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Coping with Asthma in Racially and Ethnically Diverse Urban Children: The Role of Emotional Problems in Disease Control

Erin M. Rodríguez¹, Harsha Kumar², Annie Draeger³, and Lisa Sánchez-Johnsen³

¹Department of Educational Psychology, University of Texas at Austin, Austin, Texas

²Department of Pediatrics, Division of Pulmonary, Allergy and Sleep Medicine, University of Illinois at Chicago, Chicago, Illinois

³Department of Psychiatry, University of Illinois at Chicago, Chicago, Illinois

Abstract

This study examined cross-sectional associations among coping, mental health, and asthma outcomes in racially/ethnically diverse urban children. Children (N=42; 65% female) ages 9 to 17 (M=11.9) years old and their parents reported on the child's coping, emotional and conduct problems, asthma control, and school missed due to asthma. Higher child and parent reported secondary control coping was correlated with fewer mental health problems and better child reported asthma control. Child reported emotional problems partially accounted for associations between child and parent reported secondary control coping and child reported asthma control. Secondary control coping may improve asthma by reducing emotional difficulties.

Keywords

asthma; child; coping; mental health

Asthma is the most common childhood chronic illness, affecting approximately 1 in 10 children in the U.S. (Akinbami et al., 2012). As a leading cause of missed school days and hospitalizations in children, asthma results in significant disruptions and functional impairment for children and their parents (Shields et al., 2004; Akinbami et al., 2011). Children with asthma are also at higher risk for emotional problems such as anxiety and depression (Katon et al., 2007), and conduct problems (McQuaid, Kopel, & Nassau, 2001), and these mental health problems can exacerbate asthma symptoms (Hasler et al., 2005;

Address correspondence to Erin M. Rodríguez, Department of Educational Psychology, University of Texas at Austin, 1 University Station D5800, Austin, TX 78712-1294, UT Mail Code: D5800. Phone: (512) 471-0283. erodriguez@austin.utexas.edu.

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¹All measures were translated into Spanish. The demographic questionnaire and the Response to Stress Questionnaire were adapted from similar versions translated and backtranslated by the first author and other bilingual research team members using the iterative process described by Brislin (1970). The Spanish versions of the Strengths and Difficulties Questionnaire (SDQ; Gómez-Beneyto et al., 2013; Hernandez et al., 2012) and the Asthma Control Test (Rodrigo et al., 2008; Vega et al., 2007), were previously translated and validated with Spanish-speaking participants. The Spanish version of the Asthma Therapy Assessment Questionnaire is distributed by Merck & Company, Inc. All measures were pretested and refined based on feedback by bilingual research staff.

Tibosch, Verhaak, & Merkus, 2011; Weil, Wade, Bauman, Lynn, Mitchell, & Lavigne, 1999).

Urban low-income Black and Latino children are disproportionately affected by asthma (Gold & Wright, 2005) and their asthma is more likely to be poorly controlled (Berg et al., 2004; Clark et al., 2010). These children also experience more barriers to health care and treatment (Brotanek, Halterman, Auinger, & Michael, 2005; Mansour, Lanphear, & DeWitt, 2000). Poorer asthma control and lack of access to care may increase racial/ethnic minority children's experience of stressors related to asthma, putting them at greater risk for emotional and behavioral difficulties. For example, stressors associated with having poorly controlled asthma (e.g., missing school, activity limitations, unpredictable or frequent hospital visits) may contribute to the development of emotional and conduct problems. Previous research indicates that higher levels of primary control coping (i.e., efforts to change a stressor) and secondary control coping (i.e., efforts to accommodate or adapt oneself to a stressor) longitudinally predict children's asthma outcomes (Schreier & Chen, 2008). However, there is a lack of research examining the relation between children's primary and secondary control coping with asthma and their mental health, despite the high risk for emotional and conduct problems in these children. Longitudinal studies of coping have linked primary and secondary control with later mental health outcomes (e.g., Calvete et al., 2011), as well as asthma outcomes (Schreier & Chen, 2008); in addition, emotional problems have been linked to subsequent asthma outcomes (Tibosch et al., 2011). Coping may impact asthma control indirectly through its effect on mental health, but research has not examined models of disease control that account for both coping and mental health. It is important to understand interrelations among these variables, not only for children's asthma management, but also to promote positive mental health outcomes.

Coping and Children's Mental Health

Coping refers to conscious, volitional efforts to regulate oneself and/or the environment in response to stress (Compas et al., 2001). Based on a theoretical model described by Compas and colleagues (2001), coping consists of three types of strategies: primary control, secondary control, and disengagement. This model of coping has been validated in confirmatory factor analyses with culturally diverse samples of youth coping with a range of stressors, including childhood illness (e.g., Compas et al. 2006; Wadsworth et al. 2004; Yao et al. 2010). The current study focused on primary and secondary control, building on previous research linking each to disease outcomes in children with asthma (Schreier & Chen, 2008). We also chose to focus on primary and secondary control because they have been shown to mediate the effects of interventions for youth with chronic illness (Jaser et al., 2014), suggesting that primary and secondary control have the most relevant implications for intervention. Primary control coping involves directly changing the stressor or one's emotional response to the stressor (e.g., problem solving, emotional expression and emotional modulation), while secondary control coping involves adaptation and accommodation to the stressor (e.g., cognitive reappraisal, positive thinking, acceptance). Higher levels of both primary control coping (Evans et al., 2014) and secondary control coping (Calvete, Camara, Estevez, & Villardón, 2011) in response to stress have been shown to longitudinally predict fewer emotional problems in youth. Higher primary and secondary

control coping have also been linked to fewer conduct problems, particularly in low-SES youth (Wadsworth & Compas, 2002), although associations with conduct problems have been found less consistently than associations with emotional problems (Compas et al., 2001; Wadsworth, Raviv, Santiago, & Etter, 2011). Overall, research suggests that both primary and secondary control coping are predictive of children's mental health outcomes.

Children's Coping with Asthma

Research on children's coping with chronic illness suggests that higher primary and secondary control coping may be beneficial for children's disease management and emotional and behavioral adjustment (Compas, Jaser, Dunn & Rodriguez, 2012). Secondary control strategies may be especially helpful in response to illness-related stressors that are relatively uncontrollable, such as treatment side effects, because those stressors are less easily changed and benefit from a more accommodative response, such as cognitive restructuring or distraction (Compas et al., 2012). In contrast, primary control coping strategies, such as problem solving, may be most helpful with relatively controllable stressors/situations such as following a medication schedule.

Coping and Children's Asthma Outcomes

Findings on coping and asthma control indicate different outcomes of primary and secondary control strategies. For example, one study found that primary control coping strategies predicted subsequent increased rescue inhaler use, absenteeism, and contact with physicians, while secondary control strategies predicted subsequent improved asthma peak-flow rates and increased physician contact (Schreier & Chen, 2008). In another study, one aspect of secondary control coping (cognitive restructuring) was concurrently associated with less asthma inflammation (i.e., a composite of eosinophil counts and stimulated production of Th-2 cytokine IL-4) and longitudinally predicted less rescue inhaler use and school absenteeism, but only for youth from low-socioeconomic status (SES) backgrounds (Chen et al., 2011). Findings are mixed in regards to primary control strategies. One study found that active coping (which includes primary control strategies such as seeking support and problem solving) was associated with better asthma management in a racially and ethnically diverse group of low-SES urban youth (Koinis-Mitchell & Murdock, 2002).

Coping and Mental Health in Children with Asthma

Few studies have examined associations between coping and mental health in children with asthma, and findings have been inconclusive. One study found that certain primary control strategies (problem solving, seeking social support) were not significantly associated with mental health problems or asthma-related quality of life, but this was in a sample of primarily middle-SES White youth (Marsac, Funk, & Nelson, 2007). Interestingly, another study showed that high efficacy in using certain primary control strategies (e.g., problem solving) was associated with *more* emotional distress when children are faced with uncontrollable stressors, such as those related to low-income urban environments (Murdock, Greene, Adams, Hartmann, Bittinger, & Will, 2010). Findings may be mixed because of differences in the populations studied and in the measures used, indicating the need to use an empirically validated assessment of coping to clarify previous results.

Overall, findings on primary and secondary control suggest that secondary control strategies may be more beneficial than primary control strategies for asthma control for low-SES urban youth. However, additional research is needed to identify the mechanisms by which secondary control potentially impacts asthma, such as child emotional and conduct problems. Furthermore, research that clearly distinguishes between primary and secondary control coping may clarify previously mixed findings regarding the role of primary control coping in children from low-SES backgrounds.

The Current Study

The current study examines relations among children's coping with asthma-related stressors (primary and secondary control coping), child emotional and conduct problems, and asthma health outcomes (symptom control and days of school missed due to asthma) in primarily low-income, urban, ethnically and racially diverse children with asthma. This study addresses limitations of the previous literature in several ways. First, we assessed emotional and conduct problems, in order to examine the role of mental health in the relation between coping and asthma outcomes. Second, we utilized both parent and child reports of coping, mental health, and asthma control, while prior research has typically relied on either parent or child report (see Marsac et al., 2007 for an exception). Multi-informant reports allow for a more thorough assessment of child behavior and decrease the likelihood that results are due to shared method variance (Compas et al., 2012). Third, our sample of primarily low-income, urban, ethnically and racially diverse youth is representative of children at elevated risk for poor asthma control (Bryant-Stephens, 2009). In this way, our study extends findings about primary and secondary control coping based on mostly White, middle class families (e.g., Schereir & Chen, 2008).

We hypothesized that higher levels of secondary control coping would be associated with fewer emotional and conduct problems, better asthma control, and less school missed. With regard to primary control coping, past findings have been mixed. Primary control involves problem solving, which may be adaptive for relatively controllable stressors, but for children living in environments with many uncontrollable asthma-related stressors (e.g., low SES, inner-city), primary control may be less effective. Therefore, in the current sample of youth, we did not expect to find a significant relation between primary control coping and emotional or conduct difficulties, nor with asthma outcomes. Finally, we hypothesized that child mental health (emotional and conduct problems) would in part account for the relation between secondary control coping and asthma outcomes (asthma control and school missed due to asthma).

Method

Participants

Participants included 42 children ages 9 to 17 years old with asthma and their parents/caregivers, hereafter referred to as parents (see Table 1 for demographic information). The families in the current study are a subsample of 78 families of children ages 5 to 17 who participated; we did not include families of children ages 5 to 8 in the current analyses because those children did not complete self-reports. In addition to the 78 families who

participated, twenty-five families were recruited and interested in participating, but were not able to schedule an appointment to participate within the study timeframe; an additional twenty-four families declined to participate. The main reasons for declining included not being interested or not having time to complete the study. Thus, the active decline rate was 19%, and the completion rate was 61% of all families recruited to participate.

In the current study, children were on average 11.9 years old ($SD = 2.4$ years) and 65% were female. Latino/Hispanic children comprised 36% of the sample and identified their race as White (26%), American Indian (7%), or another race (67%). The ethnicities of Latino participants were Mexican/Mexican American (93%), Puerto Rican (5%), and Honduran (2%). Those who were not Latino identified their race as Black/African-American (49%), White (11%), Asian (2%), or another race (2%). Two children (5%) completed questionnaires in Spanish based on their reported preferred language. Parents were on average 39.6 years old ($SD = 8.1$) and 91% were female; race/ethnicity demographics were equivalent to those reported for child participants. Twenty-four percent of parents completed questionnaires in Spanish based on their reported preferred language. Parents had on average 12.5 years of education ($SD = 3.6$; range = 0-18), and 59% reported being single, divorced, separated or widowed, while 41% reported being married or living with someone. The majority (68%) reported a family income of \$25,000 or less; 28% reported an income of \$25,001-50,000 and 4% reported an income of \$50,001 or above. The average number of children in the household in our sample was 2.7 ($SD = 1.5$), and only a minority of households had caregivers who were married or living with someone (41%). Therefore we estimated that, on average, families in the study had one adult caregiver and 3 children in the home. The poverty threshold for a family of four with one adult and three children was \$24,091 in 2014 (<https://www.census.gov/hhes/www/poverty/data/threshld/>), suggesting that most families were close to the poverty threshold for a household of this size.

Procedure

Participants were recruited from a university hospital outpatient clinic specializing in pediatric asthma and allergies, located in a large Midwestern city in the United States. Approximately 70% of the children with asthma seen in this outpatient clinic have moderate to severe persistent asthma. Eligibility requirements included: (a) children ages 5-17 years of age and parent ages 18 years or older, (b) diagnosis of asthma in the child (diagnosis was obtained via medical records, and confirmed by parent report), (c) child receiving treatment at the specialty outpatient clinic, and (d) parent and child were able to speak English and/or Spanish. Informed consent and assent were obtained from parents and children, and the study was reviewed and approved by the university's Institutional Review Board. Parents and children were compensated for participating. Participants completed the study at the clinic while waiting for or after the child's outpatient appointment, either as written questionnaires or orally as an interview with a research assistant, based on their preference. Twenty-four percent of parents and 48% of children elected to complete the questionnaires as an interview.

Measures

Family demographics—Each parent reported the child's age, race, and ethnicity and self-reported age, race, ethnicity, family income, marital status, number of children in the household, and education.

Child Coping—Mothers and children completed the Responses to Stress Questionnaire-Pediatric Asthma version (RSQ; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). This version of the RSQ was specifically tailored to assess children's coping in response to asthma-related stressors (e.g., "Not being able to use my inhaler or other treatment devices correctly;" "Concerns about having an asthma attack;" "Missing school days or falling behind in school work because of asthma"). The RSQ includes 57 items on which participants indicate on a 4-point scale how much they use various coping methods, from 0 (not at all) to 4 (a lot), and has been used with children ages 9 and older (e.g., Compas et al., 2010).

Factor analyses of the RSQ have identified five factors (Connor-Smith et al., 2000); we used primary control engagement coping (i.e., problem solving, emotional expression, emotional modulation) and secondary control engagement coping (i.e., cognitive restructuring, positive thinking, acceptance, distraction) in the current study. Internal consistencies for the current sample for each of the factors of interest were good, ranging from $\alpha = .80$ to $\alpha = .87$ across parent and child reports. Proportion scores were created by dividing the total score for each factor by the total score for the RSQ (Connor-Smith et al., 2000; Osowiecki & Compas, 1998, 1999; Vitaliano, DeWolfe, Maiuro, Russo, & Katon, 1990) and were used in the current analyses to control for varying patterns of responses related to the total number of items endorsed.

Child Emotional and Conduct Problems—Parents and children completed the Strengths & Difficulties Questionnaire (SDQ; Goodman, 1997), a brief and well-validated questionnaire to assess mental health difficulties in children within the past six months. The emotional and conduct problems scales were used in this study. Both scales consist of five items ranging from 0 to 10 with higher scores indicating greater problems. Emotional items correspond to internalizing problems and include: "I worry a lot," and "I am often unhappy, depressed or tearful." Conduct items correspond to externalizing problems and include: "I get very angry and often lose my temper," and "I am often accused of lying or cheating." The internal consistency of these subscales in the current sample was somewhat lower than desirable (for parent and child report respectively, $\alpha = .64$ and $.63$ for emotional problems and $.63$ and $.58$ for conduct problems).

Asthma symptom control—Parents completed the Asthma Therapy Assessment Questionnaire (ATAQ; Skinner et al., 2004) about their child. The symptom control subscale was used to assess asthma control (e.g., "wheezing or difficulty breathing" in the last four weeks); higher scores indicate poorer asthma control. Internal consistency of the ATAQ for the current sample was good ($\alpha = .82$). Children completed the Asthma Control Test (ACT; Nathan et al., 2004). This five-item questionnaire assessed level of symptom control and functional impairment due to asthma (e.g., "how much of the time did your asthma keep you

from getting as much done at work, school or at home”); higher scores indicate better asthma control. Internal consistency of the ACT for the current sample was good ($\alpha = .77$).

Asthma-related school absenteeism—Parents reported on the number of full days of school that their child missed in the past three months due to asthma.

Data Analyses and Statistical Power

We conducted preliminary analyses to examine relations between demographic variables (age, race/ethnicity, gender) and study variables (coping variables, mental health problems, asthma control, and missed school due to asthma). Next, we tested regression models for emotional and conduct problems, and examined direct and indirect effects, based upon a theoretical model of mental health problems mediating the relation between coping and asthma outcomes. Our analyses were grounded in current theory and practice in mediational analyses (see Hayes, 2009), which indicate that it is important to test for indirect associations via intervening variables (in this case, mental health problems), even if there is not a significant simple correlation between the independent and dependent variable (in this case, a correlation between coping and asthma control), because indirect associations may be present even without evidence of a direct association. Therefore, we chose to conduct regression analyses and examine indirect effects when there was a significant association between the independent and mediating variable (i.e., coping and mental health), and between the mediating variable and the dependent variable (i.e., mental health and asthma control), even if there was not a significant correlation between the independent and dependent variable (i.e., coping and asthma control).

With a sample of 42 participants, power was .79 to detect statistical significance for two-tailed correlations of .4 or greater with $\alpha = .05$, and power was .51 to detect statistical significance for two-tailed correlations of .3. Power was .57 to detect statistical significance for linear multiple regressions of $f^2 = .15$ or greater with two predictors and $\alpha = .05$. Direct and indirect associations were tested using the SPSS macro PROCESS (Hayes, 2013). PROCESS uses bias-corrected bootstrapping confidence intervals to test significance. Bootstrapping is a procedure that involves random resampling to describe the accuracy of an estimate, such as a regression coefficient (Efron & Tibshirani, 1993). Bias-corrected bootstrapping confidence intervals can account for non-linear indirect effects unlike the traditional Sobel test, making them more able to identify that an indirect relationship is significant (Preacher & Hayes, 2004). The bias-corrected bootstrap method is also preferred when statistical power is a concern (e.g., with samples smaller than 100; Hayes & Scharkow, 2013). PROCESS yields unstandardized regression coefficients and bias corrected 95% confidence intervals (CIs) around the effect, using a resample procedure of 1,000 bootstrap samples. CIs that do not cross zero indicate significant effects ($p < .05$). Given that data are cross-sectional, we interpreted mental health variables as potential explanatory processes (i.e., variables explaining the associations between coping and asthma control) but refrained from describing results in terms of mediation.

Results

Descriptive Analyses

Means and standard deviations for all study variables are reported in Table 2. Child and parent reports indicated, respectively, that children used primary control coping on average 18% and 20% of the time and secondary control coping 27% and 25% of the time. The mean scores for child emotional problems (out of 10) were $M = 3.10$ ($SD = 2.24$) based on child self-report, and $M = 2.70$ ($SD = 2.05$) based on parent report. The mean scores for child conduct problems were $M = 2.30$ ($SD = 1.90$) based on child self-report, and $M = 1.55$ ($SD = 1.68$) based on parent report. All means were in the normal range, which varies by subscale (e.g., 0 to 2 on parent-reported conduct problems, 0 to 5 on self-reported emotional problems; Goodman, 2001), indicating normative levels of mental health difficulties. Mean asthma control scores were 18.95 (out of 25, $SD = 4.52$) on the child report ACT. The cutoff indicating uncontrolled asthma is 19 on the ACT, with higher scores indicating better asthma control (Liu et al., 2007); thus, based on child self-reports, the youth in the study on average had relatively poorly controlled asthma. The mean score on the parent report ATAQ was 2.70 (out of 7, $SD = 2.50$); higher scores indicate poorer asthma control. Parents reported an average of 2.44 ($SD = 3.38$) days of school missed due to asthma over the past three months.

Correlational Analyses

Results of bivariate correlational analyses of child coping, mental health problems, and asthma outcomes are shown in Table 2. Neither parent nor child report of child primary control coping was significantly correlated with child mental health problems or asthma outcomes.

Child Report—Child reported secondary control coping was significantly negatively correlated with child reported emotional problems and asthma control. Child reported asthma control was significantly negatively correlated with child reported emotional problems and conduct problems.

Parent Report—Parent report of child secondary control coping was significantly negatively correlated with child reported emotional problems and conduct problems but not child reported asthma control. Parent reports of child mental health were not significantly correlated with coping or asthma control, except for the negative correlation between parent reported conduct problems and child reported asthma control. Parent reports of child asthma control were not significantly correlated with coping or mental health. Parent reported missed school days were not significantly correlated with coping or mental health problems, but were significantly correlated with parent and child reports of asthma control.

Linear Multiple Regression Analyses

Based on the results of bivariate correlations, we conducted hierarchical linear regression analyses to examine the variance explained by mental health problems in the association between secondary control coping and asthma control (see Table 3). Child self-reported asthma control was used as the dependent variable in all regression analyses; we did not use parent report of asthma control because it was not correlated with coping or mental health.

We examined three models. In the first model, child self-reported secondary control coping was entered in Step 1 and child self-reported emotional problems was entered in Step 2. The final model was significant, $F(2, 39) = 5.42$, $p < .01$, total Adjusted $R^2 = .18$. The direct association between secondary control coping and asthma control was not significant at Step 2 ($b = 15.20$, $SE = 14.92$, 95% CI $[-14.98, 45.39]$), but the indirect association via emotional problems was significant ($b = 16.31$, $SE = 7.91$, 95% CI $[3.90, 35.21]$). In the second model, we entered parent report of child secondary control coping in Step 1 and child self-reported emotional problems in Step 2. The final model was significant, $F(2, 39) = 4.96$, $p < .05$, total Adjusted $R^2 = .16$. The direct association between secondary control coping and asthma control was not significant at Step 2 ($b = 7.08$, $SE = 12.96$, 95% CI $[-19.12, 33.29]$), but the indirect association via emotional problems was significant ($b = 11.06$, $SE = 5.87$, 95% CI $[2.31, 28.05]$). In the third model, we entered parent report of secondary control coping in Step 1 and child self-reported conduct problems in Step 2. The final model was not significant, $F(2, 39) = 2.83$, $p = .07$, total Adjusted $R^2 = .08$. The direct association between secondary control coping and asthma control was not significant at Step 2 ($b = 5.86$, $SE = 14.40$, 95% CI $[-23.27, 35.00]$), nor was the indirect association via conduct problems ($b = 12.28$, $SE = 7.92$, 95% CI $[-0.43, 31.59]$).

Discussion

The current study examined cross-sectional associations among coping, mental health, and asthma control in primarily low-income, urban, racially and ethnically diverse youth with asthma. This study builds upon previous research by examining the role of mental health in the relation between coping and asthma control. Our results showed that higher levels of secondary control coping, which involves strategies such as acceptance, cognitive restructuring, positive thinking, and distraction, were correlated with fewer emotional and conduct problems (based on both parent-report and child self-report) and better child self-reported asthma control. Furthermore, in regression models, children's emotional problems indirectly accounted for the relation between secondary control coping (based on parent or child report) and child reported asthma control. Primary control coping was not associated with children's mental health or asthma control. Overall, our findings suggest that lower levels of children's emotional problems explain the relation between higher levels of secondary control coping and better asthma control.

Our results clarify and extend prior findings on coping and asthma outcomes in youth. Specifically, prior research indicated that secondary control coping was associated with better asthma outcomes including improved asthma peak-flow rates (Schreir & Chen, 2008) and lower inflammation, particularly in children from low-SES backgrounds (Chen et al., 2011). Our results indicate that this relation between secondary control and asthma is explained by the shared variance between secondary control coping and emotional problems. Previous longitudinal research has indicated that secondary control strategies precede both emotional problems (e.g., Calvete et al., 2011) and asthma outcomes (Schreir & Chen, 2008), and that emotional problems precede asthma outcomes (Tibosch et al., 2011). Taken with prior findings, our results highlight emotional problems as a potential mechanism by which secondary control strategies may impact disease functioning in youth with asthma.

Interestingly, primary control coping was not significantly associated with emotional or conduct problems nor with asthma outcomes. Prior research on primary control coping has been mixed, suggesting that primary control may be helpful for some behavioral aspects of asthma management (e.g., Koinis-Mitchell & Murdock, 2002; Schereir & Chen, 2008), but that perceived high efficacy in using primary control strategies such as problem solving may not be effective and is actually associated with higher distress for youth in low-SES, urban environments (Murdock et al., 2010). Within our sample of ethnically and racially diverse, low-SES urban youth, the lack of significant findings for primary control coping suggests that primary control strategies may not be as important as secondary control strategies to improve asthma control and support psychological well-being.

The results should be interpreted within the context of study limitations. Main limitations include the cross-sectional nature of the data, methodological limitations in our ability to detect significant effects, and the reliance on parent and child reports of asthma control. Because the data is cross-sectional, we cannot determine the direction of the relations among variables; indeed, it is likely that bidirectional relations exist among coping, mental health, and asthma control. Future studies should utilize longitudinal designs to evaluate the directionality of these relationships to help clarify appropriate intervention targets for youth with asthma. Notably, the internal consistency of our measure of emotional and conduct problems was lower than desirable and could have limited our ability to detect associations with coping and asthma control. Further, some participants completed the questionnaires as an interview while others completed written questionnaires; this may have affected our ability to detect associations due to the methodological variability. Another limitation is the relatively small sample size in the current study, which limited our statistical power to examine group differences in the associations among study variables. Future research should address whether associations are affected by race, ethnicity, SES, and other demographic variables related to asthma outcomes. An additional limitation is that our asthma outcomes solely involved questionnaire report. Physiological assessments (e.g., a pulmonary function test) could have provided a more objective measure of disease pathology. Nevertheless, child and parent reports of asthma control and school attendance reflect children's actual functioning. Thus, our results reflect processes related to functioning and impairment, more so than psychobiological disease processes. Finally, the sample was drawn from a clinic that primarily treats children with moderate to severe asthma and the mean age of the children in the study was just under 12 years. Therefore, the results of the study may not generalize to all urban, minority youth with asthma, particularly youth with mild asthma and older adolescents.

Despite these limitations, the current study has numerous strengths. These are among the first findings to identify emotional problems as an explanatory factor linking children's secondary control coping and their asthma control. This finding is important because youth with asthma may be at higher risk for developing emotional and behavioral problems (Katon et al., 2007). Our results suggest the importance of strengthening secondary control coping in youth with asthma, not only to improve disease control, but also to support positive emotional and behavioral functioning. Future research should also examine whether specific types of emotional problems (e.g., anxiety or depression) are uniquely related to coping and asthma control. In addition, our sample included racially, ethnically and linguistically

diverse urban youth from primarily low-SES backgrounds; this represents the population of youth who are more likely to suffer from asthma (Gold & Wright, 2005), have more poorly controlled asthma (Clark et al., 2010), and experience more barriers to healthcare (Brotanek et al., 2005; Mansour et al., 2000). Thus, our findings are more easily generalized to this population of children who experience asthma disparities and have implications for intervention with this at-risk population.

Implications for Practice

Pediatric asthma is a relatively common chronic condition that can have a significant negative impact on children's emotional, behavioral and academic functioning (Akinbami et al., 2011; Katon et al., 2007; McQuaid et al., 2001). For children living in contexts characterized by uncontrollable stressors, interventions that promote secondary control coping may be a key factor in improving asthma control and mental health outcomes. For example, interventions for children with diabetes (Jaser et al., 2014) or youth at risk for emotional problems (Compas et al., 2010) indicate that secondary control coping can be enhanced through cognitive-behavioral interventions and mediates the beneficial effects of the interventions on quality of life and mental health. Many interventions for low-SES urban youth typically focus on promoting primary control strategies such as problem solving about asthma treatment plans and medication use (e.g., Bruzzese et al., 2011; Joseph et al., 2007). While increasing primary control coping may be helpful in managing asthma symptoms when stressors are relatively controllable (e.g., electing to use a rescue inhaler, avoiding environmental triggers), interventions that promote secondary control coping may actually improve both asthma control and mental health for youth in environments characterized by high levels of uncontrollable asthma-related stress.

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Table 1

Participant Characteristics

Race/Ethnicity	Characteristics	
	Child	Parent
Black (Non-Latino)	49% N=21	49% N=21
White (Non-Latino)	11% N=5	11% N=5
Latino (Of all races)	36% N=15	36% N=15
Asian (Non-Latino)	2% N=1	2% N=1
Other (Non-Latino)	2% N=1	2% N=1
Age	M=11.9 years SD=2.4	M=39.6 years SD=8.1
Female	65% N=27	91% N=38
Male	35% N=15	9% N=4
Family Income		
<\$25,000		68% N=29
\$25,000-50,000		28% N=12
>\$50,000		4% N=2

Table 2

Correlations Among Coping, Emotional and Conduct Problems, Asthma Control, and School Missed Due to Asthma

	M (SD)	1	2	3	4	5	6	7	8	9	10
1. Child Report PCC	0.18 (0.03)	–									
2. Child Report SCC	0.27 (0.05)	.32*	–								
3. Parent Report PCC	0.20 (0.04)	.30	.13	–							
4. Parent Report SCC	0.25 (0.05)	.09	.18	.36*	–						
5. Child Report SDQ Emo	3.10 (2.24)	-.21	-.50**	-.10	-.31*	–					
6. Child Report SDQ Con	2.30 (1.90)	-.15	-.24	-.15	-.44**	.47**	–				
7. Parent Report SDQ Emo	2.70 (2.05)	.14	-.20	-.12	-.14	.20	.26	–			
8. Parent Report SDQ Con	1.55 (1.68)	-.03	-.20	-.28	-.24	.16	.47**	.38*	–		
9. ATAQ	2.70 (2.50)	.13	-.02	.01	-.19	.19	.09	.04	.15	–	
10. ACT Total Score	18.95 (4.52)	.06	.34*	.24	.21	-.44**	-.35*	-.21	-.33*	-.51**	–
11. School Days Missed due to Asthma	2.44 (3.38)	.06	-.19	.07	-.03	.09	.09	.12	.17	.50**	-.43**

Note. PCC = primary control coping. SCC = secondary control coping. ATAQ = Asthma Therapy Assessment Questionnaire (parent report of asthma control). ACT = Asthma Control Test (child report of asthma control). SDQ Emo = Strengths and Difficulties Questionnaire, Emotional Problems subscale. SDQ Con = Strengths and Difficulties Questionnaire, Conduct Problems subscale.

* $p < .05$;

** $p < .01$

Table 3
Linear Multiple Regressions Predicting Child Report of Asthma Control from Coping and Emotional or Conduct Problems

	Child Report of Coping					Parent Report of Coping				
	B	SE	β	t	95% CI for indirect effects	B	SE	β	t	95% CI for indirect effects
<i>Step 1:</i> SCC	31.51	13.63	0.34	2.31*		18.14	13.33	0.21	1.36	
<i>Step 2a:</i> SCC	15.20	14.92	0.17	1.02		7.08	12.96	0.08	0.55	
Child Report SDQ Emo	-0.73	0.33	-0.36	-2.23*		-0.84	0.30	-0.42	2.78**	
Indirect Effect	16.31	7.91			[3.90, 35.21]	11.06	5.87			[2.31, 28.05]
					Adjusted $R^2 = 0.18$ $F(2, 39) = 5.42^{**}$					Adjusted $R^2 = 0.16$ $F(2, 39) = 4.96^*$
<i>Step 2b:</i> SCC						5.86	14.40	.07	0.41	
Child Report SDQ Con						-0.76	0.39	-.32	-1.92	
Indirect Effect						12.28	7.92			[-0.43, 31.59]
										Adjusted $R^2 = 0.08$ $F(2, 39) = 2.83$

Note. SCC = secondary control coping. SDQ Emo = Strengths and Difficulties Questionnaire, Emotional Problems Subscale. SDQ Con = Strengths and Difficulties Questionnaire, Conduct Problems subscale.

* $p < .05$;

** $p < .01$.