

Perceived Discrimination Associated With Asthma and Related Outcomes in Minority Youth

The GALA II and SAGE II Studies

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e-Appendix 1.

METHODS

Study Participants

Participants must have self-identified all four grandparents as Latino (GALAI) or African American (SAGEII) to be eligible. Those in the third trimester of pregnancy, with ≥ 10 pack-year smoking history, and current smokers were excluded. Other eligibility criteria are listed in **Table E1**. Pregnancy in the third trimester was an exclusion criteria for both studies (GALA II and SAGE II) as pregnancy modified the severity of asthma and impacts pulmonary function measurements. Participants who were smoking at the time of recruitment were excluded as smoking independently contributes to respiratory symptoms. Participants without asthma were recruited from the same community or hospital-based clinics as participants with asthma and were match on age (+/- 1 year).

Asthma Control and Pulmonary Function Measures

Asthma control is a composite measure of symptoms, rescue medication use, and pulmonary function measures. Specifically, participants with a Forced Expiratory Volume in One Second (FEV_1) or FEV_1 /Forced Vital Capacity Ratio of less than 80% were classified as having worse control. Pulmonary function testing was conducted according to American Thoracic Society recommendations to obtain standard measurements of airway obstruction.¹ Percent predicted pulmonary function was calculated using the Hankinson et al. spirometric reference equations for African Americans (SAGE II) and for Mexican Americans (GALA II).²

Covariates

Self-reported race/ethnicity was collected using two separate questions in serial. Ethnicity was collected through the question "Do you consider yourself Spanish/ Hispanic/Latino?" with a "Yes/No" choice (if yes, please specify: Mexican, Mexican American, Chicano; Spanish, Hispanic, Latino; Dominican; Cuban, and so forth). Race was collected through the question "What is your race? Would you say, White; Black, African American, or Negro; American Indian or Alaska Native; Asian Indian; Chinese; Filipino; Japanese; Korean; Vietnamese; Other Asian; Native American; Native Hawaiian; Guamanian or Chamorro; Samoan; Other Pacific Islander; or Other (please specify)." Multiple selections were allowed for both questions. The participant (or the participant's parents) selected the appropriate answers to all questions for the participant, parents, and grandparents, and responses were used to categorize subjects as African American, Mexican American, or other Latino. The other Latino group represented 19.8% of the total Latino study population and predominantly consisted of individuals who identified with more than one Latino group (61%), or were from Central America (22.2%), South America (4.6%), or the Caribbean

(11.7%). Islander Puerto Ricans were classified as such if the participant (or the participant's parents) identified as Puerto Rican was residing in Puerto Rico. Participants identifying as Puerto Rican but not residing in Puerto Rico were excluded from these analyses as experiences of discrimination may differ greatly between mainland and Puerto Rico.

In our study, we consider the self-report of mold exposure and/or water damage as a marker of substandard housing. History of breastfeeding was a positive response to the question 'Was the child ever breastfed?'; and daycare attendance was report of the participant ever being in a daycare setting with at least 5 other unrelated children.

For this study, education was considered a stable measure of SES³, income was indicative of current access to resources⁴⁵, and insurance status was a marker of access to healthcare services⁶. From these measures, a composite score of SES was created. Briefly, an individual's composite SES index was calculated by assigning a low, medium, or high values for each variable, summing their values and categorizing as low, middle, and high SES based on recruitment site-specific tertiles to account for regional variation.

Genetic ancestry measurement were calculated using reference haplotypes from European and African individuals from HapMap phase II,⁷ and 71 Native American individuals genotyped on the Axiom LAT1 array.⁸

Statistical Analysis

In ordinal logistic regression, the three categories of asthma control are modeled as two parallel lines, one comparing controlled versus poorly controlled and the other comparing controlled/partially versus poorly controlled. Because these two lines have the same slopes or parameter estimates, there is only one odds ratio for each predictor variable in the model.⁹

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e-Table 1. Eligibility Criteria for Participation for GALA II and SAGE II Asthma Cases and Healthy Controls.

Criterion	Asthma Cases	Healthy Controls
Age between 8 and 21 years old	Yes	Yes
All four grandparents self-identified as Latino/Hispanic (GALA II) origin	Yes	Yes
All four grandparents self-identified as African American (SAGE II)	Yes	Yes
History of physician-diagnosed asthma	Yes	No
Symptoms of wheezing or shortness of breath	Yes	No
No respiratory infections for ≥ 6 weeks (clinical stability)	Yes	No
No asthma exacerbations for ≥ 6 weeks (clinical stability)	Yes	No
Less than 10 pack year smoking history and no smoking in the last year	Yes	Yes
If pregnant, < 3rd trimester	Yes	Yes
No history of other lung diseases or other chronic illnesses	Yes	Yes

e-Table 2. Criteria for determining asthma control*

Participants with asthma were considered to have their asthma under control if they met all of the following:

1. Daytime symptoms no more than twice per week
2. No limitation of activities caused by asthma
3. No nocturnal symptoms
4. Use of rescue medication no more than twice per week
5. FEV₁ or FEV₁/FVC ratio $\geq 80\%$

Asthma control for participants not meeting at least 1 of these criteria was classified as partially controlled, and participants with at least 3 measures present were classified as having uncontrolled asthma.

* NHLBI Third Expert Panel on the Management of Asthma. Guidelines for the diagnosis and management of asthma: full report 2007

e-Table 3: Report of any perceived discrimination by situation* for each race/ethnic group

	African American		Mexican American		Other Latino		Islander Puerto Rican	
	Control	Case	Control	Case	Control	Case	Control	Case
N	360	594	553	533	244	278	489	536
In School	94 (26.1)	189 (31.8)	109 (19.7)	114 (21.4)	50 (20.5)	67 (24.1)	30 (6.1)	40 (7.4)
Medical Settings	9 (2.5)	22 (3.7)	13 (2.3)	11 (2.1)	3 (1.2)	4 (1.4)	2 (0.4)	11 (2.1)
With Services	70 (19.4)	150 (25.3)	9 (8.9)	32 (6.0)	12 (4.9)	12 (4.3)	4 (0.8)	7 (1.3)
Public Settings	79 (21.9)	165 (27.8)	70 (12.7)	42 (7.9)	24 (9.8)	23 (8.3)	5 (1.0)	17 (3.2)

* Values reported are n and (percent). Bolded values signify $p \leq 0.05$

e-Table 4. Adjusted* odds of having asthma by report of perceived discrimination (Any/None) by Global African Ancestry^ According to Race/Ethnicity

Race/Ethnicity	Low African Ancestry	High African Ancestry	<i>p-value for interaction</i>
African American	1.38 (0.89, 2.18)	2.21 (1.49, 3.30)	0.42
Mexican American	1.14 (0.76, 1.74)	1.00 (0.67, 1.49)	0.55
Other Latinos	1.69 (0.75, 4.00)	1.42 (0.79, 2.57)	0.88
Island Puerto Rican	1.80 (0.97, 3.42)	1.21 (0.58, 2.58)	0.47

*Adjusted for age, sex, current and *in utero* tobacco exposure, socioeconomic status, study site, mother's preferred language (Latino models), and child's Latino subgroup (other Latino model)

^ Low/High African ancestry based on mean for each racial/ethnic group

e-Table 5. Adjusted* odds of poor asthma control by report of perceived discrimination (Any/None) by SES class according to race/ethnicity

Race/Ethnicity	Low	Middle	High	<i>p-value for interaction</i>
African American	2.21 (1.29, 3.85)	1.48 (0.90, 2.45)	2.50 (1.11, 5.76)	0.94
Mexican American	1.22 (0.69, 2.14)	3.39 (1.31, 8.81)	0.96 (0.42, 2.16)	0.78
Other Latinos	1.27 (0.56, 2.89)	0.53 (0.12, 2.49)	1.26 (0.19, 3.46)	0.35
Island Puerto Rican	1.53 (0.51, 4.94)	0.65 (0.28, 1.51)	1.43 (0.43, 4.54)	0.53

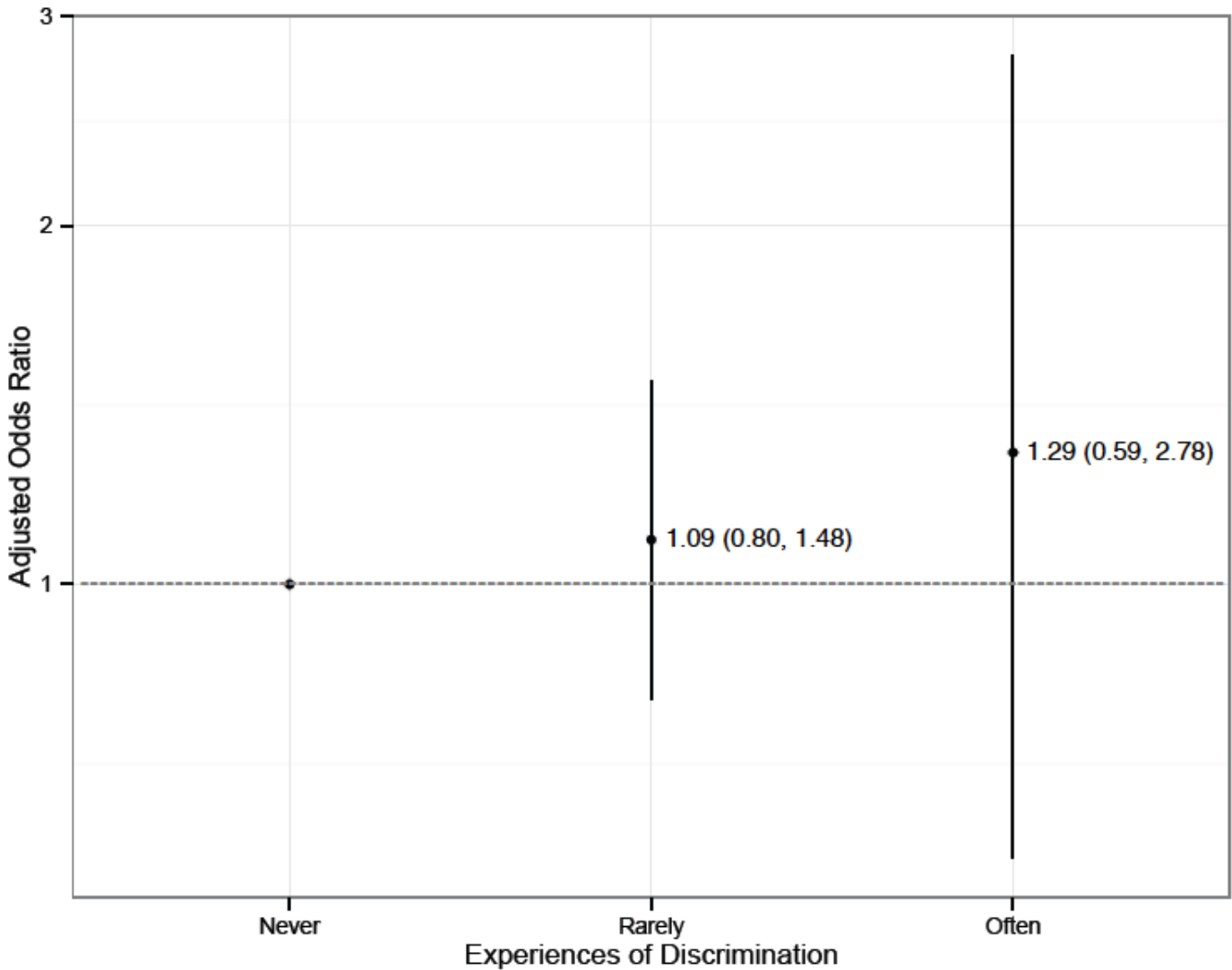
* Adjusted for age, sex, secondhand tobacco, in utero tobacco, study site, use of controller medication, global African ancestry, mother's preferred language (Latino models), and child's Latino subgroup (other Latino model)

e-Table 6. Adjusted* odds of poor asthma control by report of perceived discrimination (Any/None) by Global African Ancestry[^] According to Race/Ethnicity

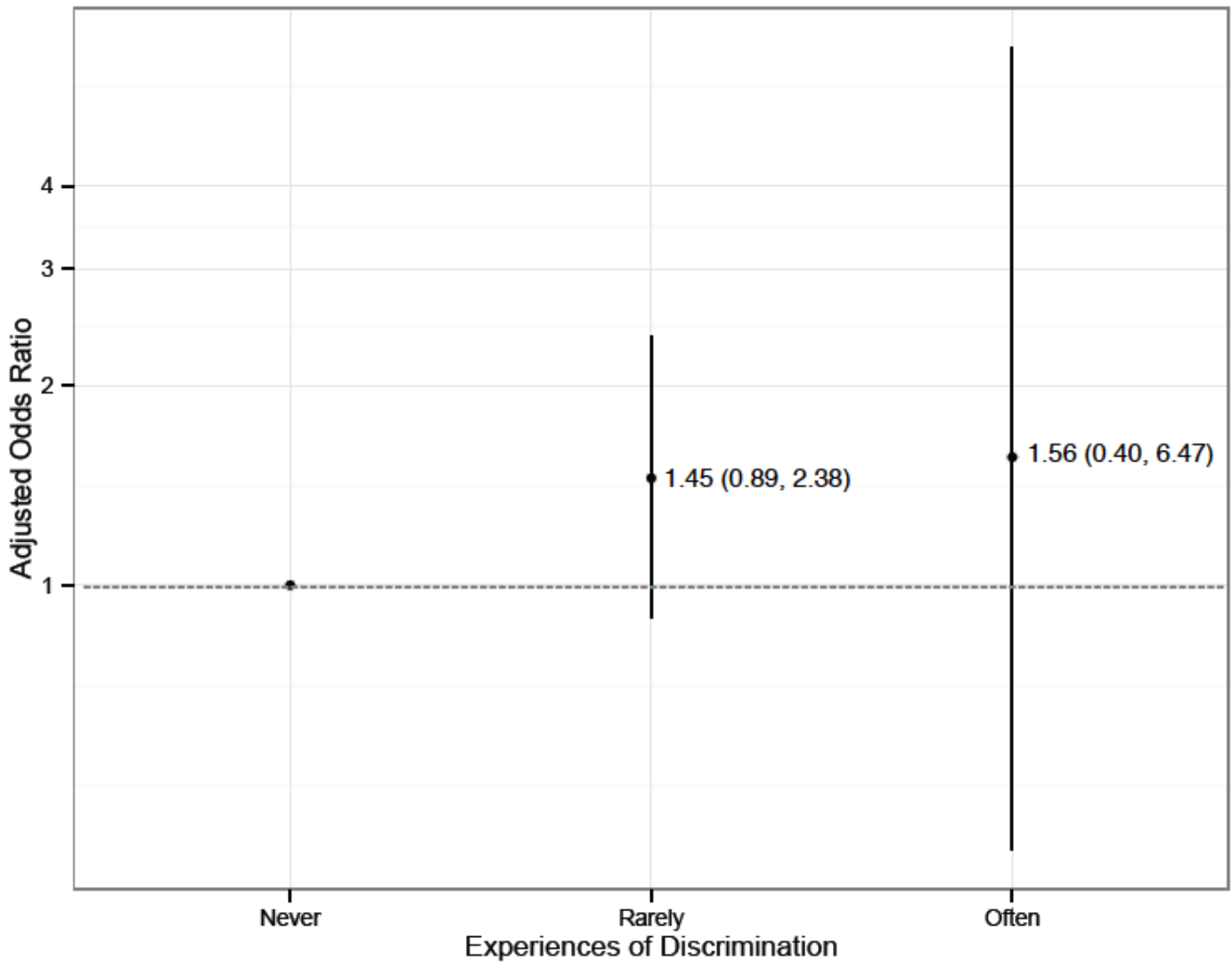
Race/Ethnicity	Low African Ancestry	High African Ancestry	<i>p-value for interaction</i>
African American	1.74 (1.03, 2.98)	2.08 (1.35, 3.20)	0.85
Mexican American	1.98 (1.08, 3.67)	1.09 (0.63, 1.88)	0.22
Other Latinos	0.74 (0.25, 2.12)	1.74 (0.84, 3.58)	0.42
Island Puerto Rican	0.81 (0.40, 1.67)	0.97 (0.38, 2.53)	0.84

* Adjusted for age, sex, socioeconomic status, secondhand tobacco, in utero tobacco, study site, use of controller medication, mother's preferred language (Latino models), and child's Latino subgroup (other Latino model)

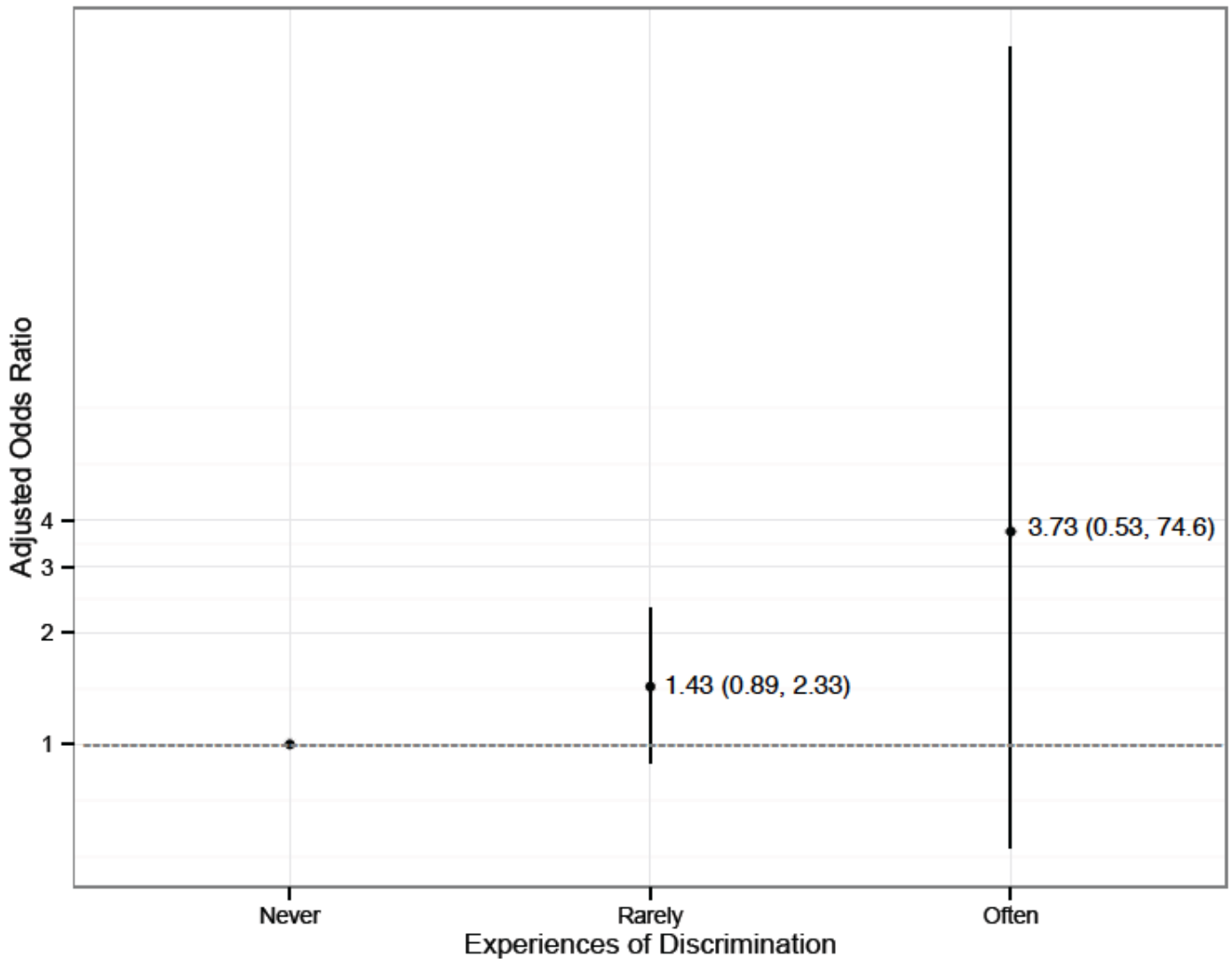
[^] Low/High African ancestry based on mean for each racial/ethnic group



e-Figure 1. Adjusted odds of having asthma by severity of reported perceived discrimination in Mexican American children from GALA II. Results presented are for each category of experiences of discrimination: never (negative answer to all situations), rarely (affirmative to one situation), or often (affirmative to two or more situations). Models adjusted for age, sex, current and *in utero* tobacco exposure, socioeconomic status, mother’s preferred language, and study site. P for trend 0.52.



e-Figure 2. Adjusted odds of having asthma by severity of reported perceived discrimination in Other Latino children from GALA II. Results presented are for each category of experiences of discrimination: never (negative answer to all situations), rarely (affirmative to one situation), or often (affirmative to two or more situations). Models adjusted for age, sex, current and *in utero* tobacco exposure, socioeconomic status, mother’s preferred language, child’s Latino subgroup, and study site. P for trend 0.53.



e-Figure 3. Adjusted odds of having asthma by severity of reported perceived discrimination in islander Puerto Rican children from GALA II. Results presented are for each category of experiences of discrimination: never (negative answer to all situations), rarely (affirmative to one situation), or often (affirmative to two or more situations). Models adjusted for age, sex, current and *in utero* tobacco exposure, socioeconomic status, mother’s preferred language, and study site. P for trend 0.52.