Asthma in Latinx Youth: Voluntary and Involuntary Stress Responses

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Abstract

Asthma is a leading cause of impaired health-related quality of life that affects over 4.9 million children in the United States. Children with asthma face illness-related stressors, including medical appointments, medication management, and concerns about asthma attacks. Latinx youth suffer from disparate rates of asthma outcomes and face additional stressors, including low socioeconomic conditions, language barriers, and inequitable healthcare, that may affect voluntary and involuntary stress responses and exacerbate asthma severity. Secondary control coping, which includes mental adaptation to stress, has been associated with better asthma control, whereas disengagement coping, characterized by denial or avoidance, has been consistently linked to poorer outcomes. Fewer studies have examined involuntary stress responses, however; chronic stress leads to nervous system arousal and inflammatory processes that underlie asthma control. This study examined the relationship between stress responses and asthma control and hypothesized to find (a) secondary control coping to be positively associated with asthma control, and (b) involuntary engagement and involuntary disengagement responses to be negatively associated with asthma control. Correlation analyses of baseline data from *Adapt 2 Asthma,* a randomized controlled trial of a novel asthma intervention, supported these hypotheses. Greater use of secondary control coping was associated with better asthma control in child $r(136) = .28$, $p < .001$, and parent reports of asthma control, $r(136) = -.17$, $p = .044$. Involuntary disengagement and involuntary engagement were negatively associated with child-reports of asthma control, $r(136) = -.30$, $p < .001$; $r(136) = -.26$, $p = .002$. Findings add to the current literature that support adaptive coping interventions for pediatric asthma. Although a more novel topic, the relationship between involuntary stress responses and asthma control is one that suggests directions for future studies and asthma interventions to address stress reactivity.

Asthma in Latinx Youth: Voluntary and Involuntary Stress Responses

Asthma is a chronic illness in which the airways become inflamed and narrow, resulting **in** difficulty breathing, wheezing, coughing, shortness of breath, chest tightness, and fatigue. Moderate asthma symptoms are experienced on a daily basis but can flare up and heighten to a debilitating degree during an asthma attack. Allergens, changes in the weather, air pollution, physical activity and emotional stress are common triggers of an asthma attack (Martin et al., 2022). Physicians usually prescribe daily medication to reduce asthma symptoms and a rescue inhaler to treat asthma attacks. Asthma is the most common chronic pediatric health condition, with children and adolescents experiencing asthma attacks at a higher rate (50.8%) than any other age groups (Centers for Disease Control and Prevention, 2022). Other groups that experience disproportionate rates of asthma include the Latinx population, who have a higher asthma attack rate than other racial ethnic groups, and low-SES individuals, seen through a negative association between family income and asthma rates (CDC, 2022). Thus, it is warranted to further research the confluence of these factors that contribute to low-SES Latinx children's asthma symptoms and severity.

The symptoms, treatment, and triggers of asthma pose daily and illness-related stressors for children (Rodriguez et al., 2020). Common daily stressors include impaired physical activity and missing school for doctor's appointments, while illness-related stressors include medication management and symptom control. Low-SES Latinx children face additional stressors, including negative healthcare experiences and treatment barriers, that contribute to their risk for worse asthma control. Prior studies on pediatric chronic illness have found an association between a child's voluntary stress response and asthma control (Chen et al., 2011). There is evidence that

involuntary stress responses also affect asthma severity due to the autonomic nervous system's role in inflammatory processes (Chen & Miller, 2007).

To further expand on the current literature on voluntary and involuntary stress responses, the current study focused on the low-SES Latinx population, including the stressors and stress responses that interact to contribute to disparities in asthma outcomes. Independent variables of interest included involuntary and voluntary stress responses, which were hypothesized to influence children's asthma-related outcomes, measured by self and parent reports of asthma control.

Stressors of Asthma for Latinx Youth

Children with chronic illnesses are at risk for social and mental health problems due to reduced opportunities for social interaction and supportive friendships(Collins et al., 2008). Missing school for asthma-related reasons not only decreases their opportunity for social interaction and support, it also decreases possible effective sources of coping.

Children with asthma are more likely to suffer from mental health concerns, have higher average absences from school, and have less social support compared to their peers (Collins et al., 2008). The challenges that children with asthma face have a complex relationship with one another; for example, their decreased attendance to school caused by doctor's appointments or impairing symptoms, could explain their decreased friendships. These findings provide insight into the indirect ways that asthma affects children's wellbeing, showing that asthma can have a domino effect and hinder multiple domains of their life. However, this study did not address disparities between racial and socioeconomic groups, who suffer from worse outcomes of asthma than their peers (CDC, 2022).

Stressors specific to the Latinx population include lower healthcare literacy and negative healthcare experiences (Rodriguez et al. 2020). It is important to consider the parent's perspective and the stressors the whole family faces, as this contributes to a child's asthma outcomes (Sales et al., 2008). Berg et al. (2007) conducted interviews with Latinx parents of children with asthma, who widely expressed fear, some unsure if their child would live, and also lacked knowledge of asthma. The study also found common barriers for low-SES Latinx parents, including lower healthcare literacy levels and lower education levels. One mother described an emergency room experience in which there was not a Spanish-speaking physician available to explain her child's asthma attack to her. Parents expressed wanting desperately to help their child and not being able to trust the level of care that healthcare professionals provided for their child.

In addition to healthcare barriers, Latinx children are more than twice as likely than their non-hispanic white peers to experience poverty (22% versus 10%) (Children in Poverty by Race and Ethnicity, Kids Count Data Center, 2023). Low-SES status presents additional stressors that affect children's adjustment to asthma (Rodriguez et al., 2020). Financial barriers, which are more commonly experienced by Latinx than non-Latinx White families (McQuaid et al., 2009), increase a child's risk for low asthma control. If their parent struggles to afford asthma treatment, the child picks up on the stress the parent experiences and faces heightened emotions due to this challenge, lowering their asthma control and putting them at higher risk of an asthma attack. Rodriguez et al. (2020) described the process as "cyclic", in that SES-specific stressors cause emotional distress that worsens asthma symptoms, and lead the child to need more asthma treatment. However, these families lack financial and medical resources and each of the challenges reinforce the other.

Stress Responses

Coping strategies are voluntary attempts to adapt to a stressor (Connor-Smith et al., 2000). Under the control-based coping model, coping strategies are divided into primary control, secondary control, and disengagement. Primary control involves trying to use available resources to directly fix one's situation. Secondary control involves attempting to positively adapt to the situation, rather than change it, through techniques such as cognitive reframing. Lastly, disengagement is the denial or avoidance of a stressor. Prior studies have found that for children with chronic illness, secondary coping skills are associated with lower anxiety, depression, pain levels, and better adjustment (Compas et al., 2012). There are mixed findings on the effect of primary control coping skills; however, the efficacy could vary across individuals and be dependent on the stressor. Disengagement coping, on the other hand, has been consistently associated with poorer physical and psychological health outcomes (Compas et al., 2012).

In contrast to voluntary stress responses, there are also involuntary stress responses, which can be conceptualized in a two-factor model as either involuntary disengagement or involuntary engagement (Connor-Smith et al., 2000). Involuntary disengagement is navigating resources away from the stressor and includes avoidant responses such as emotional numbing, lack of action, and ignoring the stressor. Involuntary engagement, on the other hand, includes approach strategies such as ruminative thinking, emotional arousal, and physiological arousal. For example, when dealing with asthma, an involuntary engagement response a child might have is to be overly anxious or jumpy, while an involuntary disengagement response could be dissociating from the situation.

Coping Strategies in Pediatric Chronic Illness

Given the many ways of categorizing coping strategies, including problem versus emotion-focused, dispositional versus situational, passive versus active, avoidance versus approach, and control-based (Ayers et al., 1996), refining measurement of chronic illness stress was warranted. The Pain Response Inventory (PRI; Walker et al., 1997) and Responses to Stress Questionnaire (RSQ; Connor-Smith et al., 2000) have strong support for the use in chronic illness and are based on robust models of stress responses (Skinner et al., 2003). The PRI categorizes coping into active, accommodative, and passive coping, and the RSQ categorizes coping into primary coping, secondary coping, and disengagement coping. While the two measures define coping strategies in similar ways, the PRI is intended to assess coping with pain, while the RSQ has many adaptations to measure responses to specific stressors (e.g., RSQ-BI measures stress response to brain injury). The current study used the control-based model, as measured in the RSQ, to categorize coping strategies into primary coping, secondary coping, and disengagement coping due to its widespread use in the pediatric asthma field.

Compas et al. (2012) conducted a systematic overview of studies that used either the RSQ or PRI to measure the relationship between coping strategies and health outcomes in children with a variety of chronic illnesses. Ten out of the sixteen studies measured an association between secondary coping strategies and better adjustment to chronic illness (Campbell et al., 2009; Miller et al., 2009; Weitz et al, 1994). Disengagement coping strategies, on the other hand, were consistently associated with poor adjustment, somatic symptoms, anxiety, and depression (Campbell et al., 2009; Connor-Smith & Compas 2004; Shirkey et al., 2011). Although there were clear relationships between secondary and disengagement coping strategies and health outcomes, the relationship between primary coping and health outcomes

was not consistent. Primary coping was associated with better adjustment and lower levels of anxiety and depression in children with cancer (Campbell et al., 2009; Miller et al., 2009) and better adjustment and illness-related outcomes in children with diabetes (Band & Weisz; Jaser & White, 2011) but with more disability and somatic symptoms in children with chronic pain (Simons et al., 2008; Thomsen et al., 2002; Walker et al., 1997). Eight studies found no relationship between primary coping and health outcomes. While Compas et al. (2012) did not analyze any studies of stress responses in children with asthma, the consensus among the studies on cancer, recurrent abdominal pain, chronic pain, and type 1 diabetes was for secondary coping strategies to be associated with better health outcomes and disengagement coping strategies being maladaptive. Furthermore, the use of the control-based model of coping across many of the studies contributes to an understanding of its applicability to coping with chronic illness.

Coping strategies and patterns differ depending on the chronic illness (Oppenheimer, et al., 2018). Thus, for asthma, it is important to consider the relationship between lung functioning and coping. Children who rely on secondary coping skills are more likely to have improved lung function over a 12 month period (Schreier & Chen, 2008). On the other hand, the use of primary coping skills was associated with increased rescue inhaler use, which Schreier and Chen (2008) concluded involved a child being more communicative about their needs and solution-focused, resulting in behaviors that provide direct relief of their symptoms. The consistent findings of secondary coping strategies being associated with greater health outcomes (Bruce et al., 2012; Schreier & Chen, 2008) informed the present study's hypothesis that secondary coping skills are positively associated with better asthma control.

Involuntary Stress Response and Asthma

Whereas coping strategies are voluntary responses to a stressor, involuntary responses include activation of the autonomic nervous system (Compas et al., 2001). Our autonomic stress response, also known as the "fight or flight" system evolved to keep us safe in life-threatening situations, and is also activated by chronic stress or illness. The activation of the hypothalamic-pituitary-adrenal (HPA) axis leads to release of cortisol, which leads to increased inflammation. Due to increased inflammatory processes and cortisol levels, chronic illness can serve as a chronic stressor that takes a biological "wear and tear" on the body (McEwen and Stellar, 1993), with long-term health implications for children. Prior studies have found negative consequences of involuntary stress responses in patients with chronic illness. For example, Compas et al. (2005) measured both involuntary (autonomic) and voluntary stress responses (psychological coping) of women with breast cancer. They found that disengagement and engagement involuntary stress responses were associated with increased distress for women with breast cancer (Cornpas et al., 2005).

Under a biopsychosocial model, the relationship between stress, coping, and health outcomes can be understood as a function of processes of the nervous system, with an emphasis on the role of attention (Compas et al., 2001). Stress leads to the activation of the autonomic nervous system, which affects our ability to shift our attention, influencing the amount of physiological arousal in response to a stressor. A lowered ability to regulate attentional focus tends to increase anxiety and fear levels, resulting in increased pain levels. Furthermore, our attention and subsequent response to stressors influences whether we "fight or flight", synonymous with the engage/disengage stress responses. To apply their biopsychosocial model, Cornpas et al. (2001) studied children with recurrent abdominal pain, finding that those who used

more involuntary stress responses, whether engagement or disengagement, had greater pain and poorer emotional adjustment compared to those who primarily used voluntary engagement coping strategies.

Compas et al. (2006; 2001) demonstrated the role of the autonomic nervous system in negative physical and mental health outcomes when recurrently or chronically activated. Compas et al. (2001) represented health outcomes as being affected by attention and coping responses to stress. However, they did not distinguish clearly between voluntary and involuntary processes, lumping both into the category of "attention". While the theoretical biopsychosocial model (Compas et al., 2001) relates the autonomic nervous system to attention control, it fails to identify additional processes of the autonomic nervous system that link the stress response to health outcomes. Compas et al. (2006) more clearly distinguished between involuntary stress responses, finding for both involuntary engagement and disengagement to be associated with higher levels of distress, however, this was in a sample of women recently diagnosed with cancer. The present study distinguished between involuntary disengagement and involuntary engagement and provided an understanding of the physiological reactions that children have when dealing with asthma.

Response to Stress in the Low-SES Latinx population

When considering adaptive versus maladaptive responses to stress, the Latinx experience may differ from that of the general population. Cultural factors such as familism, ethnic identity, religiosity, and socialization contribute to involuntary and voluntary responses to stress (Santiago et al., 2016; Rodriguez et al., 2020). Santiago et al. (2016) had Latinx adolescents complete daily journals to report multicultural stressors and involuntary and voluntary stress responses. Qualitative analysis of the daily journals indicated that familism and ethnic identity can serve as

positive resources for Latino adolescents. A positive association was associated between these two variables and engagement coping, while also being negatively associated with involuntary responses to stress. Family ethnic socialization, which is the incorporation of cultural values and behaviors into the child's life, was associated with disengagement coping and involuntary stress responses. This finding suggests that pressures presented by maintaining their family's multiethnic culture could alter a Latinx child's coping patterns. However, these findings are reflective of acute daily stressors, whereas asthma is a chronic stressor that possibly diminishes adaptive stress responses and promotes maladaptive ones (Santiago et al., 2016).

In addition to Latinx identity and familial values, religiosity is commonly emphasized in Latinx households. Religiosity serves as a common secondary coping strategy for Latinx youth to accept and cognitively reframe the challenges of asthma (Rodriguez et al., 2020). Beyond cultural factors, stress caused by the low-SES context lowers Latinx's children's ability to engage in effective coping strategies. Rodriguez et al. (2020) conducted interviews with Latinx families, and participants talked about using problem-solving skills, categorized as a primary coping strategy, for controllable aspects of asthma, such as following the prescribed treatment plan, while relying on secondary coping strategies to deal with the "uncontrollables", such as social isolation. However, children who reported higher stress levels were less likely to rely on secondary coping strategies while those with lower stress levels were more likely to use primary and secondary coping strategies. The association between stress levels and coping strategy suggests that higher stress levels faced by low-SES Latinx children alter their stress responses, further re-iterating the need to define the relationship between involuntary and voluntary stress responses and asthma control.

Conclusions

Prior research has examined stressors that children with asthma face, such as decreased school attendance and lack of social support (Collins et al., 2008). Low-SES Latinx families face additional stressors, including barriers to treatment, lower healthcare literacy and financial strain (Rodriguez et al., 2020). The additional stressors this population faces creates a cycle in which the child experiences worse asthma symptoms that increase their need for treatment, but barriers heighten their emotional response. This emotional response and increased stress lead to worse asthma control, which warrants the need to further research what coping strategies can be effective. There have been several findings that children with chronic illness benefit from a secondary coping mindset and have negative health outcomes with a disengagement coping mindset (Compas et al., 2012). Based on past consistent findings, it was hypothesized for secondary coping skills to be positively associated with asthma control.

There are few studies that have linked involuntary stress responses to asthma related outcomes, despite the autonomic stress system's role in regulating processes relevant to the disease, such as inflammation (Wright, 2005; Chen, & Miller, 2007). Furthermore, given the "wear-and-tear" that the chronic activation of the HPA axis takes on our body (McEwen & Stellar, 1993), it was expected that involuntary stress responses, both disengagement and engagement, would be associated with lower asthma control.

This study aimed to expand on the understanding of coping strategies that affect asthma outcomes and expand the application of secondary coping strategies to the Latinx population. Secondly, it aimed to fill the research gap that exists in investigating the role of the involuntary stress response in children with asthma.

Methods

Study Design Overview

The current study focused on gaps in asthma research on the pediatric Latinx population and aimed to answer whether 1) secondary coping skills are associated with better self and parent-rated asthma control and if 2) involuntary stress responses are associated with self and parent-rated asthma control. Baseline measures of Adapt 2 Asthma, a clinical trial testing a culturally-competent asthma coping intervention for Latinx children (Rodriguez et al., 2024), were used in all analyses. Bivariate correlational analyses were run in RStudio to separately measure each of the five stress responses in relation to child-reported and parent-reported asthma control. Independent variables included two voluntary stress responses: secondary control coping and disengagement and two involuntary stress responses: involuntary disengagement and involuntary engagement. All independent variables were measured using the Responses to Stress Questionnaire (RSQ) (Connor-Smith, et al., 2000). The dependent variable was asthma control, which was self-reported by the child via the Asthma Control Test (ACT) and by the parent using the Asthma Treatment Assessment Questionnaire (ATAQ). It was hypothesized that secondary coping would be positively associated with asthma control and that involuntary stress responses would be negatively associated with asthma control.

Participants

Baseline data for Adapt 2 Asthma (Rodriguez et al., 2024), a clinical trial testing a culturally competent coping intervention for Latinx children, was collected from 2021 to 2025. Eligibility criteria for the parent, caregiver, or legal guardian participant required that they be proficient in English or Spanish and 18 years or older. The only exclusion criteria was disability that would impair the child from participating in the intervention. A total of 138 child-parent

dyads completed the pre-intervention assessment. All children were between 8-14 years old (M= 10.93, *SD=l.94)* and had prior asthma diagnosis. 83% had a family income <$50,000. Gender, race, and nationality of child participants are reported in Table 1.

Recruitment

Participants were mainly recruited to Adapt 2 Asthma through primary care partner clinics in Austin, Texas and surrounding counties. The clinics chosen have a patient population composed mainly of Latinx families who live in low-SES circumstances. Prospective participants were identified by the clinic through reviewing electronic health records (EHR) for patients with asthma, then providing names and contact information to the research team. Potential parent participants were then contacted for the first time about the study by either the clinic staff or research staff, depending on the clinic's preference. If the first contact came from the research staff, then an introductory letter describing the study was mailed to the family before calling them to invite their participation in the study. Eligibility screening was conducted over the phone if the family expressed interest in participating, and if still eligible, they were scheduled for a baseline assessment visit.

In addition to recruiting from primary care partner clinics, efforts included attending community events, distributing flyers to local organizations and collaborating with schools. When recruiting from schools, students with asthma were identified and introduced to the study by school nurses, parent liaisons, and administrators. If a family expressed interest in partaking in the study, then their contact information was shared with the research team.

Measures

Demographics

Demographic information reported by parents included the child's age, sex, ethnicity, nationality, and SES information (i.e. education level, income level, employment, etc.). Child participants completed shortened versions of the demographic forms, which asked about their country of origin, religion/spirituality, generational status, and ethnicity.

Asthma Control Test (ACT)

The Asthma Control Test (ACT) measures how controlled a participant feels that their asthma symptoms have been for the past four weeks. The ACT has adequate internal consistency and reliability (a=.84) (Nathan et al., 2004). This measure acts as an accurate proxy for objective measures of asthma control, reflected through correlation with physician ratings' and lung function (measured by predicted spirometry). The first four questions of the ACT ask participants to rate the frequency of specific asthma symptoms over the past four weeks and the final question asks participants to rate their asthma control over the past four weeks. Participants are given 5 response options to each item that are based on a 5-point Likert Scale. For example, question 2 asks "During the past 4 weeks, how often have you had shortness of breath?". Likert ratings are summed to range from 5-25, with a lower score representing poorer control of asthma and a perfect score of 25 representing complete control of asthma. Scores summing 19 or less were found to be the threshold for differentiating between controlled versus uncontrolled asthma (Schatz et al., 2006).

Responses to Stress Questionnaire (RSQ)

The Responses to Stress Questionnaire (RSQ) assesses the way participants deal with stress and measures voluntary and involuntary responses to stress (Connor-Smith et al., 2000).

Participants are asked about recent stressors they have had specifically related to their asthma, how stressful these have been for them, and about their perceived control over these stressors. The RSQ has five factor subscales: primary control engagement coping, secondary control engagement coping, disengagement coping, involuntary engagement, and involuntary disengagement. Subscales are further categorized as three forms of coping strategies: primary control engagement coping, secondary control engagement coping, and disengagement coping; and two types of involuntary stress responses: involuntary engagement and involuntary disengagement. The measure has been validated for use in children with chronic illness and all five factors have been found to have adequate to excellent internal consistency and retest reliability (Connor-Smith, et al., 2000). Participants are prompted to answer each question in relation to dealing with the stress of their asthma for the past 6 months. All answer choices are based on a 4-point Likert scale. Questions assess how frequently a child engages in a coping mechanism or experiences a specific response to deal with their asthma (1 representing not at all-4 representing a lot). For example, question 3 asks how often they "Try to think of different ways to change or fix the situation."

A proportion score is calculated for each factor by dividing the sum of responses to the individual subscale by the sum of responses to all 5 RSQ factors. Higher scores are representative of more use of the respective response to stress (i.e. secondary control coping, involuntary disengagement, etc.). Question 3, listed in the previous paragraph, is categorized as primary coping, and would be scored accordingly.

Asthma Therapy Assessment Questionnaire (ATAQ)

The Asthma Therapy Assessment Questionnaire (ATAQ) was completed by parents to assess the child's asthma control. The shortened version used in Adapt 2 Asthma has been validated in the use of adolescents 5-17 years old (Skinner et al., 2004). Seven questions ask parents about asthma symptoms and consequences their child has faced in the past four weeks. For example, question la. : "In the past 4 weeks, did your child have wheezing or difficulty breathing when exercising?". If the child uses an inhaler or nebulizer, then one of the questions contains two additional items, one regarding the frequency of usage in the past four weeks and the other about the past twelve months. The subscale questions are scored by translating answer choices to a dichotomous score, with no use of the inhaler/nebulizer scored as O and 1 or more puffs of medication scored as 1. The other six questions are scored as "yes" and "unsure" equaling 1 and " no" equaling 0. The sum of the seven items yield a total score ranging from O to 7, with a lower score being indicative of well-controlled asthma and a higher score being indicative of problems with asthma control.

Procedures

Consent

Research assistants were trained and certified to complete the consenting and assenting process with the parent and child. Research assistants read from a script that outlines the key details of the study and summarized the consent, assent, and parent permission forms with the parent and child present. Participants were then given time to review the forms and ask any questions before making a decision on their participation. At this point, if the parent nor child had any questions and wished to participate in the study, they were asked to provide their digital

signature. Participants received a blank copy of the consent, assent, and child permission forms for their own record.

Data Collection

Assessments were completed at participants' homes, the University of Texas at Austin, community clinics, and other community-based locations (i.e. Austin Public Library). Two research assistants conducted each assessment, one responsible for conducting questionnaires with the child and one responsible for questionnaires with the parent. Questionnaires were read aloud to participants in their preferred language (English/Spanish) and were entered into RedCap by the research assistant. Participants were provided a printed copy of questionnaires to follow along as they went through them. The research assistant also provided visual aids that reminded the participants of answers to choose from (i.e. scale of 1-5) as they went through the questionnaires. The child questionnaires were completed in the following order: Demographics, ACT, RSQ. The parent questionnaires used in this study were completed in the following order: Demographics, ATAQ. The child and the parent were compensated $50 each for completion of the assessment.

Statistical Analyses

All analyses were conducted using RStudio. Pearson's bivariate correlation was used to separately measure the relationship between each of the following variables: secondary control coping, disengagement, involuntary disengagement, and involuntary engagement with child-rated and parent-rated asthma control (total of 8 analyses).

Results

Table 2 summarizes correlations among the five stress responses of interest: secondary control coping, disengagement coping, involuntary disengagement, and voluntary engagement, between stress responses and Asthma Control Test (ACT) scores, and between stress responses and Asthma Treatment Assessment Questionnaire (ATAQ) scores. Results indicated for Secondary Control Engagement Coping to be positively correlated with both child and parent reported asthma control via ACT scores, r(136) = .28,p < .001 (See Figure **1)** and ATAQ scores, r(136) = -.17,p = .044 (higher ATAQ indicates more asthma-related difficulties) (See Figure 2). Disengagement coping was not significantly correlated with ACT scores, r(136) = -*.04,p* = .62 nor was it associated with ATAQ scores, $r = .09$, $p = .31$. Involuntary Engagement and Involuntary Disengagement were both negatively correlated with child-reported asthma control via ACT scores, r(136) = -*.30,p* < .001; r(136) = -.26 (See Figure *3),p* = .002 (See Figure 4).

Discussion

Results indicated for secondary control coping to be associated with better asthma control, however; there was not a significant association between disengagement coping and asthma control. Involuntary disengagement and involuntary engagement stress responses were associated with poor asthma control through child reports of asthma control, however this relationship was not significant through parent reports of asthma control.

The association measured between secondary control coping and asthma control is in line with past findings of positive adaptive effects of such coping mechanisms, both in asthma research and in chronic illness research. This finding supports the current state of the pediatric asthma field, which has focused on multidisciplinary approaches to include mental and emotional regulation in asthma treatment (Rodriguez et al., 2024).

Furthermore, the negative correlation between involuntary disengagement and involuntary disengagement with child-reported asthma control adds to the current literature that primarily focuses on the voluntary stress response portion of the five factor model set forth by Connor-Smith et al. (2000). Findings expand on the model proposed by Chen & Miller (2007), which conceptualized stress as increasing demand of the autonomic nervous system, leading to increased immune and inflammatory responses that result in worse asthma outcomes.

In contradiction with the study's hypotheses, neither involuntary disengagement nor involuntary engagement were associated with parent-reports of asthma control. This could be explained by the internal experience of involuntary stress responses and the insight that children have into their symptoms. The parent assesses their child's asthma control through observable and objective measures, such as use of their rescue inhaler. However, the child assesses their asthma control on symptoms that align with involuntary stress responses, such as chest tightness

or difficulty breathing. Future studies could use parent reports of both variables, rather than child-reported stress responses and parent reported asthma control, to further define this relationship.

The non-significant relationship between disengagement coping and asthma control diverges from prior chronic illness research, which has consistently linked such coping strategies to poorer adjustment (Compas et al., 2012). One possible explanation is that certain forms of disengagement, such as denial of the stressor, may provide short-term relief from emotional distress without directly impairing asthma management. Furthermore, cultural factors specific to Latinx families, such as familism or religiosity, may offset the negative effects of disengagement coping (Santiago et al., 2016; Rodriguez et al., 2020). These findings suggest that the effectiveness of coping strategies may vary depending on the context of such behaviors within the child's family and community.

Given the correlational design of the study, the exact mechanisms of the relationships measured remain unclear. As suggested in Rodriguez et al. (2020), the relationship between coping and asthma control is bidirectional and those with lower levels of stress are more able to use effective coping strategies, potentially moderating the relationship between secondary control coping and asthma control. Involuntary stress responses involve nervous system arousal, thus are complex and possibly moderated by biological factors, such as inflammation and hormone levels (Chen & Miller, 2007).

Findings of the current study contribute to the limited literature on stress processes in Latinx youth with asthma. Latinx children face intersecting stressors, including financial barriers, discrimination, and limited access to culturally and linguistically competent healthcare (Berg et al., 2007; Rodriguez et al., 2020). These contextual factors may amplify physiological stress

reactivity and reduce opportunities for adaptive coping. The relationship between involuntary stress responses and uncontrolled asthma suggest that multi-level change, reaching beyond individual intervention, could address asthma outcome disparities. Through reducing stress Latinx youth face due to systemic inequities, the disparities specific to asthma outcomes could also be reduced.

Overall, the current study reinforces and supports the idea of culturally tailored asthma interventions that focus on secondary control coping skills, while also suggesting that future pediatric asthma studies focus on addressing physiological and involuntary stress responses.

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Table 1

Sociodemographic Characteristics of Participants

Characteristic	*n*	% of sample
Gender		
Male	75	54
Female	63	46
Race		
White	103	74.6
Multiracial	18	12.7
Black	15	11.2
Indigenous	2	1.5
Nationality		
American	78	56.6
Mexican	43	30.9
Honduran	12	8.6
Cuban	3	2.3
Ecuadorian	8	.6
Puerto Rican	8	.6

Note. Participants could identify as being of multiple nationalities and were asked to "check all that apply".

Table 2

Correlations Between Child-report Response to Stress Questionnaire and Asthma Control

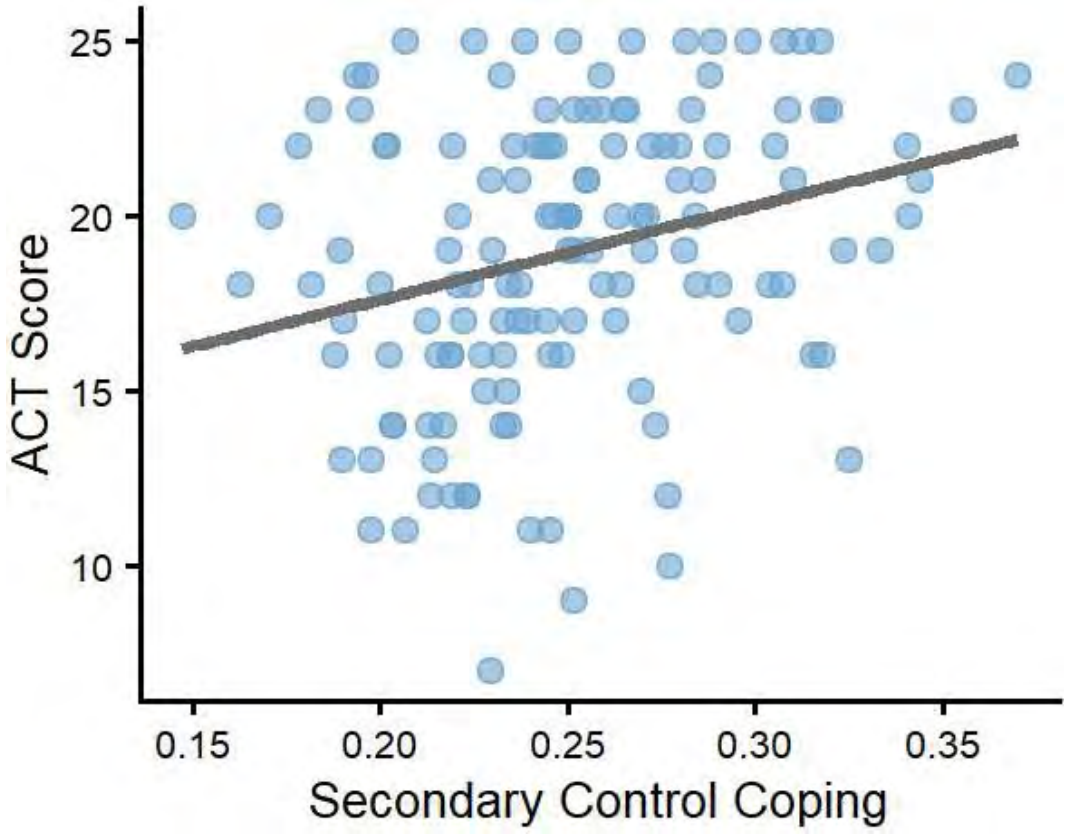
Variable	*M*	*SD*	1	2	3	4	5
1. Secondary Control Coping	0.25	0.04					
2. Disengagement Coping	0.15	0.03	-.37**				
3. Involuntary Disengagement	0.19	0.03	-.64**	-.04			
4. Involuntary Engagement	0.24	0.03	-.68**	.01	.41**		
5. ACT Score	18.93	4.09	.28**	-.04	-.26**	-.30**	
6. ATAQ Score	1.98	1.77	-.17*	.09	.08	.14	-.30**

Note. The Asthma Control Test is child-reported with higher scores representative of well-controlled asthma. The Asthma Therapy Assessment Questionnaire is parent-reported with higher scores representative of more asthma control problems

* $p < .05$. ** indicates $p < .01$

Figure 1

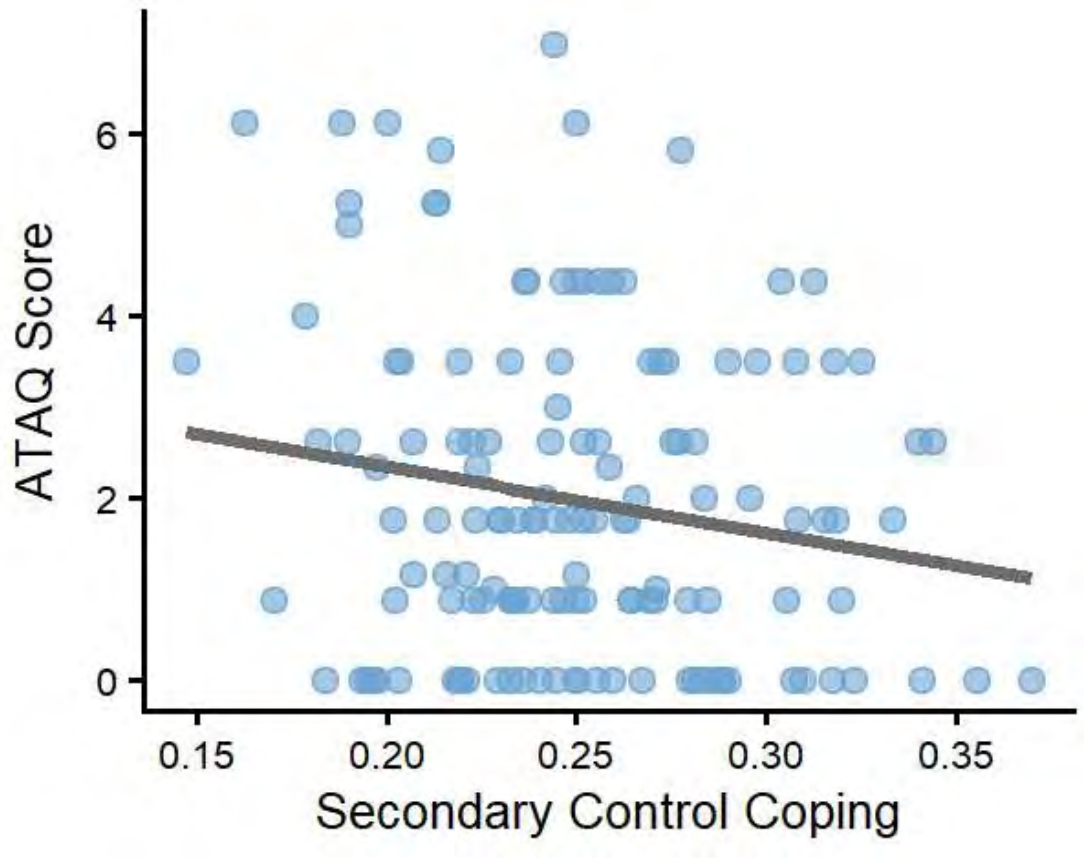
Secondary Control Coping and Child-reported Asthma Control



Note. Secondary Control Coping, found on the x-axis, is measured using proportion scores. These range from O to 1 with higher scores representative of more use of the respective coping method. Asthma Control Test (ACT) scores, found on the y-axis, can range from 0-25 and higher scores are representative of well-controlled asthma.

Figure 2

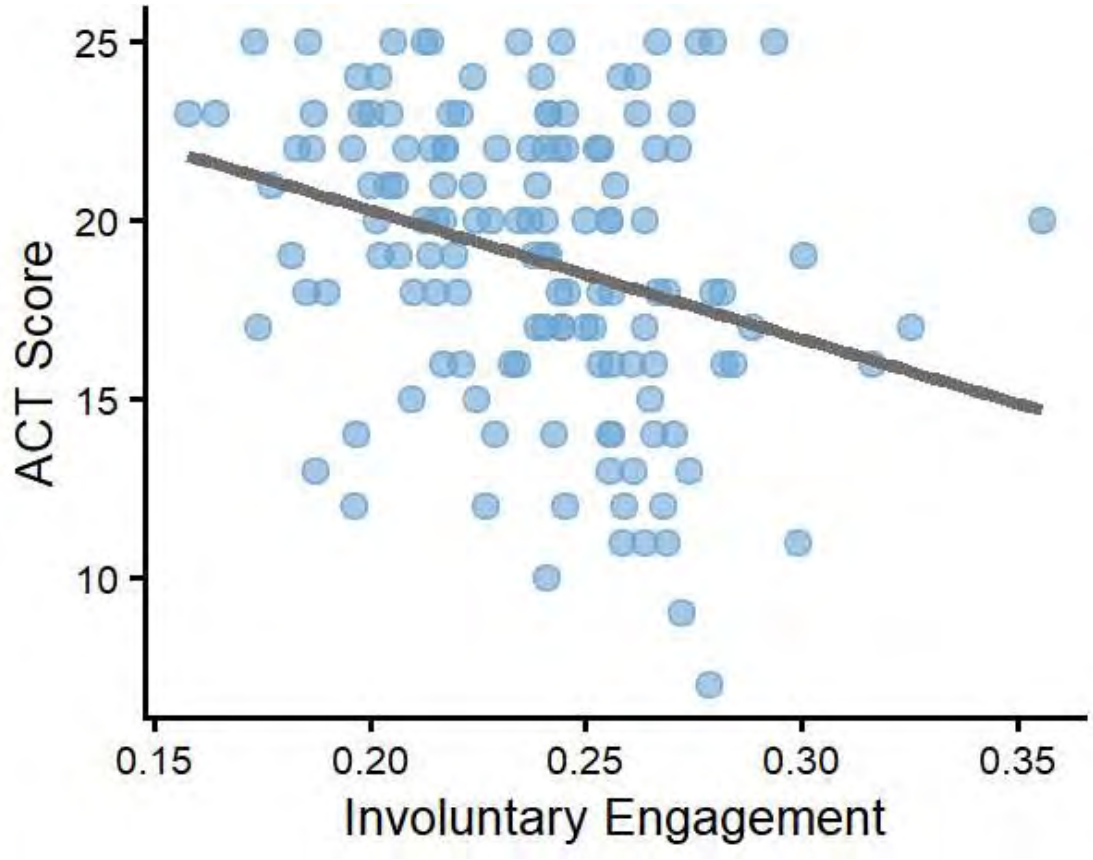
Secondary Control Coping and Parent-reported Asthma Control



Note. Secondary Control Coping, found on the x-axis, is measured using proportion scores. These range from O to 1 with higher scores representative of more use of the respective coping method. Asthma Therapy Assessment Questionnaire (ATAQ) scores, found on the y-axis, are parent-reported with higher scores representative of more asthma control problems.

Figure 3

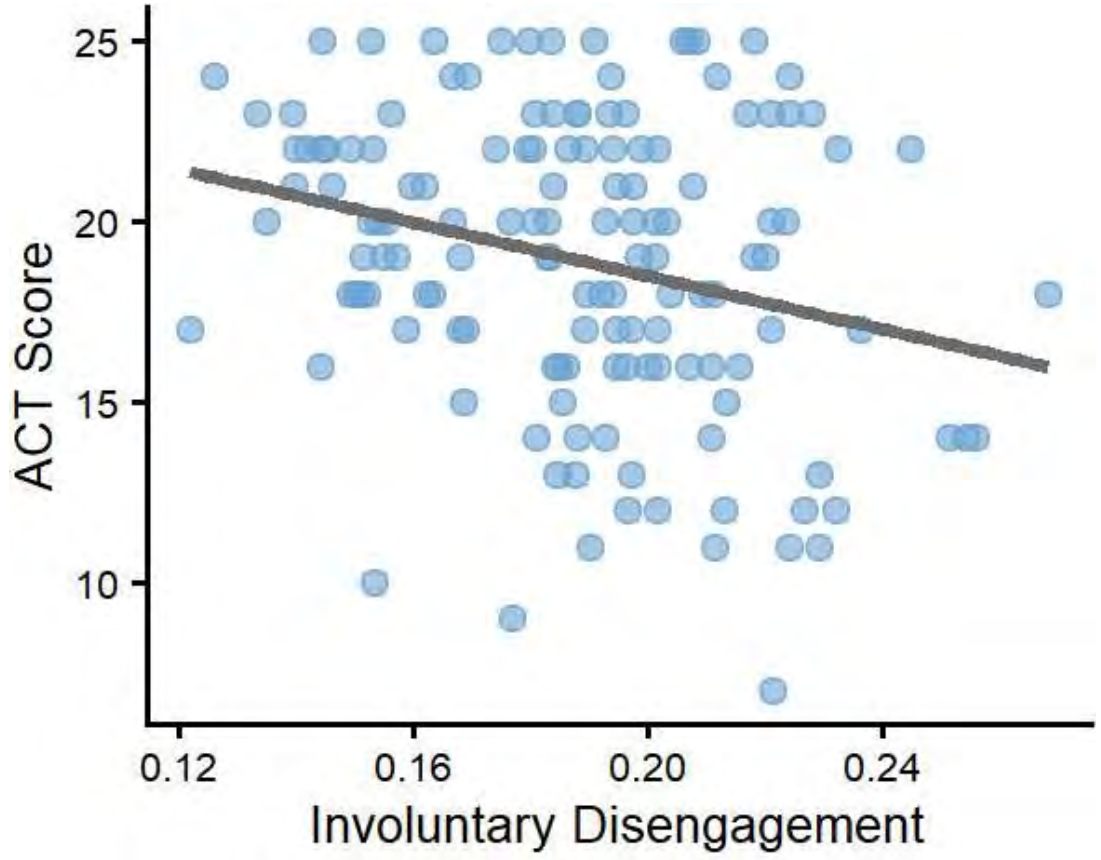
Involuntary Engagement and Child-reported Asthma Control



Note. Involuntary Engagement, found on the x-axis, is measured using proportion scores. These range from O to 1 with higher scores representative of more use of the respective stress response. Asthma Control Test (ACT) scores, found on the y-axis, can range from 0-25 and higher scores are representative of well-controlled asthma.

Figure 4

Involuntary Disengagement and Child-reported Asthma Control



Note. Involuntary disengagement, found on the x-axis, is measured using proportion scores. These range from O to 1 with higher scores representative of more use of the respective stress response. Asthma Control Test (ACT) scores, found on the y-axis, can range from 0-25 and higher scores are representative of well-controlled asthma.