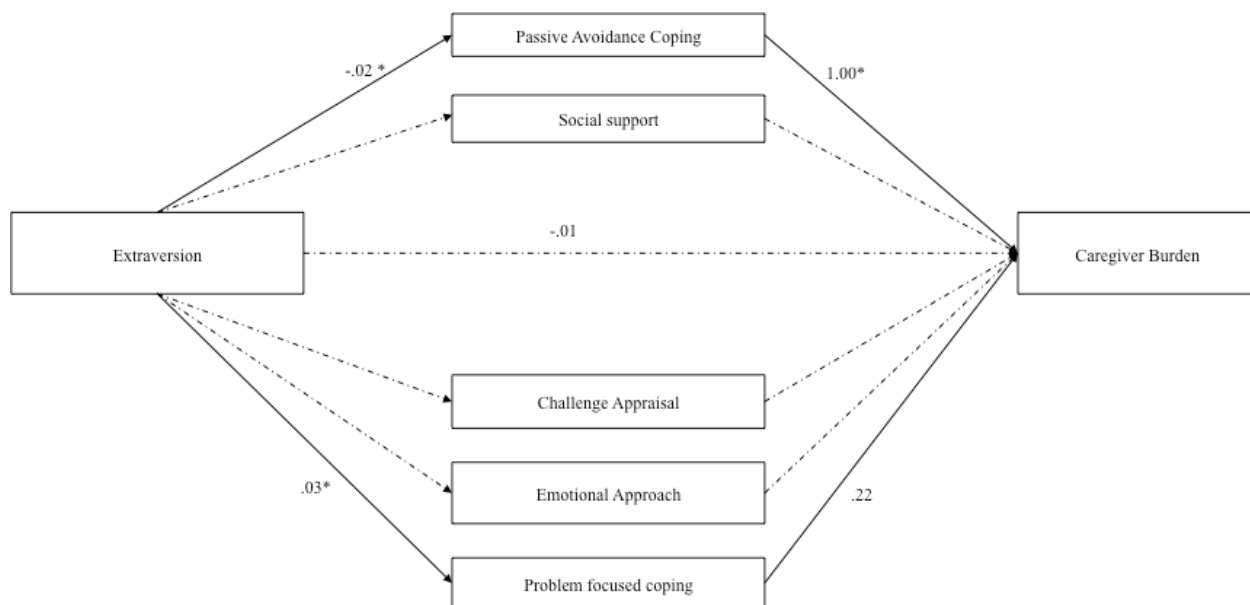


Figure B.3. Parallel mediation analyses between extraversion and caregiver burden.

Dashed lines represented nonsignificant mediations. Solid lines represented significant mediations.

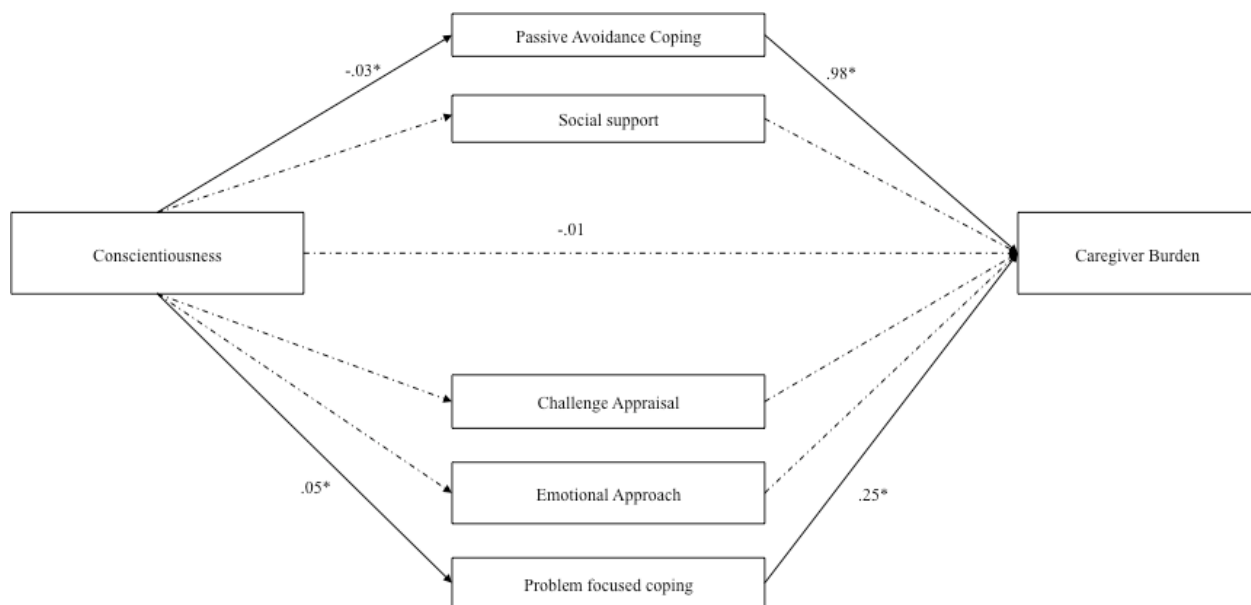


Figure B.4. Parallel mediation analyses between conscientiousness and caregiver burden. Dashed lines represented nonsignificant mediations. Solid lines represented significant mediations.

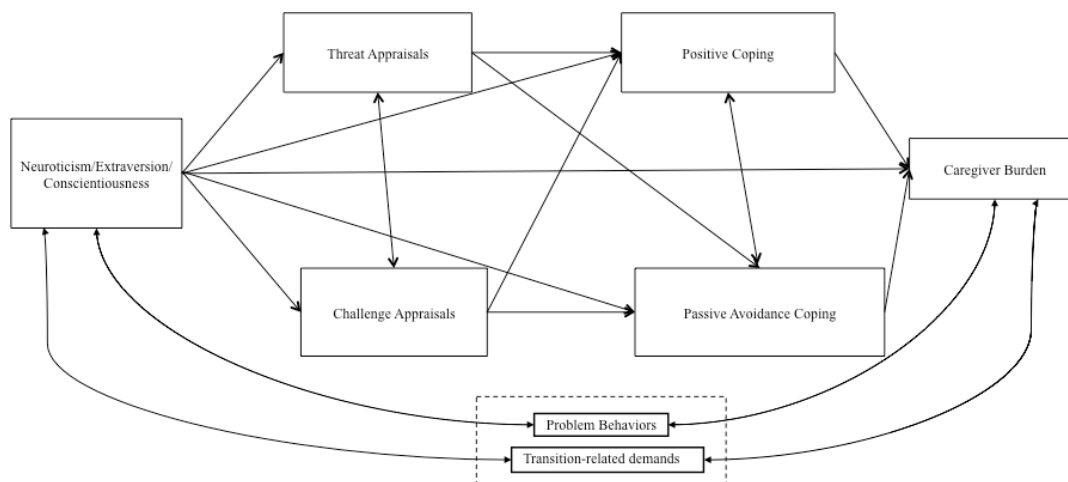


Figure B.5. Path analysis model.