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The longitudinal relationship between parental reports of asthma and anxiety and depression symptoms among two groups of Puerto Rican youth

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Abstract

Objective—To examine the relationship between parental reports of child asthma and levels and slopes of anxiety and depression symptoms among two contrasting groups of Puerto Rican youth, and to determine whether asthma is a special risk above and beyond parents' reports of other youths' medical conditions.

Methods—Two probability samples of youth in San Juan and Caguas, Puerto Rico (n=673) and in the south Bronx, New York (n=598), and their caretakers were interviewed in three yearly assessments. Parental reports of their children's asthma during each assessment were used to indicate whether youth had intermittent (PR=34%, NY=23%) or persistent (PR=7%, NY=16%) asthma. Youths' depression and anxiety symptoms were assessed using self reports to the DISC-IV. Information on youths' medical comorbidity was gathered through parental reports.

Results—Multilevel analyses adjusting for comorbid medical conditions indicated that parental reports of youths' intermittent and persistent asthma were related to higher levels, but similar slopes, of anxiety and depression among youth in New York. In Puerto Rico, youth with persistent asthma experienced less improvement in anxiety over time than youth without asthma, but no other associations were found.

Conclusion—Having asthma, based on parental reports, represents a risk factor for Puerto Rican youths' internalizing symptoms, even after adjusting for comorbid medical conditions. This risk is more pronounced among youth living in New York, which highlights the importance of

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Competing Interest Statement

The authors have no competing interests to report.

considering the social context in which youth develop and minority status when examining associations between physical health risk factors and mental health.

Keywords

anxiety; asthma; depression; Puerto Ricans; trajectories

Introduction

Asthma is the most prevalent chronic illness in childhood [1]. As a chronic, life-threatening condition, having asthma can affect youths' psychological adjustment. Cross-sectional associations between asthma and depression [2, 3], anxiety [3-10], and combined measures of depression and anxiety [11, 12] have been reported in children and adults, with more severe asthma predicting more internalizing problems [11]. However, to our knowledge, no longitudinal examinations have examined the influence of asthma on trajectories of depression and anxiety in young adolescents. How asthma relates to change in depression and anxiety over time during early adolescence, a period characterized by increases in internalizing symptoms [13, 14], remains unknown.

Asthma is more prevalent among ethnic minorities, who are disproportionately affected by risk factors for asthma including poverty, limited access to health care, and exposure to hazardous environments [15]. Puerto Ricans in particular have the highest prevalence of asthma of all ethnic/racial groups in the US, with rates ranging from 22%-30% on the mainland [16-20] and 32%-41% on the island [21-23]. Among Puerto Ricans, having asthma has been consistently associated with depression, but inconsistently related to anxiety [24-27].

In addition to having higher rates of asthma, Puerto Ricans tend to report higher rates of other chronic illnesses than other ethnic groups [27]. These chronic conditions, in turn, are related to internalizing disorders [27]. Whether having asthma represents a unique risk for Puerto Rican youths' anxiety and depression above and beyond the risks that other medical conditions represent is unknown. We address this question by adjusting for youths' comorbid medical conditions.

Even though it is known that asthma does not affect all ethnic/racial groups equally, only a few studies have examined how the sociocultural context in which individuals live and ethnic minority status affect asthma prevalence and morbidity [17, 28, 29]. Associations between asthma and trajectories of anxiety and depression might be different for youth living in contexts where they are part of the dominant group (i.e., children living in their country of origin) versus those living in contexts where they are not part of the dominant group and therefore represent a statistical minority (i.e., ethnic minorities). In this paper, we will refer to this concept of living in a context where your sociocultural conditions are not those of the statistical majority as being in a 'minority context'. Youth living in minority contexts are likely to be exposed to different stressors and social environments than those living in a context where they represent the majority group. Specifically, children developing in minority contexts experience stressors associated with their relative social disadvantage such as neighborhood disadvantage, community violence, and discrimination [30]. Exposure to such stressors may in turn intensify the relationship between asthma and internalizing symptoms. To our knowledge, no studies have compared how the association between asthma and trajectories of internalizing symptoms might differ depending on the sociocultural context that defines minority vs. non-minority status for a given high-risk ethnic group, adjusting for socioeconomic status (SES).

We attempt to address this dearth of knowledge using data from a longitudinal study of Puerto Ricans in two contexts: one in which they are part of the dominant group, Puerto Rico (PR), and one in which they are the statistical minority, in New York (NY) [31]. We test associations between youths' asthma and their depression and anxiety symptoms over time, determine if these associations are independent of comorbid medical conditions, and examine if the associations vary depending on minority context, after adjusting for SES. We hypothesized that (1) parent-reported asthma would be related to higher overall levels of depression and anxiety symptoms, and to greater increases of depression and anxiety symptoms over time; (2) that these relationships would hold after adjusting for comorbid medical conditions; and (3) that these associations would be stronger among Puerto Rican youth living in a minority context (NY).

Method

Sample

Data are from a longitudinal study of Puerto Rican youth living in the Standard Metropolitan Areas of San Juan and Caguas, Puerto Rico and in the South Bronx, New York. Both samples were multistage probability samples that represent the target areas based on the 1990 U.S. Census. Household eligibility criteria included the presence of a child aged 5 to 13 and both the child and a primary caregiver had to self-identify as Puerto Rican. Up to three randomly selected children were included per household. Participants were assessed yearly for three years between year 2000 and 2004. Each parent-child dyad received \$75 compensation for their participation in each assessment (for details about the sampling design and procedures see Bird et al. [31]). Our analyses focus on 1,271 early adolescents aged 10 years and older at baseline (NY $n=598$; PR $n=673$) for whom youths' reports of internalizing symptoms are available. The top part of Table 1 shows the weighted proportions, means, and 25th and 75th percentiles for selected demographic characteristics. The average age for the two groups was 11.57, with half of them being female and half male. The majority of youth in NY were USborn, whereas the majority of youth in PR were islandborn. Mothers in NY had less education and were more likely to be single than mothers in PR. The mean household income was comparable in the two sites; however, considering differences in the cost of living across the two contexts, higher rates of welfare receipt in NY illustrate socioeconomic differences between sites better, since housing expenses are factored in when determining welfare eligibility.

Attrition rates were low at waves 2 and 3, but they were higher in NY than in PR at wave 2 (11.2% vs. 5.05%) and wave 3 (14.72% vs. 9.36%). We tested whether baseline covariates predicted attrition at waves 2 and 3. Only 1/15 variables predicted missing data at wave 2: children in single-parent households were more likely to have missing data than those living in two-parent households ($b(SE)=0.43(0.21)$, $p<.05$). Analyses adjust for this variable. None of the variables predicted dropout at wave 3.

Measures

At baseline parents reported whether their child had ever had asthma. In the next two waves parents reported whether their child had had asthma in the past year. We used information from all waves to create three asthma categories: intermittent asthma (IA), persistent asthma (PA), and no asthma. We defined intermittent asthma as reporting having asthma at one or two assessments, and persistent asthma as reporting having asthma in all assessments. Youths who had never had asthma are the reference group.

Parents were also asked about a number of medical conditions affecting their child, including stomach aches, headaches and migraine, pneumonia, gastroenteritis, heart disease,

bronchitis, ulcers, diabetes, cancer, leukemia, thyroid disease, and HIV. We created a composite score that represents a count of the medical conditions parents reported their child had over the three years of the study. The abovementioned medical conditions were selected among a broader list of conditions because previous studies have shown that these are related to internalizing symptoms [32-42].

Internalizing symptoms were measured using youths' reports to selected schedules of the National Institute of Mental Health Diagnostic Interview Schedule for Children Version IV (NIMH-DISC-IV [43, 44]). The anxiety measure consisted of positive symptom counts to questions corresponding to generalized anxiety, specific phobia, post-traumatic stress disorder, separation anxiety, and social phobia ($\alpha=.66$). The depression measure consisted of positive symptom counts for major depression. Symptom counts have better test-retest reliability than categorical diagnoses [44].

Analytic Strategy

Multilevel models—To determine if asthma was related to the development and persistence of internalizing symptoms in the two sites, we fitted a series of multilevel models (MLM) [45] that allowed us to take into account non-independence of observations due to multiple levels of nesting in the data (i.e., observations nested within individuals, siblings nested within households, and households nested within neighborhoods). We constructed models that represented trajectories of internalizing as linear trends. These were identified by an intercept term, which represented level of symptoms, and a slope, which described how the level changed over time. Time was centered at wave 3 so that the intercept represents the level of internalizing at the last year of the study. Because parental reports of asthma were used to define intermittent and persistent asthma over all waves, level of internalizing symptoms at the end of the study is more interpretable than level in the first year.

We first present analyses that do not adjust for comorbid medical conditions (models labeled A) and then add this variable to take into account possible reporter bias and to evaluate the unique associations between parental reports of asthma on anxiety and depression (models labeled B). Analyses adjusted for child's age, gender, single parent household, parental psychopathology [46], stressful life events [47], number of household members, and welfare.

We present analyses by site, but to test whether site differences in how asthma relates to internalizing symptoms were reliable, we conducted analyses in the entire sample and added interactions between asthma and site. These analyses adjust for the same covariates noted above, plus maternal education and propensity scores to adjust for site differences in SES and other background characteristics. We estimated the propensity scores using logistic regression, where the probability of living in New York was predicted from 13 baseline covariates (e.g. parental psychopathology, mother's education, income).

All analyses use sampling weights to adjust for unequal probabilities of selection resulting from the complex study design and for differences in the age and gender distribution between the 1990 and 2000 Census. We conducted our analyses in SAS 9.2 using the MIXED procedure.

Results

Descriptive findings

Table 1 (bottom) shows the descriptive statistics for the main predictor and outcome variables. IA was more prevalent in PR (n=209, weighted percent=34%) than in NY (n=112,

weighted percent=23%), but PA was higher in NY (n=80, weighted percent=16%) than in PR (n=44, weighted percent=7%). The mean levels of depression and anxiety decreased over time and were higher for youth in NY than in PR.

Depression

Table 2 shows the results from multilevel models of the association between parental reports of asthma and levels of depression in NY and in PR. In NY, both IA and PA were associated with increases in overall levels of depression symptoms (95% CI: 0.35,1.56 and 0.23,1.68, respectively) before adjusting for comorbid medical conditions (Model A). After adjustment, the NY associations were slightly reduced in size, but they remained significantly different from zero (Model B). As expected, comorbid medical conditions were significantly associated with level of depression. In PR, neither IA nor PA were significantly related to overall levels of depressive symptoms in Model A (95% CI: -0.24,0.61 and -0.32,1.36, respectively) or in Model B (95% CI: -0.30,0.55 and -0.40,1.28, respectively). Medical comorbidity, however, was associated with an increase in depression. We tested site by asthma interactions and verified that the apparent site difference for the IA effect was significant [b(SE)=-0.78(0.37), $p<.05$ for Model A; b(SE)=-0.82(0.37), $p<.05$ for Model B], but there was no reliable site difference for the PA effect [b(SE)=-0.46(0.57), *n.s.* for Model A; b(SE)=-0.46(0.56), *n.s.* for Model B].

In addition to the asthma effects, Table 2 shows that in both sites, there was a significant decline in depression over the three years. We fit additional models that included interactions between asthma and time to test whether the rate at which depression symptoms decreased over time was different for children with IA and PA compared to children without asthma. None of these interactions were significant in NY [b(SE)=0.19(0.28), *n.s.* for intermittent and b(SE)=0.18(0.32), *n.s.* for persistent] or in PR [b(SE)=-0.10(0.18), *n.s.* for intermittent and b(SE)=0.37(0.36), *n.s.* for persistent] when adjustment for comorbidity was made. In NY, this means that IA and PA was associated with an overall increase in depression, but this risk remained stable over time. In PR, where there was no main effect of IA or PA, this means that having asthma did not affect the rate at which depression symptoms decreased over time. We found the same pattern of results in the model that did not adjust for medical conditions¹.

Anxiety

Table 3 shows results for anxiety that are similar to those for depression. IA and PA in NY were significantly related to increases in levels of anxiety before (95% CI:0.33,2.57 and 0.94,3.61, respectively) and after adjusting for comorbid medical conditions (95% CI:0.18, 2.40 and 0.55,3.22, respectively), whereas in PR, neither IA nor PA were related to anxiety in either the unadjusted (95% CI: -1.04,0.64 and -1.68,1.59) or the adjusted models (95% CI: -1.19,0.48 and -1.89,1.36, respectively). We tested whether the pattern was significantly different across site after adjusting for covariates and propensity scores and found that both IA and PA effects significantly interacted with site in model A [b(SE)=-1.67(0.71), $p<.05$ and b(SE)=-2.22(1.08), $p<.05$, respectively] and model B [b(SE)=-1.76(0.70) and b(SE)=-2.23(1.06), $p<.05$, respectively].

We also tested whether asthma was related to the relative increase or decrease in anxiety in Model B. In NY we found no significant time by asthma interactions [b(SE)=-0.09(0.54),

¹Another adjustment strategy is to limit the cases to those without medical complications. Although this is easier to interpret from a causal perspective, this approach cut the sample by approximately half. Using this approach, the conclusions were similar to those presented above, except that IA was no longer significantly related to depression in NY [b(SE)=0.58 (0.40)]. The loss of significance was as much due to the increase in the standard error as the reduction in the effect itself.

n.s. for intermittent and $b(SE)=0.34(0.63)$, *n.s.* for persistent asthma]. In PR, however, the result was somewhat different. IA was not related to slopes of anxiety in the adjusted model [$b(SE)=0.00(0.35)$, *n.s.*] but PA was ($b(SE)=1.81(0.68)$, $p<.01$). Figure 1 shows that youth with PA had lower levels of anxiety at wave 1, but flatter trajectories of anxiety symptoms than those without asthma. In this study, where, on average, anxiety symptoms decreased over time, this means that youth with PA showed less improvement over time than those without asthma. These results were consistent with those found in the unadjusted models². A three-way interaction between site, time, and persistent asthma showed that this difference in slope across sites was significant [$b(SE)=1.95(0.79)$, $p<.05$].

Discussion

Using three waves of data on two groups of Puerto Rican youth, one in Puerto Rico and one in New York, we found three main results: (1) rates of persistent asthma were higher in NY (16%) than in PR (7%), but rates of intermittent asthma were higher in PR (34%) compared to NY (23%); (2) both persistent and intermittent asthma were related to anxiety and depression in NY, but not in PR; (3) associations between asthma and anxiety and depression in NY remained significant after adjusting for comorbid medical conditions.

Our study was novel in including three years of internalizing outcomes. However, the associations we found in NY are consistent with some previous cross-sectional studies [3-10]. In NY, intermittent and persistent asthma were related to higher overall levels of depression and anxiety, but neither IA nor PA were related to the rate of change of these symptoms, which suggests that asthma does not have a specific impact on the incidence of internalizing symptoms among young adolescents. Whatever effects asthma has on internalizing among youth in NY are already in place by age 10.

In contrast, in PR, youth with persistent asthma had a different pattern of change of anxiety symptoms over time. Anxiety and depression symptoms decreased over time in general in both sites, a pattern that has been described as an attenuation effect in longitudinal studies of psychopathology [48, 49]. Anxiety among youth with PA, however, did not decrease as much as among those without asthma. This result could be due to at least two processes. One is that response-bias processes that lead to the attenuation effect do not affect youth with PA as much as other youth. This interpretation would be consistent with the Figure 1 pattern that suggests that PA youth both have lower anxiety at wave 1 than other youth, and that the rate of change is less. Alternatively, the same response bias affects both groups, but the stress associated with asthma makes the PA youth likely to have increasingly higher anxiety over time relative to their peers. Under this interpretation, the initially lower level of anxiety in the PA group would appear to be a sampling fluctuation, since studies consistently find a positive association between asthma and anxiety symptoms [3, 4, 6, 8-10] or no association [24-26], but never a significant inverse association. We are unable to distinguish the two explanations with these data.

The fact that asthma was associated with more internalizing in NY, but not in PR, is consistent with an interpretation of the site difference as representing the experience of youth as minority vs. majority members, but it could also be due to other differences between the two samples. Participants in the two sites differed in SES, and so we adjusted for propensity scores, single-parent household, number of household members, maternal

²As for depression, we checked adjustment by limiting the participants to those with no medical comorbidity. The effect for IA in New York was larger than in Table 3 [$b(SE)=1.63(0.85)$, $p<.10$] but was no longer significant because of a larger standard error. In Puerto Rico the interaction of persistent asthma with time also had a larger effect [$b(SE)=2.04(1.09)$] but reduced from significant at the .05 level to marginally significant because of the standard error. We interpret these results as consistent with those reported in the main body of the article.

education, and welfare. We also adjusted for parental psychopathology, stressful life events, and medical comorbidity. In this sense, our analyses were conservative rather than underadjusted, and they revealed that site differences were reliable after adjusting for these variables.

Differences in how asthma related to internalizing symptoms in a minority versus a majority context then might be due to differences in the social and physical environments youth are exposed to and the stress associated with living in the different environments. As members of a statistical minority in NY, Puerto Rican youth experience elevated stress due to their relative social disadvantage and minority status, such as acculturation stress, discrimination, and neighborhood violence. These stressors are related to greater asthma morbidity [21, 50]. In addition, youth in NY are exposed to multiple environmental triggers for asthma such as high pollution, cockroaches, and mice [51], which also increase asthma morbidity [52]. It is known that there is a dose-response relationship between asthma severity and internalizing symptoms [11]. Children with mild asthma have no substantial increase in internalizing symptoms when compared with those without asthma. If we consider PA a proxy for more severe asthma, our finding that mainland Puerto Ricans were more likely to have PA than island Puerto Ricans is consistent with this hypothesis. Another study using clinical ratings of asthma severity found that island Puerto Ricans were more likely to have milder forms of asthma than mainland Puerto Ricans [29]. Thus, the accumulation of social and environmental risk factors for asthma among youth in NY, and the stress associated with living in a minority context, might explain why in this study, the association between asthma and internalizing symptoms was stronger among Puerto Ricans living in NY.

Alternatively, contextual differences in how asthma related to anxiety and depression might be due to differences in parents' response styles. Research has shown that island Puerto Ricans report higher rates of somatization than other groups [53, 54], partly because in the Puerto Rican culture, reporting physical and emotional symptoms is not considered undesirable [55]. This acquiescent response style might attenuate in parents in NY as they acculturate to the US culture. Evidence shows that island Puerto Ricans tend to magnify asthma symptoms as compared to other Latinos in the US and whites [56]. Thus, it is possible that island Puerto Ricans' parents overstated their children's asthma symptoms compared to parents in NY.

Even though there may be contextual differences in parents' response styles, associations between asthma and overall levels of depression and anxiety in NY, and rate of change of anxiety in PR, were robust to adjustment for parent-reported medical comorbidities, indicating that parents' reports of asthma made a unique contribution to the development of anxiety and depressive symptoms, above and beyond their reports of other medical conditions.

Our findings have clinical implications and suggest new avenues for research. Depression and anxiety among asthma patients can be problematic because comorbidity between asthma and psychological disorders is related to poor asthma management, poor treatment adherence, and more admissions to the emergency room [57-53]. Children who are diagnosed with asthma, particularly those in NY, should be screened for psychological problems so that they can receive adequate treatment for both conditions. Asthma is a life-threatening condition that can evoke feelings of fear, especially if children do not feel that they can adequately control their symptoms [54]. As such, interventions should focus on improving children's asthma management skills, as well as learning to cope with anxiety-provoking events, such as having an asthma attack. Future research should examine what factors can buffer the negative influence of asthma on internalizing symptoms like depression and anxiety. Our finding that how asthma related to depression and anxiety

depended on the social context in which youth resided stresses the importance of considering the social context in which youth develop when studying the relationship between physical and mental health and suggests that future research should identify social and environmental factors that might account for these differences. Finally, our finding that in PR, persistent asthma did not represent an initial risk for anxiety but it predicted more maladaptive trajectories of anxiety over time points to the importance of continued monitoring and treatment of children with asthma.

Limitations of this study include reliance on parents' response to the question "has your child ever had asthma?" at wave 1, and "has your child had asthma in the past year" at waves 2 and 3, to determine children's asthma status. This measure may be biased because it relies on parents' ability to identify asthma symptoms accurately [25]. However, this question has been widely used internationally [55] and has been validated in English [55] and Spanish [56]. Furthermore, studies show that a similar question used to assess asthma in adults ("have you ever had asthma?") has high sensitivity and specificity in distinguishing asthmatics from nonasthmatics [57]. We also relied on parents' reports of comorbid medical conditions, which may have limited accuracy. Future research should obtain more reliable health data by using medical records or performing physical exams. We have no measures of asthma severity or coping mechanisms; therefore, we are unable to determine if improvements in internalizing symptoms over time partly reflect reductions in asthma severity or improvements in asthma management skills. Lack of information on asthma severity also limits our ability to make definitive conclusions about contextual differences in asthma severity. Auxiliary analyses using data collected in the PR sample at wave 3 showed that PA was related to experiencing any wheezing, more frequent wheezing, and having been hospitalized due to asthma, compared to intermittent asthma, which suggests that PA can be seen as a proxy for severity. Future research should include sophisticated measures of severity that consider frequency of symptoms, lung function, and medication. Last, even though the age of onset of asthma is generally earlier than the age of onset internalizing symptoms, which suggests that asthma precedes the development of internalizing disorders, the directionality of associations between asthma and internalizing symptoms remains unclear. Some research has suggested that this relationship is reciprocal [58], but available evidence suggests that the link from asthma to internalizing is stronger than the other way around [12].

Notwithstanding these limitations, this study contributes to the literature by examining how asthma relates to the course of internalizing symptoms during an important developmental period, by considering the role of the socio-cultural context in this relationship, and by examining the unique contribution of parental perceptions of asthma to the development of depression and anxiety symptoms, above and beyond the influence of comorbid medical conditions.

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Figure 1.
Relationship between persistent asthma and slopes of anxiety in Puerto Rico.

Table 1

Weighted proportions, means, and 25th and 75th percentiles for demographic characteristics, predictors and outcomes

	New York (n = 598)			Puerto Rico (n = 673)			Entire sample (n = 1,271)		
	Mean/Prop	25 th pctile	75 th pctile	Mean/Prop	25 th pctile	75 th pctile	Mean/Prop	25 th pctile	75 th pctile
Demographic Characteristics									
Age in years	11.57	10.00	12.16	11.57	10.00	12.08	11.57	10.00	12.12
Girls	0.50			0.49			0.49		
Child was born in PR	0.13			0.95			0.56		
At least 1 parent born in the mainland	0.65			0.19			0.41		
Maternal education									
Less than High School	0.46			0.23			0.33		
High School	0.44			0.43			0.43		
At least some college	0.11			0.35			0.23		
Mother is on welfare	0.46			0.37			0.41		
Income	16,065	4,150	22,080	16,529	5,685	19,765	16,312	5,091	21,034
Single parent household	0.49			0.29			0.38		
Predictor and Outcome Variables									
Intermittent asthma ^a	0.23			0.34			0.29		
Persistent asthma ^b	0.16			0.07			0.11		
Other medical conditions	0.84	0.00	0.87	1.39	0.00	1.65	1.13	0.00	1.27
Depression W1	4.52	0.35	6.67	3.73	0.29	4.97	4.10	0.31	5.89
Depression W2	3.40	0.00	4.87	2.51	0.00	2.98	2.91	0.00	3.84
Depression W3	2.92	0.00	3.81	1.83	0.00	1.89	2.32	0.00	2.72
Anxiety W1	10.12	2.88	15.54	9.09	2.61	13.02	9.58	2.84	13.94
Anxiety W2	6.83	0.84	9.78	6.19	0.81	8.64	6.48	0.82	9.51
Anxiety W3	5.30	0.04	7.58	4.39	0.00	5.93	4.80	0.00	6.76

Note.

^aIn NY, n = 112; in PR, n = 204.

^bIn NY, n = 80; in PR, n = 44.

Relationship between intermittent and persistent asthma and levels of depression with and without adjustment for comorbid medical conditions.

Table 2

Predictors	New York				Puerto Rico			
	Model A	SE	b	SE	Model A	SE	b	SE
Intercept	2.12***	0.28	2.28***	0.28	1.43***	0.21	1.41***	0.21
Time	-0.93***	0.11	-0.93***	0.11	-0.97***	0.09	-0.97***	0.09
IA	0.96**	0.31	0.86**	0.30	0.18	0.22	0.13	0.22
PA	0.96**	0.37	0.72*	0.37	0.52	0.43	0.44	0.43
Medical Conditions			0.39***	0.09			0.14*	0.06
Female	0.30	0.25	0.19	0.25	0.06	0.20	0.09	0.20
Age	0.25*	0.10	0.24*	0.10	0.23**	0.09	0.23**	0.09

Notes.

† p<.10.

IA = Intermittent asthma, PA = Persistent asthma.

Time is centered at the third time point.

Analyses adjusted for child's age, gender, single parent household, parental psychopathology, stressful life events, number of people living in the household, and welfare

p<.001

**
p<.01

*
p .05

Table 3

Relationship between intermittent and persistent asthma and levels of anxiety with and without adjusting for comorbid medical conditions.

Predictors	New York				Puerto Rico			
	Model A		Model B		Model A		Model B	
	b	SE	b	SE	b	SE	b	SE
Intercept	3.50***	0.52	3.75***	0.52	3.78***	0.41	3.73***	0.41
Time	-2.58***	0.22	-2.58***	0.22	-2.44***	0.16	-2.44***	0.16
IA	1.45***	0.57	1.29***	0.56	-0.20	0.43	-0.35	0.42
PA	2.28***	0.68	1.89**	0.68	-0.04	0.83	-0.27	0.83
Medical Conditions			0.62***	0.17			0.38***	0.11
Female	1.03*	0.47	0.87 [†]	0.46	0.06	0.40	0.15	0.39
Age	-0.09	0.19	-0.10	0.19	0.17	0.17	0.16	0.17

Notes.

IA = Intermittent asthma, PA = Persistent asthma.

Time is centered at the third time point.

Analyses adjusted for child's age, gender, single parent household, parental psychopathology, stressful life events, number of people living in the household, and welfare

*** p<.001

** p<.01

* p<.05

[†] p<.10.