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ASSOCIATIONS BETWEEN EXPRESSED EMOTION, MENTAL HEALTH, AND FUNCTIONING IN FAMILIES: CHILD ASTHMA STATUS AS A MODERATOR

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

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Abstract

Expressed emotion (EE), the affective attitudes and behaviors of one toward another, can affect caregivers' behaviors toward their child. Research examining associations between EE and child/family outcomes is mixed; these associations may be affected by other influences such as the presence of a chronic disease or parent mental health. In this study of families living in an urban area, we examined associations between EE and child outcomes (anxiety/depressive symptoms) and family functioning, with parent anxiety as a covariate. We evaluated child asthma status as a moderator as the presence of a chronic illness may strengthen the association between EE and child/family outcomes. Ninety-four children (mean±SD age=8.83±2.03 years, 48.9% female, 92.6% African American; 47 with asthma) and their parents (81.3% annual household income less than $25,000) completed an observational study including interviews and questionnaires. Measures included the Multidimensional Anxiety Scale for Children (MASC), Children's Depressive Symptoms Inventory (CDI), Self-Report Family Inventory (SFI), Generalized Anxiety Disorder scale (GAD-7), and Five-Minute Speech Sample (FMSS) coded for EE. To examine study aims, regression analyses were conducted using PROCESS macro version 3.4. Asthma status (yes/no) was examined as a moderator. EE was associated with child anxiety symptoms, controlling for parent anxiety symptoms ($F(1,70) = 7.67$, $p=0.007$). Criticism was also positively associated with asthma control ($F(1,39)=4.33$, $p=.04$, $R2=.08$). Asthma status did not moderate any of the associations. Results suggested that high levels of caregiver EE were associated with child anxiety symptoms, but asthma status did not moderate associations. It is possible that regardless of additional family demands related to asthma, EE is associated with child anxiety. Further examination into other systemic stressors (e.g., poverty, access to care) that may moderate these associations is warranted, as well as the impact that minimizing parent anxiety might have on overall EE.

ASSOCIATIONS BETWEEN EXPRESSED EMOTION, MENTAL HEALTH, AND FUNCTIONING IN FAMILIES: CHILD ASTHMA STATUS AS A MODERATOR

Families play an important role in child functioning and mental health. One facet of caregiving and the parent/child relationship is expressed emotion. Expressed emotion is the affective attitudes and behaviors of a person toward another individual (Magana et al., 1986). Expressed emotion is thought to be reflective of a caregiver's attributions toward their child, which can affect subsequent behaviors toward that child (Barrowclough & Hooley, 2003). High expressed emotion may be indicative of critical interactions between a parent and child, which can have a negative impact on child response activation and physical symptoms (Hooley, 2007). Research has presented conflicting findings when assessing the association between expressed emotion and child anxiety and depression. Furthermore, some research has shown that parents with high expressed emotion toward their child may be less likely to engage in positive family interactions. Thus, the literature examining expressed emotion and child and family outcomes is mixed, and it is likely that these associations are moderated by other influences.

The presence of a chronic disease is one factor that may be a moderating variable in associations between expressed emotion and child/family outcomes. For instance, the presence of a chronic illness may strengthen the association between EE and child and family outcomes such that a chronic condition can shift a family's focus and cause strain among family interactions. It is plausible that this added strain may negatively affect how parents respond and focus on their child, which can affect a child's psychopathology as well as functioning within the home. Given the prevalence of child asthma disparities among low-income areas, such as Richmond City, child asthma status (i.e., diagnosed with asthma versus not) was examined as a moderator in these associations. This study expanded upon published findings by examining how expressed emotion relates to child outcomes (anxiety and depression) and family functioning

while also examining asthma status as a moderating variable in these associations.

Bronfenbrenner's Ecological Model

The theoretical rationale for the current study is grounded in Bronfenbrenner's Ecological Model (BEM; see Figure 1) (Bronfenbrenner, 1979). BEM is a theory that emphasizes the importance of different environmental systems affecting human development and explains the interconnection of various levels of a child's environment. In understanding a child's life and developmental trajectory, it is crucial to consider various levels of influence from systems that children interact with daily.

The microsystem level of the BEM considers the individual's perception of their environment that influences them directly. In the context of my work, the microlevel is the first and most immediate level of the nested system encompassing an individual's relationships, interpersonal interactions, and immediate surroundings. An example of the microsystem is the relationship between children (embedded in the core of the system) and their parents. Furthermore, a child's interactions with their parents can influence their development of internalizing disorders. The association between parent/child interactions as captured through expressed emotion and child internalizing symptoms was examined in the current study.

As shown in Figure 1, the mesosystem is the second layer from the person surrounding the microsystem. This system encompasses the interactions of individuals in the microsystem. For instance, the mesosystem would capture interactions between two parents, or a parent and other family members. To address a child's mesosystem, this study examined the association between family functioning and parental expressed emotion. Specifically, interactions between other family members in the child's environment were captured through a measure of overall family functioning. In this study, the microsystem and mesosystem were emphasized as primary

systems of influence on the child.

The exosystem is the larger social system that the child does not contact directly, but that affects the child's mesosystem and microsystem. This may include parental work schedules or community resources that can affect families and, in turn, parent-child interactions and child mental health; thus, in this level of the system, the impact on the child is indirect. The macrosystem is the outermost layer of the child's environment including cultural norms and laws. A child's culture cannot be disentangled from lower levels of the system, and therefore it requires mention even when focusing on the micro- and meso- systems. The last level of the model is the chronosystem which includes the dimensions of time as it relates to the child's environment (Ryan, 2001). Throughout this study, the BEM is used to ground analyses and discussions to inform study implications.

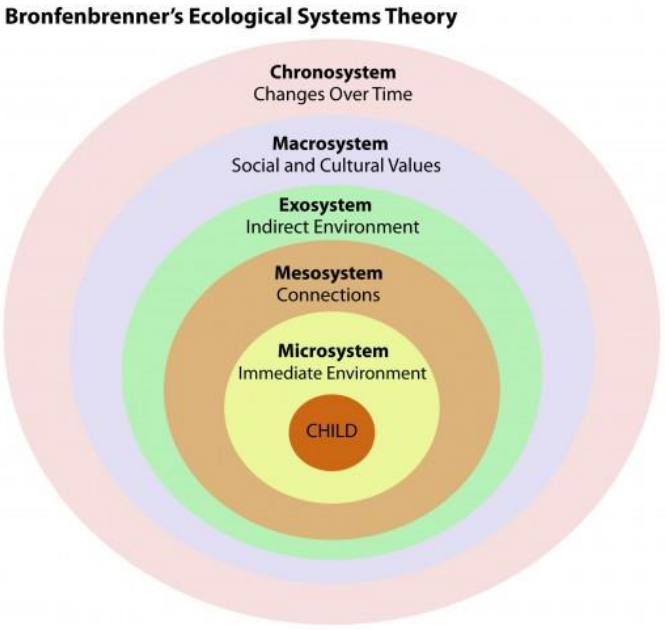

Figure 1: Bronfenbrenner's Ecological System Theory (1979)

Measuring Expressed Emotion

Parental expressed emotion can be defined as the emotional climate between a parent and their relative. This study focused specifically on the emotional climate between a parent and their child (ages 5 to 12 years). Expressed emotion is typically determined from the content and tone of an individual's discussion of their relative during a short interview (Magana et al., 1986), such as the Five-Minute Speech Sample (FMSS). In the FMSS, the interviewer follows a script with specific prompts and asks the respondent to talk about their family member for five minutes. The coding system of the FMSS shows the nature of the parent-child relationship by elucidating the parent's feelings, emotions, and attitudes about their child. Final codes captured by the FMSS include three scores of overall expressed emotion, emotional over-involvement, and criticism which are all given scores of high, borderline, or low.

Studies have demonstrated that the FMSS is a reliable coding schema. It has been shown to provide ratings which are comparable to those derived from the Camberwell Family Interview (CFI) (Vaughn & Leff, 1976), a standardized instrument used for rating expressed emotion (Magana et al., 1986). There have been an array of studies using the FMSS in a variety of populations including patients with schizophrenia (Hahlweg et al., 1987, 1989; Magana et al., 1986), bipolar illness (Miklowitz, Goldstein, Nuechterlein, Snyder, & Mintz, 1988), head injury (Jacobs, Gieron, Martinez, Campos, & Wood, 1990), children with attention deficit hyperactivity disorder (Marshall, Longwell, Goldstein, & Swanson, 1990), children with depressive disorders (Asarnow, Goldstein, Tompson, & Guthrie, 1993), children with asthma (Siccouri et al., 2017), and spouses of patients with Alzheimer's disease (Vitaliano, Becker, Russo, Magana-Amato, & al, 1988; Vitaliano, Young, Russo, Romano, & Magana-Amato, 1993). Hahlweg and colleagues (1989) examined expressed emotion among immediate relatives of young patients (*M*=22.3 years

SD=3.5; range = 18-32) who were recently diagnosed with schizophrenia. The authors found that high expressed emotion relatives were more negative in direct interactions with these patients than relatives classified as low expressed emotion. Marshall and colleagues (1990) also found that expressed emotion predicted parental interactional behavior. According to Asarnow and colleagues (1993), children who were diagnosed with depressive symptoms who returned to high expressed emotion homes after a hospital stay, were more likely to show persistent mood disorder; moreover, recovery was more common among children returning to low expressed emotion homes. Thus, high caregiver expressed emotion has been found to be related to negative interactions with patients and worse patient mental health symptoms.

Expressed Emotion and Child Mental Health

Given the importance of family during child development, particularly in early to middle childhood, understanding a parent's attitudes toward their child is of paramount interest. Sher-Censor (2015) highlighted that the use of the FMSS in child and family research has increased considerably in recent years. The FMSS has been used as a measure of parent-child dynamics, following the assumption that a parent's description of their child is indicative of behaviors in parent-child interactions. To date, however, research has presented conflicting findings when assessing the association between expressed emotion and mental health status. For instance, parental expressed emotion has been identified as a risk factor for child depressive symptoms in a sample of children with schizophrenia compared to healthy controls (Asarnow, Tompson, Hamilton, Goldstein, & Guthrie, 1994; Asarnow, Tompson, Woo, & Cantwell, 2001; Frye & Garber, 2005). Additionally, it has been suggested that critical expressed emotion can be a predictor of the development of child depressive symptoms (Asarnow et al., 1994, 2001; Frye & Garber, 2005). One study used the criticism scale to examine maternal criticism toward their

child in the development of depressive symptoms (Burkhouse, Uhrlass, Stone, Knopik, & Gibb, 2012). The authors found that maternal criticism predicted children's depression onset over the following 14 months. In other studies, parental expressed emotion has not been associated with depressive symptoms (Tompson, O Connor, Kemp, Langer, & Asarnow, 2015). Tompson and colleagues (2015) suggest that expressed emotion may not be an indicator of concurrent clinical state, but rather a measure of intrafamilial processes that contribute to the development of depressive symptoms. With these conflicting findings, further research is necessary to determine how expressed emotion and child depressive symptoms relate.

Other than internalizing behaviors, expressed emotion has also been associated with youth ADHD symptoms and externalizing behavior problems (Peris & Hinshaw, 2003). Cartwright and colleagues (2011) found that parental expressed emotion was higher toward ADHD children compared to their non-ADHD siblings. This is congruent with other research finding that boys' ADHD symptoms had an impact on mother–son hostility both concurrently and longitudinally, but there were no effects in the other direction (Lifford, Harold, & Thapar, 2009). Symptoms such as inattention, hyperactivity, and impulsivity that children experience when diagnosed with ADHD may cause strain on the parent-child relationship. This strain can make it more difficult to express warmth toward that child. A recent longitudinal study found that children with ADHD remained steady in disease symptomatology (i.e., symptoms of impulsivity, hyperactivity, and inattention remained constant) when their parents expressed high expressed emotion (Musser, Karalunas, Dieckmann, Peris, & Nigg, 2016). This is consistent with other studies that found higher expressed emotion related to criticism predicted more externalizing problems for preschool, school age, and adolescent children (Frye & Garber, 2005; McCarty & Weisz, 2002; Peris & Hinshaw, 2003). Another study used the FMSS to examine the

association between parental warmth and children's problem behavior, finding that parental warmth and children's problem behavior (including conduct problems) were negatively correlated (Pasalich, Dadds, Hawes, & Brennan, 2011).

Even though literature has shown that high expressed emotion is associated with externalizing behavior and depressive symptoms among children, the mechanism behind these associations is unclear. High expressed emotion demonstrates that the parent has negative statements about the child, and further, that a greater negative emotional reaction on the part of the parent exists (Tompson et al., 2015). With a greater negative emotional reaction, parents with high expressed emotion are more reactive than parents with low expressed emotion. High reactivity in a caregiving role has been shown to increase child stress (Blair et al., 2015). Previous findings demonstrate that increased stress reactivity, within the context of more reactive and hostile parenting, plays a role in the emergence of externalizing and internalizing behavior from preschool to school entry (Barrios, Bufferd, Klein, & Dougherty, 2017). It appears that negative emotional reactions in the parent interact with the parent-child relationship and may lead to the development of child psychopathology. This study examines the association between expressed emotion and child mental health in a highly stressed, urban sample.

Expressed Emotion and Parent Mental Health

Limited research has examined the link between parental psychopathology and expressed emotion, and further, that how parent psychopathology may play a role in associations between expressed emotion and child health and family functioning. It is well documented that maternal depressive symptoms have a negative impact on child psychopathology (Goodman et al, 2011), and that parent anxiety disorders increase the risk for similar problems in children (e.g., Beidel and Turner 1997; Biederman, Petty, Hirshfeld-Becker, Henin, Faraone et al., 2006; Merikangas,

Avenevoli, Dierker, & Grillon, 1999). Thus, it is possible that parental psychopathology (specifically depressive symptoms) is associated with high expressed emotion (Hibbs et al, 1991). Among families with a child diagnosed with behavior problems, maternal depressive symptoms were associated with high expressed emotion and criticism as measured by the FMSS (Hibbs et al., 1991). Furthermore, in a study of youth, mothers with a history of clinical depressive symptoms were found to have higher levels of expressed emotion and higher levels of overall criticism compared to mothers without a history of depressive symptoms (Thompson et al., 2010). Knowing that parental psychopathology is associated with child psychopathology, and further that parental psychopathology may be associated with family functioning, parental psychopathology was considered as a covariate in analyses.

Expressed Emotion and Family Functioning

Expressed emotion encompasses how a caregiver interacts with a child in both positive and negative ways. Family functioning is seen as a protective factor in academic performance and the development of depressive symptoms (Guberman & Manassis, 2011; Wentzel, 1994). Parents with high expressed emotion toward their child may be less likely to engage in family togetherness, spend quality time together, handle conflicts maturely, and express warmth toward their family. With this understanding, it can be hypothesized that high expressed emotion may be associated with lower family functioning. Most research on expressed emotion has been conducted among children with physical or mental illness. To date, there has been limited research examining the association between expressed emotion and family functioning. The current study extended existing literature by examining how these constructs are associated among a low-income sample of families living in an urban setting.

An advantage of assessing expressed emotion by using the FMSS in the current study is

that it can capture tone and emotion and report negative parent-child dynamics (Weston, Hawes, & Pasalich, 2017). Evidence suggests that the FMSS can be used as a brief and informative tool for indexing parent-child dynamics, such as affective dimensions of the parent-child relationship, in both clinical and research contexts (Weston et al., 2017). The few studies that have examined expressed emotion and family functioning have been conducted with parents of adult-aged children. Existing literature has found high critical expressed emotion to be associated with lower marital satisfaction (Marks, Wieck, Checkley, & Kumar, 1996), higher maternal stress (Baker, Heller, & Henker, 2000), greater family conflict (Schnur, Friedman, Dorman, Redford, & Kesselman, 1986), more negative life events (Leff & Vaughn, 1980), and worse overall family functioning (Wamboldt, O'Connor, Wamboldt, Gavin, & Klinnert, 2000). Schnur and colleagues (1986) also found that high emotional over-involvement was associated with lower family expressiveness. Among families with poor functioning, these findings suggest that caregivers may also have high expressed emotion.

To our knowledge, only one study has examined expressed emotion and family functioning with a socioeconomically and ethnically diverse group of mothers (n=276) of young children with social–emotional and behavioral problems (ages 1-3 years at baseline then 5-7 years at follow-up) (Boger, Tompson, Briggs-Gowan, Pavlis, & Carter, 2008). The study included 71% Caucasian participants, 19% African American participants, 3% Hispanic participants, 6% biracial participants, and 1% Asian participants (Boger et al., 2008). In this longitudinal study, family expressiveness, defined as communication among family members, was found to be associated with high expressed emotion over time (Boger et al., 2008). Moreover, lower family expressiveness at all time points was related to higher critical expressed emotion, suggesting that a self-report measure of family functioning may be associated with the

critical attitudes expressed during the FMSS (Boger et al., 2008). The current study expanded on the study by Boger and colleagues (2008) by examining the association between the FMSS and family functioning using multiple subscales of expressed emotion (overall, criticism, and emotional over-involvement).

Although little research has been conducted on the association between the FMSS and family functioning, previous research has been conducted on the association between the FMSS and parenting behaviors. For instance, a review including fourteen studies measuring an observational measure of positive parenting behaviors like warmth and problem solving found an association between the FMSS and positive parenting variables (Weston et al., 2017). Among these studies, significant correlations between positive parenting variables and the FMSS ranged from r = .12 to .65 (Weston et al., 2017). Thirteen studies found an association between the FMSS and negative parenting variables such as observed criticism and harshness; correlations from these studies ranged between r = .13 to .60 (Weston et al., 2017). Four studies also examined the association of the FMSS and negative parent-child interactions (Weston et al., 2017). This study expanded on previous studies of the FMSS and parenting behaviors by determining how an overall measure of family functioning was associated with parental expressed emotion.

Expressed Emotion, Mental Health, and Family Functioning in Asthma

As individuals with chronic conditions face unique challenges compared to individuals without chronic conditions, it is likely that there are differences in how expressed emotion is associated with mental health and family functioning depending upon chronic disease status. For instance, having a child with a chronic condition adds extra burden to families (Piran, Khademi, Tayari, & Mansouri, 2017) and research shows that some families of children with chronic

diseases have trouble coping with disease demands (Kobos & Imiela, 2015). Generally, caregivers of children with chronic conditions have important and multidimensional responsibilities above and beyond disease management (Raina et al., 2005). The parents of children with chronic conditions experience various financial, family, social, mental and psychological problems (Oskouie & Khanjari, 2013). Caring for a child with a chronic condition requires family management of medication adherence and handling symptomatic days. The extra time parents spend taking care of their child's illness can put strain on the family dynamic. As cognitive efforts are placed on illness treatment and management, less effort can be focused on general parenting behaviors and other important dynamics of family interactions (Piran et al., 2017). Therefore, it could be hypothesized that in the context of a child with a chronic condition, we would expect to see positive associations between expressed emotion and child mental health symptoms as well as negative associations with family functioning.

Given the prevalence of asthma in the Richmond community, this study focused on pediatric asthma as a potential moderating variable. Asthma disproportionately affects urban, poor, and racial/ethnic minority children and additional research addressing these disparities is needed (Shankar, Fagnano, Blaakman, Rhee, & Halterman, 2018). According to the Asthma and Allergy Foundation of America, Richmond was the second overall asthma capital in America based on prevalence, emergency department visits, and asthma-related fatalities in 2018 ("Asthma Capitals: 2018," 2018). In fact, Richmond is the city with the most asthma-related deaths across pediatric and adult cohorts ("Asthma Capitals: 2018," 2018). Asthma is a respiratory disease that causes inflammation of the airways, wheezing, coughing, and trouble breathing. Although serious and incurable, the inflammation is reversible with proper disease management. Thus, this study examined how having an asthma diagnosis may affect associations

between expressed emotion and child mental health as well as family functioning in a sample of children living in Richmond with a chronic illness (asthma) and without.

Although the comorbidity of asthma and the development of psychopathology is established (Delmas et al., 2011; Goodwin et al., 2012), little is known about parenting factors that could underlie this association. Siccouri and colleagues (2017) found that parents of children with asthma were more over-protective than parents of children without asthma. This association may speak to the demands that managing pediatric asthma can place on parents. Knowing that asthma can be a life-threatening chronic illness, particularly among families in lower income areas (Pacheco et al., 2014), many parents try to protect their children from asthma triggers (i.e., secondhand smoke and other environmental factors) (Teach, Crain, Quint, Hylan, & Joseph, 2006). Compared to their peers, children with asthma face more daily medical dangers, and their parents may feel overwhelmed by these added worries.

Research shows that parental involvement and negativity are associated with child anxiety. Over-protective, self-sacrificing, or non-objective behaviors have been shown to not only characterize interactions between parents and their children with anxiety, but also those with asthma (Sicouri et al., 2017). Although research is limited, one study conducted by Siccouri and colleagues (2017) examined expressed emotion in a family asthma context. They examined observed parenting behaviors associated with asthma and anxiety among children (8-13 years) using the tangram task and the FMSS. Eighty-nine parent-child dyads were included across four groups of children (asthma and anxiety, anxiety only, asthma only, and healthy controls). The authors found that parents of children with asthma were more overprotective, or self-sacrificing, than parents of children without asthma, and this difference was greater in the non-anxious group of children (Siccouri et al., 2017). Siccouri and colleagues (2017) found that expressed emotion

may underlie the association between asthma status and anxiety in children. However, the study had a small number of children with asthma enrolled and was conducted with participants who were mainly White and middle class. The current study examined expressed emotion in a cohort of children who are at risk for poor asthma outcomes.

Given the additional physical and psychological stress that children with chronic disease face, some studies have found that children with asthma are at an increased risk for developing internalizing disorders such as anxiety and depressive symptoms (Lu et al., 2012; Pinquart & Shen, 2011; Sicouri et al., 2017). One study found that youth (ages 11-17) with asthma were almost twice as likely to meet DSM-IV criteria for one or more anxiety and depressive disorders as compared to youth without asthma (Katon et al., 2007). In other studies, when compared to healthy controls, children with asthma have been shown to have more total anxiety and intrafamilial stress, but do not differ on depressive symptoms or self-esteem (Bussing, Burket, & Kelleher, 1996; Ortega et al., 2002; Vila, Nollet-Clemencon, de Blic, Mouren-Simeoni, & Scheinmann, 2000).

Studies show that this increased risk for developing anxiety (Vuillermin et al., 2010) is often driven by the fact that physical constraints from asthma (i.e., lung inflammation) can cause children to interpret asthma symptoms as an immediate threat to their survival (Sicouri et al., 2017). In a birth cohort from Australia (Goodwin et al., 2014), only more severe and persistent asthma at age 5 was associated with increased odds of anxiety at age 5-17, whereas mild asthma was not associated with increased vulnerability to any mental health disorder. Similarly, one study found that child report of anxiety symptoms was unrelated to asthma severity, but parental ratings of internalizing symptoms in their child was related to child asthma severity (Wamboldt, Fritz, Mansell, McQuaid, & Klein, 1998). A review by Goodwin and colleagues (2012) outlined

that there have been several cross-sectional (Delmas et al., 2011; Goodwin, Pine, & Hoven, 2003; McQuaid, Kopel, & Nassau, 2001; Ortega, Huertas, Canino, Ramirez, & Rubio-Stipec, 2002; Ortega, McQuaid, Canino, Goodwin, & Fritz, 2004) and longitudinal (Alati et al., 2005; Feldman, Ortega, McQuaid, & Canino, 2006; Goodwin, Fergusson, & Horwood, 2004; Goodwin, Lewinsohn, & Seeley, 2005) community-based studies showing a consistent link between having asthma and anxiety among youth. Furthermore, increased anxiety has been associated with severity of asthma symptomology and poorer asthma control when compared to healthy controls (Eisner, Katz, Lactao, & Iribarren, 2005; Feldman et al., 2006; Goodwin, Bandiera, Steinberg, Ortega, & Feldman, 2012; Lavoie et al., 2006). Overall, research has found a link between childhood asthma and anxiety, yet the reason for the link is not well understood.

The association between asthma and depressive symptoms is less understood, but may be due to social isolation, feelings of being different, physical inflammation affecting neural circuitry caused by asthma, or demands placed on children for treatment adherence (Rosenkranz & Davidson, 2009). Depressive symptoms are prevalent among teens (age 12-16) with asthma living in urban settings and can be associated with worse asthma-related clinical outcomes, functional limitation, and quality of life (Shankar et al., 2018). There is also evidence from several cross-sectional, community-based studies suggesting that adolescents with asthma are more likely to have depressive symptoms compared to those without asthma (Goodwin et al., 2004; Katon et al., 2007; Ortega et al., 2004). Similarly, several studies have found an association between asthma severity and depressive symptoms among youth ages 7-18 years (Wood et al., 2006, 2007). Although most studies have found an association between asthma severity and depressive symptoms, one study did not find this association in their research (Ortega et al., 2002).

Moreover, a chronic disease diagnosis, such as asthma, can be considered an adverse event in someone's life. Unfortunately, it is not the only adverse event that individuals encounter. Adverse childhood events (ACEs) such as violence, poverty, abuse, loss of loved ones and parental separation are believed to increase risk for development of depressive symptoms (Maughan & McCarthy, 1997; Reinherz, Giaconia, Hauf, Wasserman, & Silverman, 1999; Toth & Cicchetti, 1996), and anxiety (Stein et al., 1996). Growing evidence suggests that experiencing adversity early increases the risk of negative health outcomes, both mental and physical (Jones, Nurius, Song, & Fleming, 2018). The association between early childhood stress and later mental health outcomes is well established (Jones et al., 2018); however, research testing these associations among low-income, urban samples is much needed. This study examined how chronic disease and mental health are associated among a sample of low-income children in Richmond.

To date, the literature provides consistent evidence that asthma is often comorbid with anxiety; however, most previous studies have been conducted in samples that may not be widely generalizable, particularly to the populations most affected by disparities in asthma outcomes in the US. Furthermore, limited studies have examined potential family factors that could contribute to this association or potentially highlight a mechanism by which this association exists. In terms of mental health, there is an array of literature to suggest that children with asthma often have comorbid mental health diagnoses (McQuaid et al., 2001; Sicouri et al., 2017; Vuillermin et al., 2010). As such, having a chronic condition could strengthen the association between anxiety and depressive symptoms (in children) with expressed emotion.

In addition, when a child has asthma, the focus of the family may shift to accommodate additional medical needs. Changes in the family dynamic can cause changes in individual family

members. This can also mean that problems that arise in the child with asthma can cause changes in family functioning. One study found that positive family factors (i.e., cohesion, communication, and problem solving) were not associated with child asthma severity; however, children experiencing more positive family functioning had fewer depressive symptoms, and fewer depressive symptoms were associated with better asthma status (Al Ghriwati, Winter, Everhart, & Fiese, 2017). Other studies have found that children with higher levels of family cohesion have better asthma knowledge and medication adherence (Rosales, McQuaid, & Koinis-Mitchell, 2017). The current study further examined influences in the association between expressed emotion and family functioning among children with and without asthma, and specifically looked at asthma status as a moderator.

Expressed Emotion Research in Low-Income Populations

Asthma disproportionately burdens low-income populations (Akinbami, Simon, & Rossen, 2016), however research using the FMSS with pediatric asthma populations is limited. Emotional and financial stressors in families in low-income areas may affect parenting behaviors and family functioning (Aber, Jones, & Cohen, 2000). In a validation study of the FMSS among low-income, racially/ethnically diverse mothers of infants, mothers who had more negative life events and reported more negative affect were more likely to express negative affect and criticism in the FMSS (Kaugars, Moody, Dennis, & Klinnert, 2007). The racial/ethnic breakdown of the 169 study participants were as follows: European American (22%), African American (22%), Hispanic (52%), Native American (2%), and Asian (1%). Furthermore, 18% of the interviews were conducted in Spanish. This study provided support for using the FMSS among families with varied ethnic and linguistic backgrounds (Kaugars et al., 2007). Furthermore, among caregivers of African American patients with schizophrenia, low expressed

emotion was associated with greater symptom severity, and high expressed emotion (specifically critical remarks) was shown to be protective concerning symptom severity (Rosenfarb, Bellack, &Aziz, 2006; Gurak and Weisman de Mamani, 2017). These are among the only studies that have assessed expressed emotion in African American families.

There has been limited research on expressed emotion in low-income, racially/ethnically diverse samples of children with asthma, but there has been a great deal of research on asthma in low-income families. One study examined mental health challenges in low income, at risk youth with asthma and found that youth with low SES had higher rates of anxiety and depressive symptoms compared to those without asthma (Gillaspy, Hoff, Mullins, Van Pelt, & Chaney, 2002). These studies provide a framework for examining the association of expressed emotion, mental health outcomes, and family functioning among children with and without asthma. Research about expressed emotion in a low-income, African American population is particularly needed considering that asthma disproportionately impacts families in low-income, urban areas such as Richmond, VA.

Expressed Emotion and Asthma Control

In addition to assessing how asthma status moderates associations between expressed emotion and mental health/family outcomes, this study considered how expressed emotion is associated specifically with asthma control. Asthma control is defined as the extent to which various symptoms of asthma are reduced or eliminated by treatment ("Pocket Guide for Asthma Management and Prevention," 2018). The family dynamic can either foster or hinder a child's chronic illness management. For instance, childhood asthma severity is strongly affected by family factors, including the psychological functioning of parents, the interactions between parents and children, and child's functioning (Kaugars, Klinnert, & Bender, 2004). The

association between parent-child interactions and illness outcomes is relatively well established in schizophrenia patients (Weisman, Rosales, Kymalainen, & Armesto, 2006; Hashemi & Cochrane, 1999); nevertheless, little research has been conducted on children with asthma. To our knowledge, only one study has examined the association between expressed emotion and asthma disease management among children in a sample of 19 adolescents with severe, chronic asthma across an inpatient hospitalization stay (Wamboldt, Wamboldt, Gavin, Roesler, & Brugman, 1995). The authors found that adolescents with parents rated high in criticism also showed lower adherence to their prescribed theophylline and oral steroid medication at the beginning of the adolescent's inpatient stay at a national asthma center than the low criticism group (Wamboldt et al., 1995). Research is needed to examine how expressed emotion is associated with asthma control specifically. Asthma control assesses the extent to which asthma symptoms affect a child's daily life. While adherence research has shown that parental criticism is associated with worse medication adherence (Wamboldt et al., 1995), asthma control assesses asthma impairment above and beyond medication. The asthma control test can also help providers determine if medication or other treatment changes are needed. Therefore, this study will focus on how expressed emotion is associated with asthma control.

Current Study

This study examined expressed emotion among a low-income population in order to serve as a first step in developing parent interventions targeting child mental health, family functioning, and asthma control. The current study provided a deeper understanding of expressed emotion, and further how that construct might be associated with child mental health and family functioning. Moreover, this study examined the impact of a chronic disease diagnosis on associations between expressed emotion and family/child outcomes, as well as the association

between expressed emotion and asthma control. Overall, this research is essential in better understanding the link between the family context and mental health outcomes and fills critical gaps in the literature among a low-income, hard to reach sample of children with and without asthma.

Study Aims

This study had five aims, which are described below. Each aim captured various aspects of parent and child functioning that may be affected by expressed emotion.

Aim I: To determine differences in the FMSS by family characteristics. We examined differences in age, sex, income, and race based on subscales of the FMSS: overall expressed emotion (high, borderline, low), emotional over-involvement (high, borderline, low), and criticism (high borderline, low). Differences in sample characteristics were also examined based on child asthma status (yes/no). We then examined differences in FMSS scores based on parent psychopathology. Hypothesis 1: We did not expect differences in FMSS subscales by age, sex, income, or race. However, it was hypothesized that parent psychopathology would differ by FMSS subscale scores, with higher scores on expressed emotion among caregivers with higher levels of psychopathology.

Aim II: To examine associations between subscales of the FMSS (expressed emotion, expressed emotion-criticism, and expressed emotion-emotional over-involvement) and child anxiety and depressive symptoms (see Figure 2). Parent psychopathology was included as a covariate in analyses. Hypothesis 2: High expressed emotion, criticism, and emotional over-involvement would be associated with more symptoms of anxiety and depressive symptoms in children, above and beyond caregiver psychopathology.

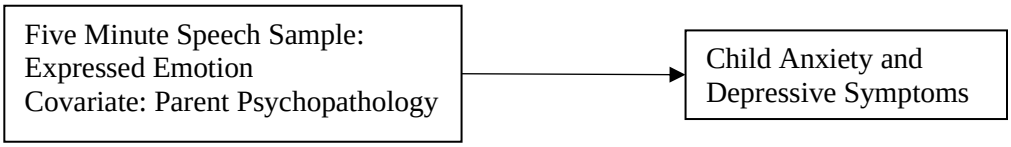

Figure 2: Predictor variables and child mental health

Aim III: To examine associations between subscales of the FMSS and family functioning (see Figure 3), with parent psychopathology as a covariate. Hypothesis 3: High expressed emotion, criticism and emotional over-involvement would be associated with worse family functioning (lower scores), above and beyond caregiver psychopathology.

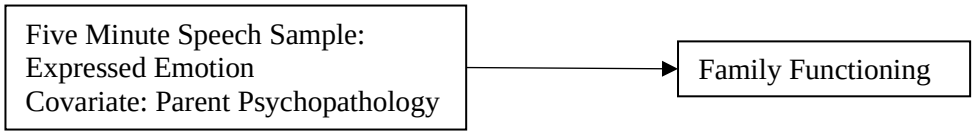

Figure 3: Predictor variables and family functioning

Aim IV: To examine whether asthma status moderated associations between FMSS subscales and child mental health symptoms, and between FMSS subscales and family functioning (see Figure 4). This aim builds on previous aims by examining whether asthma status serves as a moderator in these associations. Parent psychopathology was also used as a covariate in moderation analyses. Hypothesis 4: In the context of having an asthma diagnosis, the association between high expressed emotion, criticism, and emotional over-involvement would be stronger between child mental health and family functioning.

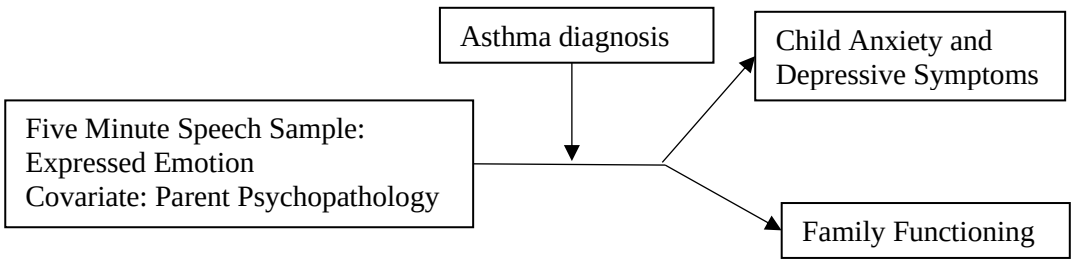

Figure 4: Asthma diagnosis as a moderator between predictor variables, child mental health, and family functioning.

Aim V: To explore associations between FMSS subscales and asthma control in the subset of families of children with asthma (see Figure 5). Hypothesis: High expressed emotion, criticism, and emotional over-involvement would be associated with worse asthma control.

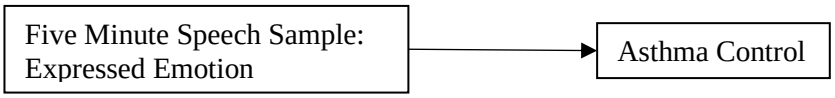

Figure 5: Predictor variables and asthma control.

Methods

Participants

Data for this study were drawn from a larger study examining contextual risk and protective factors for child emotional and physical health outcomes among families living in low-income areas (VCU Presidential Research Quest Fund; Winter & Everhart, PIs). Participants included 94 caregiver-child dyads recruited from the greater Richmond, Virginia area. Of these children, half had asthma (n=47). The research team obtained a list of children with asthma ages 5-12 years who had been seen within the VCU Health System in the last 12 months. From that list, families living in low-income zip codes, as determined by the Richmond, VA Mayor's Report on Poverty (2014) were recruited by phone. These zip codes included four areas of the city in which more than 20% of residents meet federal guidelines for poverty. The poverty rates within these targeted zip codes ranged from 21% to 53%, with populations between 2,400 and 32,000 residents. In addition to recruitment phone calls, flyers were posted in schools and

community centers within targeted zip codes. Inclusion criteria included having a child ages 5-12 years (with or without asthma), as well as having no diagnosed developmental or cognitive abilities that would preclude meaningful participation. Caregivers and children also needed to speak and understand English. Constructs of interest for this study and the measures collected are shown in Figure 6 below.

As seen in Table 1a, the average age of children in the sample was 8.83±2.03 years. Most of the sample was African American (92.6%) and reported an income below the poverty line of $25,000 (81.3%).

Table 1a.

Descriptive statistics of full sample (94 children)

	Entire Sample (n=94)		
Variable	*M*	*SD*	*Range*
Age	8.83	2.03	5-12
	N (%)		
Sex			
Male	48 (51.1%)		
Female	46 (48.9%)		
Race			
African American	87 (92.6%)		
Mixed	7 (7.4%)		
Poverty Line			
Yes, below	74 (81.3%)		
No, above	17 (18.7%)		

Procedure

Once a family was interested in the study, the family was screened on the phone for eligibility by trained research staff. If eligible, a study visit, which took place on VCU's campus, was scheduled. Study visits began with the consent and assent process. All parents were consented and children seven years of age and older provided written assent. Parents completed a

series of questionnaires and interviews that were focused on the larger study's goals.

Constructs of Interest	Respondent	Measures Used
Expressed Emotion (IV)	Caregiver	Five Minute Speech Sample (FMSS) (Magana et al., 1986)
Child Anxiety Symptoms (DV)	Caregiver	Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, & Conners, 1997)
Child Depressive Symptoms (DV)	Caregiver	Children's Depressive symptoms Inventory (CDI) (Kovacs, 1992)
Family Functioning (DV)	Caregiver	Self-Report Family Inventory (SFI) (Beavers & Hampson, 2000)
Asthma Control (DV)	Child and Caregiver	Childhood Asthma Control Test (cACT) (Liu et al., 2007) or Asthma Control Test (ACT) (Nathan et al., 2004)

Figure 6: Constructs and measures table for this study
*IV=independent variable; DV=dependent variable

Demographic Variables

Parents reported on child's age (in years), child's sex (male/female), family income, child's race/ethnicity, and child's asthma status (yes/no). Detailed descriptions of these measures can be found in the Appendix.

Covariate Variables

Center for Epidemiological Studies-Depressive Symptoms (CES-D): Caregivers completed the (CES-D) (Radloff, 1977), which is a 20-item measure that asks caregivers to rate how often over the past week they experienced symptoms associated with depressive symptoms, such as restless sleep, poor appetite, and feeling lonely. Response options range from 0 to 3 for each item (0) Rarely or None of the Time, (1) Some or Little of the Time, (2)

Moderately or Much of the time, (3) Most or Almost All the Time. The items are then summed to create an overall score. Scores range from 0 to 60, with high scores indicating greater depressive symptoms. The CES-D also provides a cutoff score of 16. A score of 16 or greater indicates an individual at risk for clinical depressive symptoms, with good sensitivity and specificity and high internal consistency (Lewinsohn, Seeley, Roberts, & Allen, 1997). The CES-D has been used successfully across wide age ranges (Lewinsohn et al., 1997). Although the CES-D has somewhat different factor structures across racial and ethnic groups, it can be used appropriately with diverse caregivers (Roth, Ackerman, Okonkwo, & Burgio, 2008). In the current sample, Cronbach alpha reliability coefficient for this measure was $\alpha = .92$.

Generalized Anxiety Disorder-7 (GAD-7): Caregivers completed the GAD-7 (Spitzer, Kroenke, Williams & Lowe, 2006), a 7-item questionnaire, which was developed to assess a patient's generalized anxiety as classified by the DSM-5. The questionnaire asks patients how often, during the last 2 weeks, they were bothered by the following symptoms. Response options are: (0) not at all, (1) several days, (2) more than half the days, and (3) nearly every day. Item examples include "feeling nervous, anxious, or on edge," "worrying too much about different things," and "trouble relaxing." Responses are summed to create an overall score. Scores of 10 or above indicate moderate anxiety symptomology and scores above 15 indicate severe anxiety symptomology. Further diagnostic assessment is warranted to determine the presence and type of anxiety disorder. Using a cut-off of eight, the GAD-7 has a sensitivity of 92% and specificity of 76% for diagnosis generalized anxiety disorder (Plummer, Manea, Trepel, & McMillan, 2016; Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). Cronbach alpha reliability coefficient for this measure was $\alpha = .91$.

Expressed Emotion

Five Minute Speech Sample (FMSS): The Five-Minute Speech Sample (FMSS) (Magana et al., 1986) is a task designed to elicit parents' underlying attitudes and beliefs regarding their child. The interviewer and caregiver were alone in a quiet room without distractions. The caregiver was instructed to speak about their child for five minutes without prompts or interruption by the interviewer. The interviewer read the following script verbatim to the caregiver:

> *"I'd like to hear your thoughts and feelings about [child's name] in your own words- without my interrupting with any questions or comments. When I ask you to begin, I'd like you to speak for five minutes telling me what kind of person [child's name] is and how the two of you get along together. After you begin to speak, I prefer not to answer any questions until the 5 minutes are over. Do you have any questions before we start?"*

The FMSS is audio recorded and then interviews are transcribed verbatim. Both the content and tone of the brief speech sample are analyzed. The coding system is composed of four categories (described below): (a) initial statement, (b) relationship, (c) criticism, (d) emotional over-involvement. The four categories are then used to create an overall expressed emotion rating, which can be high expressed emotion (sub-categorized as critical, emotional over-involvement, and combined), low expressed emotion, and borderline expressed emotion (sub-categorized as critical or emotional over-involvement). Research shows that the FMSS is reliable and provides ratings similar to those derived from the longer Camberwell Family Inventory (CFI) (Magana et al., 1986).

Initial Statement: The initial statement is based on the first thought or idea expressed by the

caregiver about his/her child. This statement is rated independently of the remainder of the speech as either: positive, negative, or neutral.

Positive Initial Statement Examples: An initial statement would be considered positive if either a positive description (i.e., "He's a very nice person," or "She's a good kid.") or a positive relationship (i.e., "My son and I have always gotten along very well," or "Paul and I have a good relationship.") is stated.

Neutral Initial Statement Examples: An initial statement would be considered neutral if it is unclear or has weak evidence (i.e., "We have an okay relationship."), is a neutral description (i.e., "He is 12 years old."), is a conditional statement (i.e., "We get along sometimes."), is a statement of improvement (i.e. "She's been doing much better."), is a statement in past tense (i.e. "He used to be very lazy."), is a positive and negative statement (i.e. "She's an intelligent and lazy person."), or is a negative behavior attributed to external cues (i.e. "Susan is a lazy person but the medication has a lot to do with it.").

Negative Initial Statement Examples: Since a negative initial statement rating creates a high expressed emotion (EE) profile, extreme caution should be used when scoring. The tone of the caregiver should also be taken into consideration (i.e. notice inflection for sarcasm). An initial statement would be considered negative if it is a negative statement (i.e. "He's a very lazy person.") or a negative relationship (i.e. Well, Harry and I have just never got along.").

Relationship: The relationship domain is based on statements the caregiver makes about the relationship between them and their child. These statements are considered when making an overall "quality of relationship" rating. Relationship ratings are based on the entire speech sample and are either: positive, negative, or neutral.

Positive Relationship Examples: A speech sample would be considered a positive relationship

if there is report of a positive relationship (i.e., “Susan and I get along very well.”), or if there is interest in the relative, (i.e. “We enjoy spending time together.”).

Neutral Relationship Examples: A speech sample is considered a neutral relationship if there is unclear or weak evidence (i.e. “We usually get along.”), conditional statements (i.e. “We don’t get along if he is sick.”), statements of past tense (i.e. “Claire and I used to get along very well.”), positive and negative statements (i.e. “Overall, we have a good relationship...at times it seems as though we don’t know each other.”), or no information is provided regarding his or her relationship with their child.

Negative Relationship Examples: Since a negative relationship, rating creates a high EE profile, use extreme caution when scoring. A speech sample is considered a negative relationship if there is report of a negative relationship (i.e., “We don’t get along.”) or inability to communicate (i.e. “We have never been able to communicate.”). A negative rating is NOT assigned if the difficulty is stated to occur only recently (i.e. “We haven’t been able to communicate recently.”-neutral).

Criticism (CRIT): A criticism is a comment indicating that the respondent dislikes, resents, disapproves of, or is angered or annoyed by their child’s behavior or character. Criticisms are assessed based on content and/or tone, and a frequency count is taken over the entire speech.

Criticism Examples: Since the presence of only one criticism creates a high-EE profile, use extreme caution when scoring. A speech sample is considered critical based on content or tone. Content can be considered critical if it includes critical phrases (i.e., “I hate it.”), or over-embellishment (i.e. “I question so many things about him, so many things about his behavior, that umm, my real feeling is really, in my gut, that he’s just a very lazy, spoiled, self-indulgent, non-caring type of person.”). Tone can be considered critical when a

description is said critically (i.e. "She *constantly* leaves her clothes laying *all around the house*."), or past occurrences are stated in a critical manor (i.e. "Vernon's bedroom *used* to look like a *pig sty*."). *Emotional Over-Involvement (EOI):* Emotional over-involvement is indicated by statements that demonstrate that the caregiver is excessively involved with the child. There are five subcategories used when coding EOI:

1. Self-sacrificing/Overprotective Behavior (SSOP) (Overall rating): this is scored as present when: the caregiver reports that they have sacrificed themselves in an extreme or unusual manner for their child and/or their behaviors indicate extreme and/or unusual over-protection of, or over-involvement with the child, and/or they imply that they do not enjoy the self-sacrificing/over-protective behavior they describe, or if there is evidence of extreme inter-dependency with behavioral consequences, with behavioral descriptions in text. (i.e. "I don't spend that much money on things for myself so that I can give it to my son," or "I'd like to take vacations, but I don't dare in case Sally needs anything."). If a speech sample contains four or more hints, a full SSOP rating is given. If there are three hints or one strong statement that does not meet the level for a full SSOP rating, a border SSOP should be coded. If there are 2 or less, nothing is coded.
2. Emotional Display (Overall rating): Since the presence of only one emotional display creates a high-EE profile, use extreme caution when scoring. Emotional display is scored when the respondent cries, becomes "choked up," has tears, exhibits emotion that disrupts the speech flow or is unable to speak during the interview due to what seems to be emotional sentiment regarding the child.
3. Excessive Detail about the Past (Overall rating): Excessive detail is scored when the caregiver gives an inordinate amount of extraneous or irrelevant information about the

relative's distant past. These statements must be made without associating the thoughts or ideas to the present (i.e. "She's always been very active. When she was in kindergarten, she used to always climb the highest trees, and she liked to ride tricycles and roller-skate. As she got older, she was good at making doll clothes.... she played with her dolls all day long... When she wasn't playing with her dolls, she was dressing up, playing with our dog.").

4. Positive Remarks (Frequency count): A positive remark is one in which a person's behavior or personality is praised or complimented. Five or more positive remarks constitute excessive praise. Positive remarks are based on content (i.e. "He's a wonderful person."). They are coded in four different forms: (a) "(S)he is"...followed by something that's good, (b) "(S)he does something really/very well" (not something negative) (phrases like "her personal hygiene is good" will be considered like a statement about what the relative does and must include a "really/very"), (c) "(S)he has this quality which is good" (we will keep an eye on this form to see if the word "Good" or something comparable must be included), (d) Global positive remarks (i.e., I'm proud of her).
5. Statements of Attitude (Frequency count): A statement of attitude is scored as present when the respondent expresses very strong feelings of love for the child or willingness to do anything for the child in the future. This can be coded if there is love for the relative (i.e., "I really love my son."), or unconditional willingness to do anything for the relative in the future (i.e. "I'll do anything in the world for Nigel."). If a statement of attitude were to occur as an initial statement, it would be rated as both positive initial statement and a statement of attitude. The presence of one or more statements of attitude in addition to either the presence of excessive detail or excessive praise creates a high-EE-EOI profile.

The presence of one or more statements of attitude creates a borderline EOI profile.

High expressed emotion is assigned if one of the following is present:

For Criticism (CRIT):

1) There is a high critical rating, meaning a negative initial statement

2) A negative relationship rating 3) One or more criticisms

For Emotional over-involvement (EOI):

1) Self-sacrificing, over-involvement behavior

2) Emotional display during the interview

3) Any two of the following:

i) Excessive detail about past

ii) one or more statements of attitude or

iii) excessive praise (5 or more positive remarks)

For CRIT and EOI to be assigned (combined presentation), both criteria for CRIT and criteria for EOI above must be present.

Low expressed emotion is assigned when none of the ratings above apply.

Borderline expressed emotion is given when a speech sample contains evidence for but does not qualify as high EE. There are two classifications of borderline rating: Critical and Emotional Over-Involvement.

A borderline EE rating would be assigned in one of the following conditions:

1) Borderline critical: the presence of one or more statements of dissatisfaction is necessary for a borderline high-EE critical rating,

2) Borderline EOI: the presence of one of the following is necessary:

a) Borderline self-sacrificing/over-protective behavior or

b) One or more statements of attitude or

c) Excess detail about the past or

d) Five or more positive remarks.

More examples of statements that should be coded as positive and negative relationships, criticisms, dissatisfaction, emotional over-involvement, excessive detail about the past, positive remarks and statements of attitude can be found in the Manual for Coding Expressed Emotion from the Five-Minute Speech Sample (Magana et al., 1986). This manual was used as the main guide in coding the FMSS.

Mental Health Measures

Children's Depressive Symptoms Inventory (CDI): Caregivers completed the Children's Depressive Symptoms Inventory (CDI) which is a rating of the severity of depressive symptoms in children and adolescents grouped into five major factor areas. Children rate how they feel on a scale from 0 to 2 for 28 items. An example item includes: "(0) I am sad once in a while, (1) I am sad many times, (2) I am sad all the time." The measure scoring system yields five subscales that were developed based on normative data from 592 boys and 674 girls ages 7–16 in the Florida public school system. The normative sample was 77% Caucasian and described as "largely middle class" (Kovacs, 1992). The CDI self-report is highly reliable and has well-established validity using a variety of different techniques, and good psychometric properties. Cronbach alpha reliability coefficient for this measure was α= .85.

Multidimensional Anxiety Scale for Children (MASC): Caregivers completed the Multidimensional Anxiety Scale for Children (MASC) which is a normed 50-item self-report questionnaire that assesses anxiety in children and adolescents aged 8-19 years. It uses four

basic scales (physical symptoms, harm avoidance, social anxiety, and separation/panic), one scale measuring total anxiety, and two additional indexes, anxiety disorder and inconsistency. For the self-report measure, participants are asked to rate their own behavior on a 4-point scale: (0) Never true about me, (1) Rarely true about me, (2) Sometimes true about me, (3) Often true about me. Item examples include: "I have trouble getting my breath," "I worry about other people laughing at me," and "I try to do things other people will like. Completion of the MASC takes approximately 15 minutes. The measure has good psychometric properties and is widely used as an anxiety measure for children. Cronbach's alpha reliability coefficient for this sample was α=.88.

Family Measures

Self-report Family Inventory (SFI): Parents completed the Self-Report Family Inventory (SFI), which is a seventeen-item self-report questionnaire that uses 5 domains to measure family functioning (Beavers & Hampson, 2000). The health domain measures overall family well-being, contentment, parental alliance/parent-child alliance, independency and distinctiveness, acceptance of all family members, and ability to problem solve. The conflict domain measures arguing, blaming, and acknowledgement of individual responsibility. The cohesion domain measures family closeness, time spent inside and outside of the family, and enjoyment of family togetherness. The leadership domain measures parental authority style, guidance, and level of control. Lastly, the emotional expressiveness domain measures feelings of love and kindness among family members (Beavers & Hampson, 2000). Based on the Beavers Systems Model of family functioning, high levels of competency within the family are associated with the family's ability to adapt in the face of stressful situations. The current study uses the Health/Competence subscale of the SFI to assess global family competence. PCs rated

how well 18-items fit their family on a 5-point scale with anchors at 1,3, and 5 including: (1) "Yes, fits our family well", (2), (3) "It fits our family some", (4), and (5) "No, does not fit our family". There is an additional item rating family functionality from 1 to 5, (1) meaning "my family does not function well at all. We really need help" and (5) "my family functions well together." Negatively worded items (e.g., 'when things go wrong, we blame each other') were reverse scored prior to scale calculation. As is common with the SFI, a mean score was calculated to yield an overall score of family competence for this study. Items are coded such that higher scores reflect greater family competence. Validation studies using the SFI have found it to be a reliable and valid self-report measure of the family environment (Hamilton & Carr, 2016). Cronbach alpha reliability coefficient in this sample was α=.85.

Asthma Measures

Childhood Asthma Control Test (cACT): Participants between the ages of 5 and 11 completed the well-validated, seven-item Childhood Asthma Control Test (cACT) (Liu et al., 2007), which assesses frequency of daytime and nighttime asthma symptoms, activity limitation, and perception of disease control. Children completed four items and caregivers completed three items. Scores ≤19 were classified as asthma that was not well controlled. An example of a child completed item on the cACT is: "Do you cough because of your asthma?" with responses including "yes, all of the time," "yes, most of the time," "yes, some of the time." and "no, none of the time." An example of a parent completed item on the cACT is: "During the last 4 weeks, on average, how many days per month did your child wheeze during the day because of asthma?" Responses include: "(5) Not at all, (4) 1-3 days/mo, (3) 4-10 days/mo, (2) 11-18 days/mo, (1) 19-24 days/mo, (0) Every day. Children who were 12 years of age completed the 5-item Asthma Control Test (ACT) (Nathan et al., 2004). A sample item

from the ACT is: “During the past 4 weeks, how often have you had shortness of breath?” Responses include “more than once a day,” once a day,” “3 to 6 times a week,” “once or twice a week,” or “not at all.” Items on the cACT (ages 4-11) and ACT (ages 12 and above) are summed to generate an asthma control score. Cronbach alpha reliability coefficient for this measure in this sample was α=.69.

Coding Procedures

FMSS transcripts were coded by a graduate-level researcher and a trained undergraduate student using the Five-Minute Speech Sample codebook manual (Magana et al., 1986). Training consisted of didactic instruction in the form of reading and discussing a scoring manual, coding practice sessions, and attending weekly coding meetings in which the results of the practice coding and any discrepancies were discussed. Coders met weekly to discuss disagreements in ratings and come to a consensus. After coders achieved 80% agreement on five consecutive training samples (Greenlee, Winter, Everhart, & Fiese, 2019), coding team members advanced to coding the recordings separately. Due to the specificity required in coding and the importance of each sentence in the speech, all recordings were coded independently, and discrepancies were discussed until an agreed upon conclusion was reached across both coders. All scores (minus the first five) were used to assess interrater reliability before consensus was reached. There was moderate agreement between the two coders on overall expressed emotion score (“borderline” scores included with “low” for analyses) (κ = .76), emotional over-involvement score (κ = .83), and criticism (κ = .68).

Analytic Plan

Based on a power analysis using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009), more than the minimum sample size (n=77) was enrolled to conduct a regression analysis with

two predictors and a moderating variable (n=94). With 80% power (1-β), the sample was sufficient to detect medium and large effects. To examine the reliability of the FMSS, we calculated item level inter-rater reliability kappa coefficients on overall expressed emotion, emotional over-involvement and criticism between coders.

Preliminary Analyses and Missing Data

Prior to running the main analyses, descriptive statistics were run for missing data and outliers. The data were checked for normality, linearity, and homoscedasticity, and corrected when necessary. The analyses were conducted with IBM SPSS statistics software. SPSS was chosen as the statistical package of choice given that the analyses to address study hypotheses were focused primarily on simple comparisons (t-tests, ANOVAs, and linear regressions). Furthermore, the use of Hayes' PROCESS Macro version 3.4 for moderation analyses does not differ across statistical platforms. Before running main analyses, each measure and questionnaire was scored to obtain raw scores, and the MASC was scored to obtain T-scores. Across all study variables, the number of missing variables was calculated. Little's Missing at Random (MCAR) test was run to assess if there were systematic differences.

Hypothesis Testing

Aim One:

Descriptive statistics were run for demographic variables in order to determine the characteristics of the sample based on scores on expressed emotion, emotional-over involvement, and criticism (high, borderline, low), as well as asthma status (yes/no). To identify potential covariates to be included in the regression models, bivariate correlation analyses were conducted to examine whether child age, child sex, family income, child race, and caregiver anxiety and depression were significantly associated with outcome variables. Variables correlated with any

outcome at $p < .05$ were retained for subsequent regression analyses.

Aims Two-Four:

In order to test our main hypotheses, a series of ANOVA analyses and regression analyses were conducted using PROCESS SPSS macro version 3.4 (Hayes, 2017). To test the hypothesis that expressed emotion (high, borderline, and low) was associated with child mental health and family functioning, a series of ANOVA analyses were conducted with post-hoc comparisons using Tukey HSD (when main effects were present) to examine mean differences. To test the hypothesis that expressed emotion was associated with child mental health (Figure 2) and family functioning (Figure 3), and more specifically, whether asthma status (yes/no) moderated these associations (Figure 4), two hierarchical multiple regression analyses were conducted using PROCESS SPSS macro version 3.4 (Hayes, 2017). Regression analyses were run between the FMSS sub-scores and child mental health as measured by the MASC and CDI and then with family functioning as measured by the SFI. Asthma status (yes/no) was included as a moderator in analyses and caregiver anxiety as a covariate. The interaction between each expressed emotion subscale (overall expressed emotion, emotional over-involvement, and criticism) and mental health measure as well as family functioning were evaluated separately. A Bonferroni correction was applied to regression analyses with a new adjusted p-value of 0.017.

Aim Five:

To examine our fifth aim, which was exploratory, we assessed if expressed emotion was associated with asthma control among those participants with a parent-reported asthma diagnosis (n=47). Covariates were not included given the exploratory nature of this aim. A regression analysis was run examining the association of expressed emotion, emotional over-involvement, and criticism with asthma control scores. All analyses were run separately.

Results

Preliminary Analyses

To test normality of variables, a Shapiro Wilk analysis was run. In the entire sample, child anxiety was normally distributed; however, child depressive symptoms and family functioning were not. Shapiro Wilk tests of normality were run by overall expressed emotion group to further analyze normality of child depressive symptoms and family functioning. Among the high expressed emotion group, child depressive symptoms (CDI) and family functioning (SFI) were not normally distributed. Among the low expressed emotion group, family functioning (SFI) was not normally distributed. All variables were normally distributed among the borderline expressed emotion group. Despite attempts to transform data using winsorizing, normal distributions were not attained. It was also found that 5.1% of all data were missing, indicating that maximum likelihood estimation of the data is necessary. Little's Missing Completely at Random (MCAR) test resulted in a non-significant p-value ($p = .09$), indicating that data were missing at random and not significantly influenced by a confounding variable.

Descriptive Analyses

Means, standard deviations, and percentages were calculated for each variable of interest categorized by the full sample (Table 1b), overall expressed emotion score (Table 2), emotion over-involvement score (Table 3), criticism score (Table 4), and asthma status (Table 5) to capture the intricacies of the data. Most caregivers in the sample scored either in the borderline (35.1%) or high (45.7%) category for overall expressed emotion (EE) based on their FMSS. Almost half of the sample scored above the clinical cut-off for caregiver depressive symptoms (46.6%) and a third of the sample scored above the clinical cut-off for caregiver anxiety symptoms (31.5%). Almost half of the sample scored above the clinical cut-off for child anxiety

symptoms (46.6%) and most of the sample scored above the clinical cut-off for child depressive symptoms (90.8%).

Table 2 presents descriptive statistics by expressed emotion group. There were no differences in expressed emotion group by demographic variables (age, sex, race, and income). Table 1b.

Means and standard deviations of variables of interest in full sample (94 child-parent dyads)

Entire Sample (n=94)			
Variable	*M*	*SD*	*Range*
MASC	59.82	20.82	0-111
GAD-7	12.56	5.47	7-28
CDI	26.53	6.50	17-50
CES-D	17.52	12.58	0-55
SFI	4.13	0.60	2.11-5.0
	N (%)		
Overall EE			
Low	18 (19.1%)		
Borderline	33 (35.1%)		
High	43 (45.7%)		

Table 2.

Descriptive statistics by overall expressed emotion score from the FMSS

	Overall Expressed Emotion							
	1. Low (n=18)		2. Borderline (n=33)		3. High (n=43)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p-value*	*Tukey's HSD*
Child Age	8.83	2.20	8.94	2.06	8.74	1.98	.92	-
MASC	47.76	17.27	58.97	20.52	65.6	20.56	.01	1<3
GAD-7	10.83	5.17	12.31	4.24	14.17	6.17	.14	-
CDI	23.65	4.70	27.65	5.65	26.90	7.49	.11	-
CES-D	14.71	12.33	16.94	10.60	18.91	14.08	.59	-
SFI	4.27	0.63	4.16	0.52	4.05	0.64	.42	-
	N (%)		N (%)		N (%)			
Child Sex							.89	-
Male	10 (55.6%)		16 (48.5%)		22 (51.2%)			
Female	8 (44.4%)		17 (51.5%)		21 (48.8%)			
Child Race							.62	-
African American	16 (88.9%)		31 (93.9%)		40 (93%)			
Mixed	2 (11.1%)		2 (6.1%)		3 (7%)			
Poverty Line							.48	-
Yes, below	15(83.2%)		24 (75%)		35 (83.3%)			
No, above	2 (11.8%)		8 (25%)		7 (16.7%)			

Note. Only statistically significant differences are noted for Tukey HSD results (p≤.05).

Table 3.

Descriptive statistics by emotional over-involvement score from FMSS

	Emotional Over-Involvement							
	1. Low (n=25)		2. Borderline (n=35)		3. High (n=34)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p-value*	*Tukey's HSD*
Child Age	9.12	2.22	8.57	2.05	8.88	1.89	.58	-
MASC	52.58	20.41	58.72	20.69	66.34	19.84	.045	1<3
GAD-7	11.24	4.47	13.25	4.84	13.71	6.49	.32	-
CDI	25.21	5.76	27.97	7.08	26.06	6.32	.26	-
CES-D	16.33	13.23	18.77	11.35	16.99	13.67	79	-
SFI	4.19	0.57	4.15	0.53	4.07	0.69	.72	-
	N (%)		N (%)		N (%)			
Child Sex							.93	-
Male	12 (48%)		18 (51.4%)		18 (52.9%)			
Female	13 (52%)		17 (48.6%)		16 (47.1%)			
Child Race							.87	-
African American	23 (92%)		32 (91.4%)		32 (94.1%)			
Mixed	2 (8%)		3 (8.6%)		2 (5.9%)			
Poverty Line							.67	-
Yes, below	21 (87.5%)		27 (79.4%)		26 (78.8%)			
No, above	3 (12.5%)		7 (20.6%)		7 (21.2%)			

Note. Only statistically significant differences are noted for Tukey HSD results (p≤.05).

Table 4.

Descriptive statistics by criticism score from FMSS

	Criticism							
	1. Low (n=69)		2. Borderline (n=14)		3. High (n=11)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*p-value*	*Tukey's HSD*
Child Age	8.84	1.92	9.29	2.49	8.18	2.14	.41	-
MASC	57.53	20.32	57.42	20.44	61	21.88	.10	-
GAD-7	12.60	5.48	13.67	6.00	14.44	5.17	.60	-
CDI	25.68	5.79	29.42	5.76	28.6	10.15	.10	-
CES-D	17.08	12.44	15.81	11.68	22.70	14.44	.39	-
SFI	4.17	0.62	3.98	0.59	4.78	4.08	.56	-
	N (%)		N (%)		N (%)			
Child Sex							.71	-
Male	37 (53.6%)		6 (42.9%)		5 (45.5%)			
Female	32 (46.4%)		8 (57.1%)		6 (54.5%)			
Child Race							.88	-
African American	64 (92.8%)		13 (92.9%)		10 (90.1%)			
Mixed	5 (7.2%)		1 (7.1%)		1 (9.1%)			
Poverty Line							.58	-
Yes, below	52 (78.8%)		12 (85.7%)		10 (90.9%)			
No, above	14 (21.2%)		2 (14.3%)		1 (9.1%)			

Note. Only statistically significant differences are noted for Tukey HSD results (p≤.05).

Table 5 presents differences in sample characteristics by asthma status and further displays t-test results. Analyses show that in the sample with asthma (n=47), 39% scored 19 or below on the asthma control test indicating poorly controlled asthma. There was a significant difference in sex between children with and without asthma (t_{92}=2.09, p=.04). There were significantly more male children diagnosed with asthma in the study compared to female children.

Table 5.

Descriptive statistics by asthma status (yes/no)

	Asthma (n=47)	*No Asthma (n=47)*	
Variable	*M ± SD*	*M ± SD*	*t*-test
Child Age (m±sd)	9.09±1.93	8.57±2.11	ns
MASC (m±sd)	60.95±21.90	58.68±19.87	ns
GAD-7 (m±sd)	13.30±5.52	12.55±5.47 (n=33)	ns
CDI (m±sd)	26.37±6.99	26.68±6.05	ns
CES-D (m±sd)	17.88±13.30	17.05±11.79	ns
SFI (m±sd)	4.13±0.74	4.14±0.42	ns
ACT (m±sd)	20.39±3.96	-	
	N (%)		*Chi-Square*
Child Sex			4.26*
Male	29 (61.7%)	19 (40.4%)	
Female	18 (38.3%)	28 (59.6%)	
Child Race			ns
African American	42 (89.4%)	45 (95.7%)	
Mixed	5 (10.6%)	2 (4.3%)	
Poverty Line			ns
Yes, below	36 (76.6%)	38 (86.4%)	
No, above	11 (23.4%)	6 (13.6%)	
Overall EE			ns
Low	8 (17%)	10 (21.3%)	
Borderline	15 (31.9%)	18 (38.3%)	
High	24 (51.1%)	19 (40.4%)	

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

Covariate Testing

A series of correlation analyses were run examining the association between demographic variables and parental mental health with outcome variables (child mental health and family functioning) to determine if any demographic variables needed to be included as covariates. Specifically, parental anxiety (GAD-7) was associated with all dependent variables (child anxiety, child depression, and family functioning). Caregiver depressive symptoms (CES-D) were correlated with child anxiety and depressive symptoms but not family functioning. Caregiver anxiety symptoms and caregiver depressive symptoms were highly correlated (r=.816, p=.01). These correlations are presented in Table 6. The results of the correlation analyses found that none of the demographic variables (age, sex, race, and poverty level) were significantly correlated with child mental health and family functioning. To remain consistent across models, and account for the co-linearity of caregiver anxiety symptoms and depressive symptoms, only caregiver anxiety was included as a covariate in hierarchical regression analyses.

Table 6.

Correlations between demographic variables, caregiver mental health and outcome variables

Variables	MASC	CDI	SFI
Age	-.031	.118	.032
Sex	.076	-.024	-.152
Race	.021	.004	.058
Poverty Level	.027	.010	-.147
GAD-7	**.353****	**.337****	**-.370****
CES-D	**.269***	**.265***	-.220

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

Hypothesis Testing

ANOVA Analyses

One-way analyses of variance (ANOVAs) were conducted to compare child mental health and family functioning scores by overall expressed emotion scores (low, borderline, high) shown in Table 2. There were significant differences in parent-reported child anxiety symptoms by expressed emotion ($F(2,85) = 4.80$, $p=0.01$). Post-hoc comparisons using Tukey HSD tests indicated that the mean difference for high expressed emotion ($M = 47.76$, $SD = 17.27$) and low expressed emotion ($M = 65.60$, $SD = 20.56$) was statistically significant ($p=.01$). However, there was no statistical difference between high and borderline expressed emotion ($p=.35$) or borderline and low expressed emotion ($p=.16$). There was no significant difference in expressed emotion between groups with child depressive symptoms ($F(2,84)=2.26$, $p=0.11$) or family functioning ($F(2,85)=0.880$, $p=.42$).

Secondly, ANOVA analyses were conducted to compare child mental health and family functioning scores by emotional over-involvement scores (low, borderline, and high) shown in Table 3. There were significant differences in parent-reported child anxiety symptoms by emotional over-involvement score at a $p<.05$ level ($F(2,85) = 3.22$, $p=.045$). Post-hoc comparisons using a Tukey HSD test indicated that the mean difference for high emotional over-involvement ($M = 52.58$, $SD = 20.41$) and low emotional over-involvement ($M = 66.34$, $SD = 19.84$) was statistically significant ($p=.04$). However, there was no statistical difference between high and borderline emotional over-involvement ($p=.30$) or borderline and low emotional over-involvement ($p=.51$). There were no significant differences in child depression symptoms across emotional over-involvement ($F(2,84)=1.37$, $p=0.26$) or family functioning ($F(2,85)=0.33$, $p=.72$).

Finally, ANOVA analyses were conducted to compare child mental health and family functioning scores by criticism scores (low, borderline, and high) as shown in Table 4. There were no significant differences in parent-reported child anxiety symptoms ($F(2,85) = 2.35$, $p = .10$), parent-reported child depressive symptoms ($F(2,84) = 2.32$, $p = .10$), or family functioning ($F(2,85) = .59$, $p = .56$) by criticism score.

Regression Analyses

This section describes the results of nine hierarchical regression analyses in which expressed emotion, emotional over-involvement, and criticism were separately indicated as predictor variables. Tests of the nine a priori hypotheses were conducted using Bonferroni adjusted alpha levels of .017 per outcome variable (.05/3). For the first model (seen in Table 7), child anxiety symptoms were the outcome variable of interest. Parent anxiety symptom scores were entered in step one of the analysis. Expressed emotion (high, borderline, low) was entered in step two. Expressed emotion was associated with child anxiety symptoms, even when controlling for parent anxiety symptoms ($F(1,70) = 7.67$, $p = .007$, $R^2 = .19$). To examine the moderating effect of asthma status, Hayes' PROCESS Macro version 3.4 was used with parent anxiety symptoms as a covariate and asthma status as a moderator. Asthma status did not moderate associations ($F(1,68) = .09$, $p = .77$, $R^2\Delta = .001$).

For the second model (seen in Table 7), child depressive symptoms as measured on the CDI was the outcome variable of interest. Parent GAD-7 scores were entered in step one of the analysis. Expressed emotion (high, borderline, low) was entered in step two. Expressed emotion was not associated with child depressive symptoms ($F(1,69) = .30$, $p = .59$, $R^2 = .09$). To examine the moderating effect of asthma status, Hayes' PROCESS Macro version 3.4 was used with parent anxiety symptoms as a covariate and asthma status as a moderator. Asthma status did not

moderate associations (F(1,67)=.55, p=.46).

For the third model (seen in Table 7), family functioning was the outcome variable of interest. Parent anxiety symptoms were entered in step one of the analysis. Expressed emotion (high, borderline, low) was entered in step two. Expressed emotion was not associated with family functioning (F(1,68)=.002, p=.96, R^2=.09). To examine the moderating effect of asthma status, Hayes' PROCESS Macro version 3.4 was used with parent anxiety symptoms as a covariate and asthma status as a moderator. Asthma status did not moderate associations (F(1,66)=.24, p=.63).

Models four through six (seen in Table 7) were rerun using emotional over-involvement instead of overall expressed emotion in analyses as previously outlined. Emotional over-involvement was associated with child anxiety symptoms, even when controlling for parent anxiety symptoms (F(1,70)=5.58, p=.02, R^2=.17). Similar to overall expressed emotion, emotional over-involvement was not associated with child depression (F(1,69)=0.04, p=.84, R^2=.09) or family functioning (F(1,68)=0.04, p=.84, R^2=.09). To examine the moderating effect of asthma status, Hayes' PROCESS Macro version 3.4 was used with parent anxiety symptoms as a covariate and asthma status as a moderator. Asthma status did not moderate associations.

Models seven through nine (seen in Table 7) were rerun using criticism as the predictor variable instead of overall expressed emotion in analyses outlines above. Criticism was not associated with child anxiety (F(1,70)=1.28, p=.26, R^2=.12), child depression (F(1,69)=2.23, p=.14, R^2=.12), or family functioning (F(1,68)=.32, p=.57, R^2=.10). Furthermore, while using Hayes' PROCESS Macro version 3.4, asthma status did not moderate associations

To address the fifth aim, asthma control was the outcome variable of interest. First, we calculated the percent of poorly controlled asthma (39%) based on scores 19 or below on the

ACT. Differences in asthma control (maintained as the continuous variable) by level of expressed emotion, emotional over-involvement, and criticism were assessed using a series of ANOVA analyses. To further examine the association between expressed emotion, emotional over-involvement, and criticism with asthma control, three regression analyses were conducted. No covariates were included in analyses as analyses were exploratory in nature. Expressed emotion ($F(1,39)=1.56$, $p=.22$, $R^2=.01$) and emotional over-involvement ($F(1,39)=.41$, $p=.53$, $R^2=-.02$) were not associated with asthma control. However, criticism was positively associated with asthma control ($F(1,39)=4.33$, $p=.04$, $R^2=.08$).

Table 7.

Results of multiple regression analyses and moderation analyses by outcome variables

Outcome Variable Predictor Variable	*t*	*p*	*β*	*F*	*df1, df2*	*p*	adj. R^2
MASC							
Overall Expressed Emotion (EE)	**2.77**	**.007**	**.30**	**7.67**	**1,70**	**.007**	**.19**
Emotional Over-Involvement (EOI)	**2.36**	**.02**	**.26**	**5.58**	**1,70**	**.02**	**.17**
Criticism (Crit)	1.13	.26	.13	1.28	1,70	.26	.12
EExAsthma Status	-.30	.77	-	.09	1,68	.77	-
EOIxAsthma Status	.52	.60	-	.27	1,68	.60	-
CritxAsthma Status	-1.63	.11	-	2.65	1,68	.11	-
CDI							
Overall Expressed Emotion (EE)	.54	.59	.06	.30	1,69	.59	.09
Emotional Over-Involvement (EOI)	-.21	.84	-.02	.04	1,69	.84	.09
Criticism (Crit)	1.49	.14	.17	2.23	1,69	.14	.12
EExAsthma Status	-.74	.46	-	.55	1,67	.46	-
EOIxAsthma Status	-.34	.71	-	.14	1,67	.71	-
CritxAsthma Status	.04	.97	-	.002	1,67	.97	-
SFI							
Overall Expressed Emotion (EE)	.05	.96	.006	.002	1,68	.96	.09
Emotional Over-Involvement (EOI)	.21	.84	.02	.04	1,68	.84	.09
Criticism (Crit)	.57	.57	.07	.32	1,68	.57	.10
EExAsthma Status	-.49	.64	-	.24	1,66	.64	-
EOIxAsthma Status	-.31	.76	-	.10	1,66	.76	-
CritxAsthma Status	.008	.99	-	.001	1,66	.99	-
ACT							
Overall Expressed Emotion (EE)	1.25	.22	.20	1.56	1,39	.22	.01
Emotional Over-Involvement (EOI)	.64	.53	.10	.41	1,39	.53	-.02
Criticism (Crit)	**2.08**	**.04**	**.32**	**4.33**	**1,39**	**.04**	**.08**

Note: **bolded** *items are statistically significant*

Discussion

This study aimed to understand expressed emotion among a low income, primarily African American, urban sample of families. In doing so, the moderating influence of asthma status was explored to determine whether the presence of a childhood chronic illness changed the association between expressed emotion and child mental health and between expressed emotion and family functioning. Parent psychopathology was considered a covariate in analyses as it has been shown to be associated with child mental health and family functioning (Franz & McKinney, 2018; Baker & Hoerger, 2012). Overall, the findings indicated that in families with high expressed emotion, children tended to display more anxiety symptoms. Furthermore, expressed emotion was associated with child anxiety after controlling for caregiver psychopathology. Findings also suggested that high overall expressed emotion scores (n=43) were driven by high scores on emotional over-involvement (n=34) as opposed to criticism (n=11). Asthma status did not moderate any analyses. However, higher levels of criticism were associated with better asthma control. These findings are discussed in more detail along with future research directions.

Expressed Emotion by Sample Characteristics

Consistent with hypotheses, no differences by sample characteristics (age, sex, income, race) were found based on level of expressed emotion, emotional over-involvement, and criticism. Caregiver expressed emotion has been examined across the full developmental spectrum among a broad range of psychological and medical diagnoses (Peris and Miklowitz, 2015) with very few studies finding differences by age; therefore, we did not suspect differences by age among our sample. Nevertheless, some literature with patients with schizophrenia found that relatives of older schizophrenic patients responded rigidly to interpersonal interactions

(Schooler, Neumann, Caplan, & Roberts, 1997) compared to relatives of younger schizophrenic patients whom competed with patients for who was in charge (Wuerker, 1994, Wuerker, 1996). One possibility to explain this difference is that the relatives have "turned off" to the offspring after some years of trying to cope with a difficult situation (Wuerker, Fu, Haas, & Bellack, 2002). It is possible that differences were not seen in our sample as children were ages 5-12 years and the effect may only be seen as children get older, when parents may "turn off" to their offspring. In regards to sex differences, some studies have found differences in expressed emotion by sex with harsher interactions (more critical comments) occurring between caregivers and males compared to caregivers and females (Wuerker, Haas and Bellack, 1999). However, those studies have been conducted in a sample of patients with schizophrenia. To our knowledge, there have been no other studies examining differences in expressed emotion by child sex.

In regards to income, the current sample reported yearly incomes that were primarily below the poverty threshold of $25,000. To detect differences by income, a wider range of income levels should be included in future research. In regards to race, previous research done by Weisman, Rosales, Kymalainen, and Armesto (2006) among patients with schizophrenia and their families found differences in associations of parental criticism and patient perception of criticism based on ethnicity (African American, Caucasian, and Latinx). White and Latinx family members who expressed more criticism were perceived as more critical by patients; however, among black families, no significant association was found between relatives' expressed criticism and patients' perceptions of their relatives' criticism. The findings by Weisman and colleagues (2006) suggest that traditional assessment measures of expressed emotion may have less predictive validity when looking at associations with patient perception among African Americans. Nevertheless, the sample for these analyses was almost all African American, so

differences by race were not detectable.

With respect to parent psychopathology, parent anxiety and expressed emotion have only been examined in a few studies. Those studies found that maternal depressive symptoms were associated with high expressed emotion and criticism (Hibbs et al., 1991), and mothers with a history of clinical depressive symptoms were found to have higher levels of expressed emotion and higher levels of overall criticism compared to mothers without a history of depressive symptoms (Thompson et al., 2010). However, even though little direct research has been done assessing parent mental health and expressed emotion, it is well documented that maternal depressive symptoms have a negative impact on child psychopathology (Goodman et al, 2011), and that parent anxiety disorders increase the risk for similar problems in children (e.g., Beidel and Turner 1997; Biederman, Petty, Hirshfeld-Becker, Henin, Faraone et al., 2006; Merikangas, Avenevoli, Dierker, & Grillon, 1999). Knowing that parental psychopathology is associated with child psychopathology, and further that parental psychopathology may be associated with family functioning, it was not surprising that parental psychopathology was also associated with expressed emotion in this sample.

Expressed Emotion and Child Mental Health

Contrary to hypotheses regarding child depressive symptoms as an outcome, none of the FMSS subscales were associated with child depressive symptoms. Research has shown conflicting findings when assessing the association of expressed emotion and child depressive symptoms. In this study, we did not find an association; however, several studies found that parental criticism was a risk factor for the development of depression longitudinally (Asarnow et al., 1994, 2001, Frye & Garber, 2005, Burkhouse et al., 2012). Nevertheless, Thompson and colleagues (2015) did not find any associations between expressed emotion and child depressive

symptoms in a cross-sectional study. Furthermore, our findings are consistent with a study of family expressed emotion among adolescents with bipolar disorder, which found no association between expressed emotion and adolescents' current depression diagnosis (Coville, Miklowitz, Taylor & Low, 2008). Given that these were longitudinal studies, it is possible that expressed emotion may measure intrafamilial processes that contribute to the development of depression down the road but does not indicate concurrent clinical state (Tompson et al., 2015). Peris and Miklowitz (2015) explained that models of "toxic family stress" (i.e. frequent, sustained, and uncontrollable stress) provide a possible framework for understanding how high expressed emotion environments interact with individual biological vulnerabilities to promote illness onset and recurrence; however, they did not hypothesis a model in which high expressed emotion interacts with concurrent child psychopathology due to biological vulnerabilities. It is plausible that the current sample (aged 5-12) is too young to experience the effects that high expressed emotion has on the development of child depressive symptoms.

Nevertheless, consistent with hypotheses, expressed emotion and emotional over-involvement were associated with child anxiety symptoms above and beyond parent anxiety symptoms. Contrary to hypotheses, criticism was not associated with child anxiety symptoms. In line with what we found, Siccouri and colleagues (2017) found an association between parental involvement and negativity with child anxiety among a sample of anxious parents. This association may speak to the impact of expressed emotion on child psychopathology above and beyond caregiver psychopathology. This means that it may not just be the presence of parental psychopathology that leads to child psychopathology but rather parental beliefs about their child exhibited through expressed emotion that contribute to the development of psychopathology. Research aimed at understanding biological responses (e.g., stress reactivity, arousal) to familial

expressed emotion is needed; however, the results of this study provide support for diving further into the intricacies of parental speech samples and their associations with child psychopathology. It is important to consider this association in the development of family-based interventions targeting child anxiety symptoms among a low-income, African American sample.

Expressed Emotion and Family Functioning

Contrary to hypotheses, none of the FMSS subscales were associated with family functioning. While differences in family functioning were hypothesized in this sample based on previous findings, only one other study has examined the association of expressed emotion and family functioning among a socioeconomically and ethnically diverse sample (Boger et al., 2008). That study only included 19% African American participants whereas the current study included 92.6%. Boger and colleagues (2008) found that lower family expressiveness was associated with high expressed emotion over time. Their study was longitudinal in nature (5 years) while the current study was cross-sectional. It is plausible that expressed emotion is related to family functioning over time but is not indicative of current functioning in the family. Furthermore, in studies with patients with eating disorders, maternal hostility significantly predicted level of general family functioning and family communication at the end of treatment, after controlling for baseline family functioning, baseline eating disorder psychopathology, and treatment (Reinecke, Accurso, Lock & Le Grange, 2016). However, the sample used for that study included 79% Caucasian participants and only one African American participant. Some research has shown that among African American families, parental criticism may serve a protective role in development of psychopathology (Rosenfard, Bellack, and Aziz, 2006), even though this association was not found in the current study.

Among resilience literature, characteristics like family cohesion and supportive parent-

child interactions promote resilience in families (Benzies & Mychasiuk, 2009). Findings indicate that warm and cohesive family interactions (Place, Reynolds, Cousins, & O'Neill, 2002; Orthner, Jones-Sanpei, & Williamson, 2004) are two strong predictors of resilience. Nevertheless, there is no information on whether parental criticism can exist in tandem with warm and cohesive family interactions in regards to resilience. It is possible that caregivers can speak about their child critically while being warm and supportive. Future research is needed to disentangle protective aspects of parental expressed emotion from negative aspects to understand how criticism may be beneficial among families facing issues related to chronic poverty and/or racial discrimination.

Furthermore, the current study assessed family functioning using the Beavers Self Report Family Inventory (SFI). The SFI appears to have sound psychometric properties; however, most of the psychometric properties have been reported in non-peer-reviewed outlets (i.e. commentaries and chapters) and therefore, according to the criteria of Alderfer and colleagues (2008), qualify as 'approaching well-established' instead of ‘well-established (Alderfer, Fiese, Gold, Cutuli, Holmbeck et al., 2008). It is possible that a different measurement of family functioning such as the Family Assessment Device (FAD) may be able to detect an association with expressed emotion as hypothesized. According to Alderfer and colleagues (2008), the FAD and its shorter General Functioning Scale have been categorized as 'well-established'. Different measures of family functioning should be used in future research to assess if expressed emotion and family functioning are associated.

Asthma Status as a Moderator

Contrary to hypotheses, asthma status did not moderate any associations of expressed emotion with child mental health and family functioning. Regarding sex differences, and differences in scores on child mental health and family functioning based on asthma status,

hypotheses were also generally not supported. Statistically, more male participants were diagnosed with asthma compared to female participants in this sample, which is in line with published statistics ("Asthma Capitals: 2018," 2018). However, there were no differences in mean scores on child anxiety symptoms, child depressive symptoms, or family functioning by asthma status. While previous literature has found that children with asthma are almost twice as likely to develop anxiety and/or depressive disorders (Vuillermin et al., 2010), these differences were not found in the current study. Prior studies also suggest that families of children with asthma face unique financial, social, and psychological problems (Oskouie & Khanjari, 2013). Nevertheless, it is plausible that the stress added from having a child with a chronic illness does not affect a family above and beyond the stress caused by living in poverty. In the current study, 81.3% of the sample reported an income below the poverty line. Furthermore, 46.6% of caregivers scored above the clinical cut-off for anxiety. Almost half of the children in the study scored above the clinical cut-off for anxiety as well, and 90.8% of the child sample scored above the clinical cut-off for depression. With a low-income sample of mostly depressed and anxious caregivers and children, it is possible that experiencing asthma does not significantly worsen mental health and family functioning. Research is needed to further understand how systemic stressors (e.g., poverty, access to care) affect family dynamics.

Our hypotheses regarding moderation were not supported in that asthma status did not moderate associations between expressed emotion subscales and child mental health and family functioning. Although research has found a link between asthma and anxiety, both cross-sectionally (Delmas et al., 2011; Feldman et al., 2006) and longitudinally (Alati et al., 2005; Goodwin et al., 2005), as well as expressed emotion and anxiety (Siccouri et al., 2017), it is plausible that the association between expressed emotion and anxiety is strong, regardless of

asthma status. Theories of childhood anxiety suggest that parenting characterized by over-involvement and negativity (rejection/criticism) are associated with anxious symptomatology in children (Chorpita and Barlow, 1998; Craske, 1999; Dadds and Roth, 2001; Rapee, 2012). However, the current study did not find differences in levels of expressed emotion, emotional over-involvement, and criticism based on asthma status. Considering that there were no expressed emotion differences based on asthma status, it is plausible that the associations of expressed emotion and child mental health and family functioning would not differ in this population of families with high levels of stress. Among these families, the demands placed on them by asthma may not affect them above and beyond the stress they experience related to other urban stressors such as limited resources or community violence.

Expressed Emotion and Asthma Control

Contrary to our hypotheses, overall expressed emotion and emotional over-involvement were not associated with asthma control. Considering the small sample size and exploratory nature of analyses, it is likely that a larger sample size is needed to detect associations. However, criticism was positively associated with asthma control, such that more criticism was associated with better asthma control scores. It is possible that expressing critical remarks about a child, at least within this sample, had a positive impact on a child's asthma management. To explain this, previous research among patients with schizophrenia suggest that a different relationship may exist between expressed emotion and symptomatology for African American patients. Rosenfard, Bellack, and Aziz (2006) found that more criticism and intrusive behavior were actually associated with better schizophrenic patient outcomes in African American patients. The authors found that increased critical comments and intrusive behavior were associated with lower levels of odd or unusual thinking over a 2-year period (Rosenfarb et al., 2006). Moreover, differences

in expressed emotion have been found based on culture (Hooley, 2007).

In the current study, higher criticism was associated with better asthma control. Among African American families, criticism appears to protect against symptom severity. It is possible that parents scoring high on parental criticism tend to take an active role in managing their own life problems and difficulties (Hooley, 2007), which may extend to taking care of their child's difficulties. To our knowledge, there are three reviews examining expressed emotion cross-culturally (Hooley, 2007; Bhugra & McKenzie 2003; Hashemi & Cochrane 1999). It has been found that levels of criticism vary across culture (Hooley, 2007). Studies suggest that in some ethnic groups, high levels of criticism or emotional over-involvement may be more culturally accepted than in others (Bhugra & McKenzie 2003, Rosenfarb, Bellack Aziz, Kratz, & Sayers, 2004). Furthermore, the meaning of expressed emotion is likely to be influenced by a broad range of cultural factors (i.e. shared language, experiences, and societal norms) (Jenkins and Karno, 1992).

Studies have also found that high expressed emotion relatives are more conscientious, less tolerant, less flexible, and have higher levels of self-criticism compared to relatives with low expressed emotion (King, Ricard, Rochon, Steiger, & Nelis, 2003; Hooley & Hiller 2000; Docherty, Cutting, & Bers, 1998). Thus, it is plausible that a caregiver's rigidity makes asthma management more effective for them compared to relatives with low expressed emotion who may be more flexible in their treatment approach. Furthermore, findings from conversations with high expressed emotion relatives found that the vast majority of caregivers were highly motivated to help their patients with schizophrenia and they were very involved with the patient's day to day care (van Os, Marcelis, Germeys, Graven, & Delespaul, 2001). In the current study, we found that criticism might be a protective factor in level of asthma control, which is

determined in part by asthma management behaviors. Future research is needed to further examine how parental criticism affects a child's asthma management routine, such as medication adherence, avoidance of triggers, emergency health-care utilization, and visits to the doctor.

Limitations

Though the current study makes several contributions to the literature, its methodology presents some limitations. The cross-sectional nature of the data does not allow conclusions to be made about causal relationships or worsening of symptoms over time. However, considering the lack of research on this topic among African American participants and participants living in urban settings, cross sectional research was warranted. The current study also used parent-reported measures of child anxiety symptoms and depressive symptoms. Research shows that parents may not be accurate reporters of their children's mental health (De Los Reyes, Augenstein, Wang, Thomas, Drabick, et al., 2015). Furthermore, it has been shown that caregiver psychopathology can influence caregiver report of child psychopathology (Kelley, Bravo, Hamrick, Braitman, White, et al., 2017). In particular, mothers who reported more symptoms of depression and anxiety for themselves also reported more internalizing symptoms among their children (Kelley et al., 2017). Nevertheless, the current study found an association between expressed emotion and child anxiety symptoms above and beyond caregiver anxiety. This finding indicates that there is something unique about parental expressed emotion that is not entirely accounted for by parent psychopathology.

Furthermore, the current study used the original coding manual for the FMSS published in 1986 (over 30 years ago). According to research by Jenkins and Karno (1992), features of expressed emotion include: cultural interpretations of the nature of the problem, cultural meanings of kin relationships, identification of cultural rule violations, vocabularies of emotion,

relative's personality traits, degrees and kinds of patient's psychopathology, family interaction dynamics, attempts to socially control a deviant relative, availability and quality of social support, and historical and political economics factors. With these features in mind, the influence of culture (i.e., location, time, shared experiences, shared understanding of social norms, and shared language) should all be considered in understanding a person's five-minute speech sample. Nevertheless, the coding mechanisms by which we continue to use fail to be culturally adapted for a population other than middle-class, white individuals. Future research should culturally adapt the original coding manual (Magana et al., 1986) with consideration of an individual's cultural beliefs and experiences. It is possible that culturally adapting the FMSS may lead to a better understanding of the construct among low-income, African American families.

Moreover, the current study was predominately African American and reported an income below the poverty line. This uniformity in participant characteristics did not allow us to determine differences by race or income. It is possible that differences might exist in a more diverse sample. Finally, the current study did not include measures of racial discrimination, barriers to care, or cultural factors that may influence associations of expressed emotion with child mental health and family functioning among a low-income, African American sample. While we are not aware of any research with the FMSS that has included these variables, it has been shown that such measurements of more culturally-relevant factors influence child mental health and socioemotional development among African American families (Bécares, Nazroo & Kelly, 2015). Therefore, in assessing associations of expressed emotion and child mental health and family functioning, variables of barriers to care, cultural factors, racial discrimination, and poverty should be considered.

Future Directions and Implications

Future research should expand upon current findings in several ways. To better understand associations between expressed emotion and our outcome variables, a larger sample size and several more measurements (i.e., family functioning, poverty, access to care, and culturally adapted expressed emotion) are warranted. This research would benefit from an understanding of how societal factors (i.e., barriers to care such as poverty and access) influence parent-child dynamics. As outlined previously, the literature indicates that expressed emotion differs by culture (Hooley, 2007). Knowing which aspects of culture might impact expressed emotion will aid in targeting intervention efforts. For example, understanding a family's beliefs of societal norms and their shared language will allow interventions to be adapted in a culturally sensitive manner. Using the language and beliefs of the individuals in an intervention program may lead to greater success of the program. It is conceivable that several societal factors (i.e., systemic racism, poverty, varying understandings of societal and neighborhood norms, access to care) are influencing parental expressed emotion among African American families, which may affect child psychopathology and family functioning downstream. A consideration of these systemic issues in intervention development is warranted.

Future research should also examine other measures of asthma management to provide a deeper understanding of associations of expressed emotion and asthma control among children with asthma. Research should also examine if asthma management measures or even medication adherence might serve as moderators in associations between caregiver expressed emotion and child mental health and family functioning considering that asthma status alone did not. The presence of a chronic illness might not impact associations, but further assessment of chronic illness characteristics should be examined as a moderator in associations. Finally, future research

should attempt to replicate findings from this study and evaluate if expressed emotion is a reasonable intervention target to reduce child anxiety symptoms.

Based on findings from the current study, it is plausible that high caregiver expressed emotion may serve as an indicator of child anxiety. Intervention efforts might consider using parent speech samples as a way to identify children at risk for experiencing anxiety symptoms. Findings from this study suggest that criticism among African American caregivers of children with asthma may serve a protective role against worsening asthma symptoms such as wheezing during the day and waking up at night due to asthma. However, future research is needed to confirm this finding and assess how critical remarks made by low income, African American caregivers of children with asthma might be associated with asthma control in a larger sample.

Conclusions

In summary, results suggested that high levels of caregiver expressed emotion were associated with child anxiety symptoms while controlling for caregiver anxiety symptoms, but asthma status did not moderate associations. Furthermore, caregiver criticism was associated with asthma control in exploratory analyses. It is possible that regardless of additional family demands related to asthma, expressed emotion is associated with child anxiety symptoms among lower income families. Further examination into poverty and access to care that may moderate these associations is warranted, as well as the impact that minimizing parent anxiety might have on overall expressed emotion. Based on this study, the FMSS is a useful tool to administer in research assessing parental expressed emotion among school age children. However, future research should examine whether the FMSS coding procedures could be culturally adapted for a low income, African American sample.

References

Aber, J. L., Jones, S., & Cohen, J. (2000). The impact of poverty on the mental health and development of very young children. *Handbook of Infant Mental Health, 2nd Ed.* New York, NY, US: The Guilford Press.

Akinbami, L. J., Simon, A. E., & Rossen, L. M. (2016). Changing Trends in Asthma Prevalence Among Children. *Pediatrics, 137*. https://doi.org/10.1542/peds.2015-2354

Al Ghriwati, N., Winter, M. A., Everhart, R. S., & Fiese, B. H. (2017). Family functioning and child asthma severity: A bio-behavioral approach. *Families, Systems & Health: The Journal of Collaborative Family Healthcare, 35,* 439–449. https://doi.org/10.1037/fsh0000264

Alati, R., O'Callaghan, M., Najman, J. M., Williams, G. M., Bor, W., & Lawlor, D. A. (2005). Asthma and internalizing behavior problems in adolescence: a longitudinal study. *Psychosomatic Medicine*, *67*, 462–470. https://doi.org/10.1097/01.psy.0000161524.37575.42

Alderfer, M. A., Fiese, B. H., Gold, J. I., Cutuli, J. J., Holmbeck, G. N., Goldbeck, L., ... & Patterson, J. (2008). Evidence-based assessment in pediatric psychology: Family measures. *Journal of pediatric psychology, 33*, 1046-1061.

Asarnow, J. R., Goldstein, M. J., Tompson, M., & Guthrie, D. (1993). One-year outcomes of depressive disorders in child psychiatric in-patients: evaluation of the prognostic power of a brief measure of expressed emotion. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *34*, 129–137.

Asarnow, J. R., Tompson, M., Hamilton, E. B., Goldstein, M. J., & Guthrie, D. (1994). Family-expressed emotion, childhood-onset depression, and childhood-onset schizophrenia spectrum disorders: is expressed emotion a nonspecific correlate of child psychopathology

or a specific risk factor for depression? *Journal of Abnormal Child Psychology*, *22*, 129–146.

Asarnow, J. R., Tompson, M., Woo, S., & Cantwell, D. P. (2001). Is expressed emotion a specific risk factor for depression or a nonspecific correlate of psychopathology? *Journal of Abnormal Child Psychology*, *29*, 573–583.

Asthma Capitals: 2018. (2018). Retrieved from https://www.aafa.org/media/2119/aafa-2018-asthma-capitals-report.pdf

Baker, B. L., Heller, T. L., & Henker, B. (2000). Expressed emotion, parenting stress, and adjustment in mothers of young children with behavior problems. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *41*, 907–915.

Baker, C. N., & Hoerger, M. (2012). Parental child-rearing strategies influence self-regulation, socio-emotional adjustment, and psychopathology in early adulthood: Evidence from a retrospective cohort study. *Personality and individual differences*, *52*, 800-805.

Barrios, C. S., Bufferd, S. J., Klein, D. N., & Dougherty, L. R. (2017). The interaction between parenting and children's cortisol reactivity at age 3 predicts increases in children's internalizing and externalizing symptoms at age 6. *Development and Psychopathology*, *29*, 1319–1331.

Barrowclough, C., & Hooley, J. M. (2003). Attributions and expressed emotion: a review. *Clinical Psychology Review*, *23*, 849–880.

Beavers, R., & Hampson, R. B. (2000). The Beavers Systems Model of Family Functioning. *Journal of Family Therapy*. United Kingdom: Blackwell Publishing. https://doi.org/10.1111/1467-6427.00143

Bécares, L., Nazroo, J., & Kelly, Y. (2015). A longitudinal examination of maternal, family, and

area-level experiences of racism on children's socioemotional development: Patterns and possible explanations. *Social Science & Medicine, 142,* 128-135.

Beidel D.C. & Turner S.M. At risk for anxiety: I. Psychopathology in the offspring of anxious parents. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 918–924.

Benzies, K., & Mychasiuk, R. (2009). Fostering family resiliency: A review of the key protective factors. *Child & Family Social Work, 14,* 103-114.

Bhugra, D., & McKenzie, K. (2003). Expressed emotion across cultures. *Advances in Psychiatric Treatment, 9,* 342-348.

Biederman J, Petty C, Hirshfeld-Becker D.R., Henin A, Faraone S.V., Dang D., et al. A controlled longitudinal 5-year follow-up study of children at high and low risk for panic disorder and major depression. *Psychological Medicine, 36,*1141–1152.

Blair, C., Ursache, A., Mills-Koonce, R., Stifter, C., Voegtline, K., & Granger, D. A. (2015). Emotional reactivity and parenting sensitivity interact to predict cortisol output in toddlers. *Developmental Psychology, 51,* 1271–1277. https://doi.org/10.1037/dev0000031

Boger, K. D., Tompson, M. C., Briggs-Gowan, M. J., Pavlis, L. E., & Carter, A. S. (2008). Parental expressed emotion toward children: prediction from early family functioning. *Journal of Family Psychology, 22,* 784–788. https://doi.org/10.1037/a0013251

Bronfenbrenner, U. (1979). *The ecology of human development*. Harvard university press.

Burkhouse, K. L., Uhrlass, D. J., Stone, L. B., Knopik, V. S., & Gibb, B. E. (2012). Expressed emotion-criticism and risk of depression onset in children. *Journal of Clinical Child and Adolescent Psychology, 41,* 771–777. https://doi.org/10.1080/15374416.2012.703122

Bussing, R., Burket, R. C., & Kelleher, E. T. (1996). Prevalence of anxiety disorders in a clinic-

based sample of pediatric asthma patients. *Psychosomatics*, *37*, 108–115. https://doi.org/10.1016/S0033-3182(96)71576-1

Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: the role of control in the early environment. *Psychological bulletin, 124*, 3.

Coville, A. L., Miklowitz, D. J., Taylor, D. O., & Low, K. G. (2008). Correlates of high expressed emotion attitudes among parents of bipolar adolescents. *Journal of clinical psychology, 64*, 438-449.

Craske, M. G. (1999). Anxiety disorders: psychological approaches to theory and treatment. Westview Press.

Dadds, M. R., & Roth, J. H. (2001). Family processes in the development of anxiety problems. *The developmental psychopathology of anxiety*, 278-303.

De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A., Burgers, D. E., & Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. P*sychological bulletin, 141*, 858.

Delmas, M.-C., Guignon, N., Chee, C. C., Fuhrman, C., Herbet, J.-B., & Gonzalez, L. (2011). Asthma and major depressive episode in adolescents in France. *The Journal of Asthma*, *48*, 640–646. https://doi.org/10.3109/02770903.2011.585410

Docherty, N. M., Cutting, L. P., & Bers, S. A. (1998). Expressed emotion and differentiation of self in the relatives of stable schizophrenia outpatients. *Psychiatry, 61,* 269-278.

Eisner, M. D., Katz, P. P., Lactao, G., & Iribarren, C. (2005). Impact of depressive symptoms on adult asthma outcomes. *Annals of Allergy, Asthma & Immunology*, *94*, 566–574. https://doi.org/10.1016/S1081-1206(10)61135-0

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. https://doi.org/10.3758/BRM.41.4.1149

Feldman, J. M., Ortega, A. N., McQuaid, E. L., & Canino, G. (2006). Comorbidity between asthma attacks and internalizing disorders among Puerto Rican children at one-year follow-up. *Psychosomatics, 47,* 333–339. https://doi.org/10.1176/appi.psy.47.4.333

Franz, A. O., & McKinney, C. (2018). Parental and child psychopathology: moderated mediation by gender and parent–child relationship quality. *Child Psychiatry & Human Development, 49,* 843-852.

Frye, A. A., & Garber, J. (2005). The relations among maternal depression, maternal criticism, and adolescents' externalizing and internalizing symptoms. *Journal of Abnormal Child Psychology, 33,* 1–11.

Gar, N. S., & Hudson, J. L. (2008). An examination of the interactions between mothers and children with anxiety disorders. *Behaviour Research and Therapy, 46,* 1266–1274. https://doi.org/10.1016/j.brat.2008.08.006

Gillaspy, S. R., Hoff, A. L., Mullins, L. L., Van Pelt, J. C., & Chaney, J. M. (2002). Psychological distress in high-risk youth with asthma. *Journal of Pediatric Psychology, 27,* 363–371.

Goodwin, R. D., Bandiera, F. C., Steinberg, D., Ortega, A. N., & Feldman, J. M. (2012). Asthma and mental health among youth: etiology, current knowledge and future directions. *Expert Review of Respiratory Medicine, 6,* 397–406. https://doi.org/10.1586/ers.12.34

Goodwin, R. D., Fergusson, D. M., & Horwood, L. J. (2004). Asthma and depressive and anxiety disorders among young persons in the community. *Psychological Medicine, 34,* 1465–1474.

Goodwin, R. D., Hottinger, K., Pena, L., Chacko, A., Feldman, J., Wamboldt, M. Z., & Hoven,

C. (2014). Asthma and mental health among youth in high-risk service settings. *The Journal of Asthma , 51,* 639–644. https://doi.org/10.3109/02770903.2014.897728

Goodwin, R. D., Lewinsohn, P. M., & Seeley, J. R. (2005). Cigarette smoking and panic attacks among young adults in the community: the role of parental smoking and anxiety disorders. *Biological Psychiatry, 58,* 686–693. https://doi.org/10.1016/j.biopsych.2005.04.042

Goodwin, R. D., Pine, D. S., & Hoven, C. W. (2003). Asthma and panic attacks among youth in the community. *The Journal of Asthma, 40,* 139–145.

Greenlee, J. L., Winter, M. A., Everhart, R. S., & Fiese, B. H. (2019). Parents' child-related schemas: Associations with children's asthma and mental health. *Journal of Family Psychology, 33,* 270–279. https://doi.org/10.1037/fam0000494

Guberman, C., & Manassis, K. (2011). Symptomatology and family functioning in children and adolescents with comorbid anxiety and depression. *Journal of the Canadian Academy of Child and Adolescent Psychiatry, 20,* 186–195.

Hahlweg, K., Goldstein, M. J., Nuechterlein, K. H., Magaña, A. B., Mintz, J., Doane, J. A., … Snyder, K. S. (1989). Expressed emotion and patient-relative interaction in families of recent onset schizophrenics. *Journal of Consulting and Clinical Psychology*. US: American Psychological Association. https://doi.org/10.1037/0022-006X.57.1.11

Hahlweg, K., Nuechterlein, K. H., Goldstein, M. J., Magaña, A., Doane, J. A., & Snyder, K. S. (1987). Parental expressed emotion attitudes and intrafamilial communication behavior. *Understanding Major Mental Disorder: The Contribution of Family Interaction Research.* New York, NY, US: Family Process Press.

Hamilton, E., & Carr, A. (2016). Systematic review of self-report family assessment measures. *Family Process, 55,* 16-30.

Hashemi, A. H. & Cochrane, R. (1999). Expressed emotion and schizophrenia: A review of studies across cultures. *International review of Psychiatry, 11*, 219-224.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.

Holmbeck, G. N. (2002). Post-hoc probing of significant moderational and mediational effects in studies of pediatric populations. *Journal of Pediatric Psychology, 27*, 87–96.

Hooley, J. M. (2007). Expressed emotion and relapse of psychopathology. *Annual Review of Clinical Psychology, 3*, 329–352. https://doi.org/10.1146/annurev.clinpsy.2.022305.095236

Hooley, J. M., & Hiller, J. B. (2000). Personality and expressed emotion. *Journal of abnormal psychology, 109*, 40.

Jacobs, M. B., Gieron, M. A., Martinez, C. R., Campos, A., & Wood, B. P. (1990). Radiological case of the month. Basal ganglia injury after cardiopulmonary arrest: clinical and magnetic resonance imaging correlation. *American Journal of Diseases of Children*, *144*, 937–938.

Jenkins, J. H., & Karno, M. (1992). The meaning of expressed emotion: Theoretical issues raised by cross-cultural research. *American journal of psychiatry, 149*, 9-21.

Jones, T. M., Nurius, P., Song, C., & Fleming, C. M. (2018). Modeling life course pathways from adverse childhood experiences to adult mental health. *Child Abuse & Neglect*, *80*, 32–40. https://doi.org/https://doi.org/10.1016/j.chiabu.2018.03.005

Katon, W., Lozano, P., Russo, J., McCauley, E., Richardson, L., & Bush, T. (2007). The prevalence of DSM-IV anxiety and depressive disorders in youth with asthma compared with controls. *The Journal of Adolescent Health, 41*, 455–463. https://doi.org/10.1016/j.jadohealth.2007.05.023

Kaugars, A. S., Klinnert, M. D., & Bender, B. G. (2004). Family influences on pediatric asthma.

Journal of Pediatric Psychology, *29*, 475–491. https://doi.org/10.1093/jpepsy/jsh051

Kaugars, A. S., Moody, E. J., Dennis, C., & Klinnert, M. D. (2007). Validity of the Five Minute Speech Sample in families with infants from low-income backgrounds. *Infant Behavior & Development*, *30*, 690–696. https://doi.org/10.1016/j.infbeh.2007.04.003

Kelley, M. L., Bravo, A. J., Hamrick, H. C., Braitman, A. L., White, T. D., & Jenkins, J. (2017). Parents' Reports of Children's Internalizing Symptoms: Associations with Parents' Mental Health Symptoms and Substance Use Disorder. *Journal of child and family studies, 26*, 1646-1654.

King, S., Ricard, N., Rochon, V., Steiger, H., & Nelis, S. (2003). Determinants of expressed emotion in mothers of schizophrenia patients. *Psychiatry research, 117*, 211-222.

Kobos, E., & Imiela, J. (2015). Factors affecting the level of burden of caregivers of children with type 1 diabetes. *Applied Nursing Research : ANR*, *28*, 142–149. https://doi.org/10.1016/j.apnr.2014.09.008

Kovacs, M. (1992). CDI. *Children's Depression Inventory. Multi-Health Systems, New York*.

Kroenke, K., Spitzer, R. L., Williams, J. B., Monahan, P. O., & Löwe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of internal medicine, 146*, 317-325.

Lavoie, K. L., Bacon, S. L., Barone, S., Cartier, A., Ditto, B., & Labrecque, M. (2006). What is worse for asthma control and quality of life: depressive disorders, anxiety disorders, or both? *Chest*, *130*, 1039–1047. https://doi.org/10.1378/chest.130.4.1039

Leff, J., & Vaughn, C. (1980). The interaction of life events and relatives' expressed emotion in schizophrenia and depressive neurosis. *The British Journal of Psychiatry : The Journal of Mental Science*, *136*, 146–153.

Lewinsohn, P.M., Seeley, J.R., Roberts, R.E., & Allen, N.B. (1997). Center for Epidemiological Studies-Depression Scale (CES-D) as a screening instrument for depression among community-residing older adults. *Psychology and Aging, 12,* 277- 287.

Lifford, K. J., Harold, G. T., & Thapar, A. (2009). Parent–child hostility and child ADHD symptoms: A genetically sensitive and longitudinal analysis. *Journal of Child Psychology and Psychiatry, 50,* 1468–1476.

Liu, A. H., Zeiger, R., Sorkness, C., Mahr, T., Ostrom, N., Burgess, S., … Manjunath, R. (2007). Development and cross-sectional validation of the Childhood Asthma Control Test. *The Journal of Allergy and Clinical Immunology, 119,* 817–825. https://doi.org/10.1016/j.jaci.2006.12.662

Lu, Y., Mak, K.-K., van Bever, H. P. S., Ng, T. P., Mak, A., & Ho, R. C.-M. (2012). Prevalence of anxiety and depressive symptoms in adolescents with asthma: A meta-analysis and meta-regression. *Pediatric Allergy and Immunology, 23,* 707–715. https://doi.org/10.1111/pai.12000

Magana, A. B., Goldstein, J. M., Karno, M., Miklowitz, D. J., Jenkins, J., & Falloon, I. R. (1986). A brief method for assessing expressed emotion in relatives of psychiatric patients. *Psychiatry Research, 17,* 203–212.

March, J. S., Parker, J. D., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The Multidimensional Anxiety Scale for Children (MASC): factor structure, reliability, and validity. *Journal of the American Academy of Child and Adolescent Psychiatry, 36,* 554–565. https://doi.org/10.1097/00004583-199704000-00019

Marks, M., Wieck, A., Checkley, S., & Kumar, C. (1996). How does marriage protect women with histories of affective disorder from post-partum relapse? *The British Journal of*

Medical Psychology, *69*, 329–342.

Marshall, V. G., Longwell, L., Goldstein, M. J., & Swanson, J. M. (1990). Family Factors Associated with Aggressive Symptomatology in Boys with Attention Deficit Hyper activity Disorder: A Research Note. *Journal of Child Psychology and Psychiatry*, *31*, 629–636. https://doi.org/10.1111/j.1469-7610.1990.tb00802.x

Maughan, B., & McCarthy, G. (1997). Childhood adversities and psychosocial disorders. *British Medical Bulletin*, *53*, 156–169.

McCarty, C. A., & Weisz, J. R. (2002). Correlates of expressed emotion in mothers of clinically-referred youth: an examination of the five-minute speech sample. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *43*, 759–768.

McQuaid, E. L., Kopel, S. J., & Nassau, J. H. (2001). Behavioral adjustment in children with asthma: a meta-analysis. *Journal of Developmental and Behavioral Pediatrics*, *22*, 430–439.

Merikangas KR, Avenevoli S, Dierker L, & Grillon C. Vulnerability factors among children at risk for anxiety disorders. *Biological Psychiatry*, *46*, 1523–1535.

Miklowitz, D. J., Goldstein, M. J., Nuechterlein, K. H., Snyder, K. S., & Mintz, J. (1988). Family factors and the course of bipolar affective disorder. *Archives of General Psychiatry*, *45*, 225–231.

Musser, E. D., Karalunas, S. L., Dieckmann, N., Peris, T. S., & Nigg, J. T. (2016). Attention-deficit/hyperactivity disorder developmental trajectories related to parental expressed emotion. *Journal of Abnormal Psychology*, *125*, 182.

Nathan, R. A., Sorkness, C. A., Kosinski, M., Schatz, M., Li, J. T., Marcus, P., … Pendergraft, T. B. (2004). Development of the asthma control test: a survey for assessing asthma control.

The Journal of Allergy and Clinical Immunology, 113, 59–65. https://doi.org/10.1016/j.jaci.2003.09.008

Ortega, A. N., Huertas, S. E., Canino, G., Ramirez, R., & Rubio-Stipec, M. (2002). Childhood asthma, chronic illness, and psychiatric disorders. *The Journal of Nervous and Mental Disease, 190,* 275–281.

Ortega, A. N., McQuaid, E. L., Canino, G., Goodwin, R. D., & Fritz, G. K. (2004). Comorbidity of Asthma and Anxiety and Depression in Puerto Rican Children. *Psychosomatics: Journal of Consultation and Liaison Psychiatry*. *45,* 93-109. https://doi.org/10.1176/appi.psy.45.2.93

Orthner, D. K., Jones-Sanpei, H., & Williamson, S. (2004). The resilience and strengths of low-income families. *Family relations, 53,* 159-167.

Oskouie, F., & Khanjari, S. (2013). Quality of Life in Parent of Children with Leukemia and its Related Factors. *Iran Journal of Nursing, 26*,1-10

Pacheco, C. M., Ciaccio, C. E., Nazir, N., Daley, C. M., DiDonna, A., Choi, W. S., … Rosenwasser, L. J. (2014). Homes of low-income minority families with asthmatic children have increased condition issues. *Allergy and Asthma Proceedings, 35,* 467–474. https://doi.org/10.2500/aap.2014.35.3792

Pasalich, D. S., Dadds, M. R., Hawes, D. J., & Brennan, J. (2011). Do callous-unemotional traits moderate the relative importance of parental coercion versus warmth in child conduct problems? An observational study. *Journal of Child Psychology and Psychiatry, 52,* 1308–1315.

Peris, T. S., & Hinshaw, S. P. (2003). Family dynamics and preadolescent girls with ADHD: the relationship between expressed emotion, ADHD symptomatology, and comorbid disruptive

behavior. *Journal of Child Psychology and Psychiatry*, *44*, 1177–1190.

Peris, T. S., & Miklowitz, D. J. (2015). Parental expressed emotion and youth psychopathology: New directions for an old construct. *Child Psychiatry & Human Development, 46*, 863-873.

Pinquart, M., & Shen, Y. (2011). Behavior problems in children and adolescents with chronic physical illness: a meta-analysis. *Journal of Pediatric Psychology*, *36*, 1003–1016. https://doi.org/10.1093/jpepsy/jsr042

Piran, P., Khademi, Z., Tayari, N., & Mansouri, N. (2017). Caregiving burden of children with chronic diseases. *Electronic Physician, 9*, 5380–5387. https://doi.org/10.19082/5380

Place, M., Reynolds, J., Cousins, A., & O'Neill, S. (2002). Developing a resilience package for vulnerable children. *Child and adolescent mental health, 7*, 162-167.

Plummer, F., Manea, L., Trepel, D., & McMillan, D. (2016). Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *General hospital psychiatry*, *39*, 24-31.

Pocket Guide for Asthma Management and Prevention. (2018). Retrieved from https://ginasthma.org/wp-content/uploads/2018/03/wms-GINA-main-pocket-guide_2018-v1.0.pdf

Radloff, L. S. (1977). The CES-D scale: A self report depression scale for research in the general population. *Applied Psychological Measurements, 1*, 385-401.

Raina, P., O'Donnell, M., Rosenbaum, P., Brehaut, J., Walter, S. D., Russell, D., … Wood, E. (2005). The health and well-being of caregivers of children with cerebral palsy. *Pediatrics*, *115*, e626-36. https://doi.org/10.1542/peds.2004-1689

Rapee, R. M. (2012). Family factors in the development and management of anxiety disorders. *Clinical child and family psychology review, 15*, 69-80.

Reinherz, H. Z., Giaconia, R. M., Hauf, A. M., Wasserman, M. S., & Silverman, A. B. (1999). Major depression in the transition to adulthood: risks and impairments. *Journal of Abnormal Psychology, 108,* 500–510.

Rienecke, R. D., Accurso, E. C., Lock, J., & Le Grange, D. (2016). Expressed emotion, family functioning, and treatment outcome for adolescents with anorexia nervosa. *European Eating Disorders Review, 24,* 43-51.

Rosales, A., McQuaid, E. L., & Koinis-Mitchell, D. (2017). Family connectedness and pediatric asthma management: The roles of child age and race or ethnicity. *Children's Health Care*, *46*, 393–407.

Rosenfarb, I. S., Bellack, A. S., & Aziz, N. (2006). A sociocultural stress, appraisal, and coping model of subjective burden and family attitudes toward patients with schizophrenia. *Journal of Abnormal Psychology*, *115,* 157.

Rosenfarb, I. S., Bellack, A. S., Aziz, N., Kratz, K. M., & Sayers, S. (2004). Race, family interactions, and patient stabilization in schizophrenia. *Journal of Abnormal Psychology, 113*, 109.

Rosenkranz, M. A., & Davidson, R. J. (2009). Affective neural circuitry and mind-body influences in asthma. *NeuroImage, 47,* 972–980. https://doi.org/10.1016/j.neuroimage.2009.05.042

Roth, D.L., Ackerman, M. L., Okonkwo, O. C., & Burgio, L. D. (2008). The four-factor model of depressive symptoms in dementia caregivers: A structural equation model of ethnic differences. *Psychology and Aging, 23,* 567–576.

Ryan, D. P. (2001). Bronfenbrenner's ecological systems theory. *Retrieved January, 9,* 2012.

Schooler, C., Neumann, E., Caplan, L. J., & Roberts, B. R. (1997). Stroop theory, memory, and

prefrontal cortical functioning: Reply to Cohen et al.(1997).

Schmidt, R., Tetzlaff, A., & Hilbert, A. (2015). Perceived Expressed Emotion in Adolescents with Binge-Eating Disorder. *Journal of Abnormal Child Psychology*, *43*, 1369–1377. https://doi.org/10.1007/s10802-015-0015-x

Schnur, D. B., Friedman, S., Dorman, M., Redford, H. R., & Kesselman, M. (1986). Assessing the family environment of schizophrenic patients with multiple hospital admissions. *Hospital & Community Psychiatry*, *37*, 249–252.

Shankar, M., Fagnano, M., Blaakman, S. W., Rhee, H., & Halterman, J. S. (2018). Depressive Symptoms Among Urban Adolescents with Asthma: A Focus for Providers. *Academic Pediatrics*. https://doi.org/https://doi.org/10.1016/j.acap.2018.12.004

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: uses in assessing rater reliability. *Psychological Bulletin*, *86*, 420–428.

Sicouri, G., Sharpe, L., Hudson, J. L., Dudeney, J., Jaffe, A., Selvadurai, H., & Hunt, C. (2017). Parent-child interactions in children with asthma and anxiety. *Behaviour Research and Therapy*, *97*, 242–251. https://doi.org/10.1016/j.brat.2017.08.010

Spitzer RL, Kroenke K, Williams JBW, Lowe B. A brief measure for assessing generalized anxiety disorder. *Arch Inern Med*, *166*, 1092-1097.

Stein, M. B., Walker, J. R., Anderson, G., Hazen, A. L., Ross, C. A., Eldridge, G., & Forde, D. R. (1996). Childhood physical and sexual abuse in patients with anxiety disorders and in a community sample. *The American Journal of Psychiatry*, *153*, 275–277. https://doi.org/10.1176/ajp.153.2.275

Teach, S. J., Crain, E. F., Quint, D. M., Hylan, M. L., & Joseph, J. G. (2006). Indoor environmental exposures among children with asthma seen in an urban emergency

department. *Pediatrics*, *117*, S152-8. https://doi.org/10.1542/peds.2005-2000M

Tompson, M. C., O Connor, E. E., Kemp, G. N., Langer, D. A., & Asarnow, J. R. (2015). Depression in Childhood and Early Adolescence: Parental Expressed Emotion and Family Functioning. *Annals of Depression and Anxiety*, *2*.

Toth, S. L., & Cicchetti, D. (1996). Patterns of relatedness, depressive symptomatology, and perceived competence in maltreated children. *Journal of Consulting and Clinical Psychology*, *64*, 32–41.

van Os, J., Marcelis, M., Germeys, I., Graven, S., & Delespaul, P. (2001). High expressed emotion: marker for a caring family?. *Comprehensive psychiatry*, *42*, 504-507.

Vaughn, C., & Leff, J. (1976). The measurement of expressed emotion in the families of psychiatric patients. *British Journal of Social and Clinical Psychology*, *15*, 157–165.

Vila, G., Nollet-Clemencon, C., de Blic, J., Mouren-Simeoni, M. C., & Scheinmann, P. (2000). Prevalence of DSM IV anxiety and affective disorders in a pediatric population of asthmatic children and adolescents. *Journal of Affective Disorders*, *58*, 223–231.

Vitaliano, P. P., Becker, J., Russo, J., Magana-Amato, A., & al, et. (1988). Expressed emotion in spouse caregivers of patients with Alzheimer's disease. *Journal of Applied Social Sciences*, *13*, 215-250.

Vitaliano, P. P., Young, H. M., Russo, J., Romano, J., & Magana-Amato, A. (1993). Does expressed emotion in spouses predict subsequent problems among care recipients with Alzheimer's disease? *Journal of Gerontology*, *48*, P202–P209.

Vuillermin, P. J., Brennan, S. L., Robertson, C. F., Carlin, J. B., Prior, M., Jenner, B. M., & South, M. (2010). Anxiety is more common in children with asthma. *Archives of Disease in Childhood*, *95*(8), 624–629. https://doi.org/10.1136/adc.2009.166967

Wamboldt, F. S., O'Connor, S. L., Wamboldt, M. Z., Gavin, L. A., & Klinnert, M. D. (2000). The five minute speech sample in children with asthma: deconstructing the construct of expressed emotion. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 41*, 887–898.

Wamboldt, F. S., Wamboldt, M. Z., Gavin, L. A., Roesler, T. A., & Brugman, S. M. (1995). Parental criticism and treatment outcome in adolescents hospitalized for severe, chronic asthma. *Journal of Psychosomatic Research, 39*, 995–1005.

Wamboldt, M. Z., Fritz, G., Mansell, A., McQuaid, E. L., & Klein, R. B. (1998). Relationship of asthma severity and psychological problems in children. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 943–950. https://doi.org/10.1097/00004583-199809000-00014

Weisman, A. G., Rosales, G. A., Kymalainen, J. A., & Armesto, J. C. (2006). Ethnicity, expressed emotion, and schizophrenia patients' perceptions of their family members' criticism. *The Journal of nervous and mental disease, 194*, 644-649.

Wentzel, K. R. (1994). Family Functioning and Academic Achievement in Middle School A Social-Emotional Perspective. *The Journal of Early Adolescence, 14*, 268–291. https://doi.org/10.1177/027243169401400209

Weston, S., Hawes, D. J., & S. Pasalich, D. (2017). The Five Minute Speech Sample as a Measure of Parent–Child Dynamics: Evidence from Observational Research. *Journal of Child and Family Studies, 26*, 118–136. https://doi.org/10.1007/s10826-016-0549-8

Wood, B. L., Lim, J., Miller, B. D., Cheah, P. A., Simmens, S., Stern, T., … Ballow, M. (2007). Family emotional climate, depression, emotional triggering of asthma, and disease severity in pediatric asthma: examination of pathways of effect. *Journal of Pediatric Psychology*,

32, 542–551. https://doi.org/10.1093/jpepsy/jsl044

Wood, B. L., Miller, B. D., Lim, J., Lillis, K., Ballow, M., Stern, T., & Simmens, S. (2006). Family Relational Factors in Pediatric Depression and Asthma: Pathways of Effect. *Journal of the American Academy of Child & Adolescent Psychiatry*, *45*, 1494-1502. https://doi.org/10.1097/01.chi.0000237711.81378.46

Wuerker, A. M. (1994). Relational control patterns and expressed emotion in families of persons with schizophrenia and bipolar disorder. *Family process, 33*, 389-407.

Wuerker, A. K. (1996). The changing careers of patients with chronic mental illness: a study of sequential patterns in mental health service utilization. *The Journal of Mental Health Administration, 23*, 458-470.

Wuerker, A. K., Fu, V. K., Haas, G. L., & Bellack, A. S. (2002). Age, expressed emotion, and interpersonal control patterning in families of persons with schizophrenia. *Psychiatry research, 109*, 161-170.

Wuerker, A. K., Haas, G., & Bellack, A. (1999). Racial and gender differences in expressed emotion and interpersonal control in families of persons with schizophrenia. *Family Process, 38*, 477-496.