

The Fragile Families and Child Wellbeing Study changed its name to The Future of Families and Child Wellbeing Study (FFCWS). Due to the issue date of this document, FFCWS will be referenced by its former name. Any further reference to FFCWS should kindly observe this name change.

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The Health-Related Consequences to Police Stops as Pathways to Risks in Academic
Performance for Urban Adolescents

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Abstract

Several heuristic models posited that environmental stress disrupt adolescents' engagement and performance in school, but few studies have identified police as a source of such stress. We examined whether police stops, direct and vicarious instances, predicted decrements in adolescents' grades via their psychological (i.e., depressive and anxiety symptoms) and health (i.e., sleep problems and self-rated health statuses) stress responses. We also examined whether the observed correlates varied across ethnic-racial and gender groups. To do so, we used two waves of longitudinal survey data from the Fragile Families and Child Well-Being Study. Children completed surveys when they were, on average, ages 9 and 15. Results illustrated that direct and vicarious police stops at age 15 predicted lower grades contemporaneously, controlling for adolescents' self-rated health, sleep, and performance on the Woodcock-Johnson tests at age 9. Psychological distress, sleep problems, and self-rated health at age 15 partially mediated the relations between police stops and grades. The negative consequences of vicarious police stops were specific to the boys and girls of color; vicarious police contact did not predict adolescents' grades for White boys and White girls. We discussed the implications of our results as they pertain to policing and adolescent development.

Keywords: ethnicity-race, gender, policing, health, academic achievement

Introduction

Police contact, including direct and vicarious stops and arrests, is a pervasive experience in the lives of ethnic-racial minority youth in the United States. In a study of mid-life adults who identified as Puerto Rican, Dominican, African American, and Mexican in Chicago and New York City, 77.2% of parents reported that at least one of their children got in trouble with the police (Hughes & Shweder, 1995). In New York City, of juveniles who experienced pedestrian stops, 92.8% were male and 92.5% were non-White (Office of Civil Rights, 2018). National data suggests that about 30% of Black boys, versus about 22% of White boys, have experienced at least one arrest by age 18 (Brame, Bushway, Paternoster, & Turner, 2014; Brame, Turner, Paternoster, & Bushway, 2012). Additionally, police contact can include vicarious experiences through witnessing family members, sibling, peers, and unfamiliar adults being stopped and harassed by police (Geller, 2017). For example, in a large sample of urban adolescents across 20 urban cities in the United States, 78% of adolescents have either witnessed or known someone who was stopped by police (Geller & Fagan, 2019).

In addition to being highly prevalent, police contact has mixed consequences, possibly a function of the nature of contact. For example, a systematic review of 33 studies found that police legitimacy, or the policing strategy that incorporates procedural just practices and dialogues with community members, was associated with reductions in crime, reoffending, and disorder, including assault, auto theft, burglary, calls for service, crimes against children, drug crime, gang crime, homicide, violent crime, and weapons crime (Higginson & Mazerolle, 2014). A meta-analysis of 30 randomized experimental and quasi-experimental studies found similar reductions in crime when policing was cooperative with community members, but this study found that there was no effect on crime when policing is aggressive, or when officers rely on

arrests and ordinance violation summons to reduce crime (Braga, Welsh, & Schnell, 2015).

Additionally, in their review of the existing literature, the National Academies of Sciences and Medicine (2017) found that this type of aggressive policing has little or no effect on crime.

Because police presence is highly prevalent in adolescents' lives, the present study seeks to build on a small and growing literature examining the consequences of police stops on adolescents' adjustment outcomes. First, most studies examining the consequences of policing focus on adolescents' behavioral problems as an outcome (i.e., delinquent behavior), overlooking other possible consequences of police stops on other domains of adolescents' adjustment. Second, with the exception of a few studies, scholars have begun to examine the consequences of police contact on adolescents' psychological outcomes (Del Toro et al., 2019; Geller, Fagan, Tyler, & Link, 2014; Gottlieb & Wilson, 2019), as well as their performance, attitudes, and attendance in school (Gottlieb & Wilson, 2019; Legewie & Fagan, 2018). However, no study has found whether policing as a form of stress may "get under the skin" to induce physical stress responses among adolescents. Additionally, no study has explored whether such stress responses may serve as possible underlying mechanisms through which policing may undermine adolescents' performance in school. Fourth, very few adolescent studies have observed how rates and correlates of policing vary across ethnic-racial groups, obscuring direct and vicarious police stops as ethnically-racially tinged experiences that may be negatively related to adjustment outcomes for adolescents of color but not for their White peers.

The present study seeks to address these gaps. We used two waves of data from the Fragile Families and Child Wellbeing (FFCW) Study to examine the consequences of police stops on adolescents' psychological and physical health as well as their academic performance, controlling for prior adjustment outcomes. The FFCW study is a longitudinal study of a cohort of

nearly 5,000 children born in 20 large urban U.S. cities between 1998 and 2000, about three-quarters of whom were born to unmarried parents. The principal investigators of the FFCW study refer to unmarried parents and their children as “fragile families” to underscore that they are families at greater risk of breaking up and living in poverty than more traditional families. Adolescents completed self-report surveys at roughly ages 9 and 15. Using this sample, we examined whether police stops, adolescents’ self-reports of being stopped directly and vicariously (i.e., knowing and/or witnessing someone get stopped by police), predicted their self-reports in anxiety, depressive symptoms, sleep problems, health, and grades. Particularly, we explored whether adolescents’ anxiety, depressive symptoms, sleep patterns, and health – at least – partially mediated the relation between adolescents’ who experienced direct or vicarious police stops and their low grades. Furthermore, we tested whether adolescents’ ethnicity-race and gender moderated the observed rates and correlates of police stops.

Police Stops and Adolescents’ Academic Performance

The literature provides two competing hypotheses regarding the possible consequences of policing on adolescents’ academic performance. On one hand, specific deterrence theory posits that police who stop youth engaging in delinquent behavior would deter youth from engaging in similar behaviors in the future (Stafford & Warr, 1993). For this reason, the intended corrective nature of policing may influence youth to engage less in delinquent behavior, possibly resulting in more prosocial activities, including more academic engagement and performance in school. Additionally, general deterrence theory (Stafford & Warr, 1993) posits that increasing police surveillance and public displays of police discipline in high crime neighborhoods would deter the public from engaging in future criminal behaviors, subsequently reducing psychological and physical health related risks to youths’ development. Legewie and Fagan (2018) conceptualized

that policing may lead to reductions in crime and neighborhood disorder, resulting in less hostile and safe environments for youth to focus and engage in school. After comprehensively evaluating the existing empirical literature, a recent National Academy of Sciences concluded that policing reduces crime (National Academies of Sciences & Medicine, 2017). Taking this into account, studies illustrate that exposure to local violent crimes, such as assaults, robberies, criminal sexual assaults, and homicides, are associated with problematic cortisol stress output and sleep patterns (Heissel, Sharkey, Torrats-Espinosa, Grant, & Adam, 2018). Additionally, Sharkey and colleagues' research demonstrated that local violent crimes predicted decrements in children's attention (Sharkey, Tirado-Strayer, Papachristos, & Raver, 2012), impulse control (Sharkey et al., 2012), cognitive performance on the Woodcock Johnson test (Sharkey, 2010), and performance in schools' standardized tests (Sharkey, Schwartz, Ellen, & Laco, 2014). Thus, there is a possibility that direct or vicarious police stops may result in improved academic performance for youth by deterring them from engaging in crime, making their neighborhoods safe, and reducing harmful environmental stressors.

On the other hand, one body of literature identifies policing as an environmental stressor for urban adolescents. Several qualitative studies and ethnographies illustrate that African American and Latino young men and women reported being directly mistreated by the police or knowing someone who experienced such mistreatment (Brunson & Miller, 2006; Rios, Carney, & Kelekay, 2017; Solis, Portillos, & Brunson, 2009; D. Wallace, 2018). Many Black and Latino participants reported that police harassment was routine in their day-to-day lives and that punishment from police was unsolicited as participants were not engaging in any criminal or delinquent behaviors (Jones, 2014; Lerman & Weaver, 2014; Rios, 2014). In a recent study, young men ages 18 to 26 in New York reported experienced an average of three types of

intrusive instances from police in their lifetime, including stops-and-frisks, stops-and-searches, harsh or racially charged language, and threats or use of physical force (Geller et al., 2014).

According to a report by the New York Civil Liberties Union (2019), nearly nine out of 10 stopped-and-frisked New Yorkers have been completely innocent. From 2010 to 2014, citizen-to-police interactions resulted in 450 deaths of unarmed citizens ages 10 and older (Buehler, 2017). In 2017 alone, police killed 1,147 unarmed citizens (Mapping Police Violence, 2017).

A small and emerging body of research illustrates that police contact can have negative consequences to a myriad of students' academic outcomes. For example, two studies with adolescent samples found that who were arrested by police also subsequently dropped out of high school and were less likely to enroll in four-year colleges and universities. Additionally, adolescents who reported being stopped by police also reported lower grades (Gottlieb & Wilson, 2019) and those who lived in neighborhoods that experienced increased police surges – a proxy of vicarious police contact – also demonstrated declines in performance on achievement tests (Legewie & Fagan, 2018). Scholars have found that police stops undermine adolescents' performance in school by eroding adolescents' trust in authorities (e.g., less favorable attitudes toward teachers) and interfering with their school attendance (Legewie & Fagan, 2018), since many adolescents reported police stops are likely to happen they are walking to and from school (Brunson & Miller, 2006; Rios, 2014) Although there is increasing evidence that police stops may undermine adolescents' academic performance, there is little evidence uncovering health as an underlying mechanism for the relationship between police stops and adolescents' grades and, as we will discuss momentarily, how these associations are ethnically-racially tinged.

Adolescents' Health as a Mediator

Indeed several heuristic models posit that environmental stress likely disrupts health patterns, such as greater cortisol stress responses and problematic sleep, which then likely poses a threat to adolescents' performance in school (Garcia Coll et al., 1996; Levy, Heissel, Richeson, & Adam, 2016). Police stops, especially when they are routine, may represent a unique source of environmental stress for urban adolescents. Levy et al. (2016) proposed that the consequences of environmental stress for psychological (depressive symptoms) and biological stress responses (e.g., disrupted sleep hours and quality, cortisol stress output) impair cognitive functioning, academic engagement, and academic achievement. In their integrative model for the study of developmental competencies in minority children, Garcia Coll et al. (1996) posited that ethnic-racial discrimination limits the quantity and quality of resources that would otherwise be focused more productively on other positive developmental domains. Police stops may be unique sources of ethnic-racial discrimination when Black, Latino, and other non-White adolescents are more likely to experience police stops, directly or vicariously, than their White peers.

Indeed, studies illustrate that individuals with police contact also report less favorable psychological outcomes (Del Toro et al., 2019; Gottlieb & Wilson, 2019). Among adult samples, individuals who experienced vicarious police stops in their neighborhoods, such as police surges, also reported greater psychological distress (Sewell, Jefferson, & Lee, 2016) and poorer health, such as high blood pressure, increased risk of diabetes and obesity, and lower self-rated health (Sewell, 2017). In regards to studies with adolescent samples, only two to our knowledge have found that adolescents who are stopped directly also reported less favorably on indices of psychological stress (Del Toro et al., 2019; Gottlieb & Wilson, 2019). However, no study has identified police stops as a source of strain to adolescents' physical health, over and above the effects of police stops on their psychological health.

In addition to the small emerging body of research examining psychological and physical health as outcomes of police stops, few studies have identified them as possible explanatory mediators for the relationship between adolescents' police stops and their academic performance. Although an academic-related outcome was not in their study of Black and Latino boys, Del Toro et al. (2019) found that participants who were stopped by police also reported greater psychological distress six months later, which in turn predicting greater delinquent behavior six months later; neither psychological distress or delinquent behavior predicted subsequent police stops. In a cross-sectional and national study of urban adolescents that did examine an academic outcome, Gottlieb and Wilson (2019) found that police stops predicted lower grades via their depressive and anxiety symptoms. However, while a general exploration of the relationship between police contact and adolescents' grades advances our knowledge of the unintended consequences of police, it is also an oversight to ignore that law enforcement violence is a public health issue that is fundamentally rooted in structural racism (American Public Health Association, 2018) and overlook the specific impact of police stops for adolescents of color, and possible intersectional variations by gender.

Ethnic-Racial and Gender Group Differences

Consistent with prior research, we expected that rates of police stops and their observed effects would vary at the intersection of adolescents' ethnicity-race and gender (Berkel et al., 2009). In a report, New York Civil Liberties Union (2019) reported that more than 90% of people subjected to police stops were male and 47% juveniles and young adults ages 14 to 24 years old. Additionally, of juveniles who experienced police encounters, only 7.2% were female and 7.5% were White. Using survey data from a national sample of urban adolescents who were on average age 15, Geller (2017) found that 45% of Black boys report having been stopped

compared to 26% of White boys, 18% of Black girls, and eight percent of White girls. Across these studies, boys appear to be more susceptible to direct police contact across ethnic-racial groups, but the rates are more alarming for Black boys than White boys.

In addition to the rates of police contact varying among groups, the correlates between police contact and youths' adjustment may also vary by adolescents' ethnicity-race and gender (Bor, Venkataramani, Williams, & Tsai, 2018; Legewie & Fagan, 2018). Regarding direct police stops, studies show police stops consistently predict unfavorable outcomes for individuals across different ethnic-racial groups (Del Toro et al., 2019; Slocum & Wiley, 2018), but the role of gender and how it interacts with adolescents' ethnicity-race to moderate these observed correlates have yet to be tested. Regarding vicarious police stops, studies show possible ethnic-racial and gender group differences with Black boys consistently showing the least favorable adjustment, with Black girls and adolescents of color showing mixed results, and with White boys and White girls showing no effect following police-related instances. For example, Bor et al. (2018) found that exposure to police killings of unarmed African Americans in the United States resulted in decrements in mental health one-to-two months following exposure for a nationally representative sample of African Americans ages 18 and up, an effect that did not differ by gender. No significant effect emerged for White Americans following exposure to unarmed African Americans and White Americans (Bor et al., 2018). Additionally, Legewie and Fagan (2018) found that police surges effected Black boys' performance on achievement tests but no discernible effect emerged for African American girls and Latino youths.

The Present Study

The present study draws on a large national sample of adolescents from the FFCW study. In these longitudinal data, the principal investigators followed a cohort of nearly 5,000 children

born in 20 large U.S. cities between 1998 and 2000. The principal investigators referred to unmarried parents and their children as “fragile families” to underscore that they are families and that they are at greater risk of breaking up and living in poverty than more traditional families.

The study includes interviews with both primary caregivers and their children ages 1, 3, 5, 9, and 15. The primary data used in the present study will rely on data from years 9 and 15. Using these two waves of data, we sought to answer the following research questions:

1. Do direct and vicarious police stops predict lower grades among urban adolescents?
2. Do the psychological and health-related consequences of direct and vicarious police stops mediate the relation between stops and adolescents’ grades?
3. Do these relations vary at the intersection of adolescents’ ethnicity-race and gender?

We hypothesize that we suspect police contact would predict lower grades among urban youth. However, it is also likely that policing may be associated with increased performance because the goal of policing is to deter youth from crime, build safe communities, reduce crime, and public exposure to violence. Because past research has found policing in urban neighborhoods as negative, invasive, and abusive experiences, then such contact may be a source of psychological and physical stress for urban adolescents.

In line with several heuristic models (Garcia Coll et al., 1996; Levy et al., 2016), the psychological and physiological consequences of police contact may – at least – partially explain the relation between police contact and adolescents’ academic performance. In other words, we predicted that direct and vicarious police stops will predict more problematic sleep, greater psychological distress, and lower self-rated health, which then likely undermine students’ academic performance.

We also predicted that adolescents' ethnicity-race and gender will moderate the observed correlates. Our hypotheses are based on a small body of research, two studies that examined ethnic-racial group differences in the consequences of direct police stops (Del Toro et al., 2019; Slocum & Wiley, 2018) and two others that did so for vicarious police contact (Bor et al., 2018; Legewie & Fagan, 2018). Based on these studies, we hypothesized that all ethnic-racial and gender groups would show equally unfavorable associations between getting stopped by police directly and their adjustment outcomes. In the case for vicarious police stops, however, we hypothesized that Black boys, Latino boys, and Other non-White boys would exhibit more unfavorable consequences associated with vicarious police stops relative to their female peers. Additionally, we predicted that vicarious police stops would have no association with adjustment outcomes for White boys and White girls.

Methods

Data in the present study come from the FFCW study. Of the initial 4898 who ever participated in the Fragile Families dataset, 3444 (70.3%) participated in the study in Wave 6. Of the 3444, 39 adolescents had missing data on important demographic information, including age ($n = 2$), primary caregivers' highest level of education attainment ($n = 37$), percent of census tract that is different ethnic-racial groups, and percent of adult population (age 25 and above) in census tract with high school or some higher education and bachelor's degree or high according to the American Community Survey ($n = 34$). An additional 18 adolescents were omitted because they were either not attending school ($n = 15$), were homeschooled ($n = 69$), or had missing data on their school-related variables ($n = 3$), which were primary outcomes of interest. Thus, the analytic sample remained large ($n = 3284$). Within the analytic sample, adolescents were ethnically/racially diverse as many identified as White (16.7%), Black or African American

(46.8%), Latino (23.9%), and “Other” (12.6%). In the “Other” category, 2.5% identified as Other, 5.0% as multi-racial, and 5.1% were either missing on ethnic-racial identification, did not know how to identify, or refused to answer the question. Youth who were “other,” included youth who identified as Native American, Asian or Asian Pacific Islander, European, Central American or Caribbean, or identified as American only. Youth who were multi-racial were fairly diverse, but most of them identified a combination of White and Black. We merged these youth in these latter categories as “Other” in order to formulate a group that is comparable in size as the White, Black, and Latino groups and to have adequate statistical power to examine the intersection of ethnicity-race and gender.

Procedure

The data come from the Fragile Families and Child Well-being Study, a longitudinal birth cohort study of largely low-income families. Approximately 5,000 births were randomly sampled from 75 hospitals in 20 large (populations over 200,000) U.S. cities between 1998 and 2000 with an oversample of nonmarital births (at a ratio of 3 to 1). Mothers and fathers were interviewed soon after the birth of the focal child and follow-up interviews were conducted when the child was approximately 1 (1999–2001), 3 (2001–2003), 5 (2003–2006), 9 (2007–2010), and 15 years old (2014–2017). The focal child completed self-report surveys at ages 9 and 15. The Fragile Families and Child Well-being Study is a de-identified, publicly available dataset. No ethics approval was sought because the Institutional Review Board (IRB) does not require IRB review for the analysis of de-identified, publicly available data.

Measures

Police stops. We measured adolescents’ experiences with the police through adolescents’ self-reports of their personal and vicarious stops by police (Geller & Fagan, 2019; Gottlieb &

Wilson, 2019). We measured adolescents' personal or direct stops by police using their response to a single question, "Have you ever been stopped by the police while on the street, at school, in a car, or some other place?" . Adolescents who were never stopped by the police were coded as "0" versus adolescents who have been stopped by the police were coded as "1". Following prior research (Geller & Fagan, 2019; Gottlieb & Wilson, 2019), we used information from the following three questions to create measures that reflected adolescents' vicarious police stops: (1) "Have you ever seen someone stopped by the police in your neighborhood," (2) have you ever seen someone stopped by the police in your school," and (3) "do you know anyone who has been stopped by the police?" Adolescents who answered "yes" to any of these three questions were coded as having experienced vicarious police stops and individuals who answered "no" to all three questions were coded as not having experienced vicarious contact.

Sleep problems. We measured adolescents' sleep problems as a latent variable using four indices of adolescents' sleep patterns. The first two indices were the following two questions: (1) "How many nights out of seven in a typical week do you have problems falling asleep," and "how many nights out of seven in a typical week do you have problems staying asleep throughout the night" (each question's response range: 0 – 7). The third index was adolescents' self-reported duration of sleep during the week (Mathew, Li, Hale, & Chang, 2019), which was recoded on a three-point scale, with higher scores indicating more duration problems (1 = *recommended eight to 10 hours*, 2 = *may be appropriate seven to 11 hours*, 3 = *not recommended less than seven or more than 11 hours*). This method for coding sleep duration is based on the National Sleep Foundation's current recommendation of eight to 10 hours for teenagers (Hirshkowitz et al., 2015). Additionally, one study that compared self-reported sleep with wrist actigraphy (i.e., the gold standard for objective measurement of sleep duration) found

a significant and moderate relation between the two measures ($r = .45$) (Lauderdale, Knutson, Yan, Liu, & Rathouz, 2008). The fourth index of adolescents' problematic sleep patterns was their primary caregiver's response to a question, "youth has trouble sleeping" (1 = *not true*, 3 = *often true*). A confirmatory factor analysis (CFA) indicated the one factor structure with the four indicators fit the data well, $\chi^2(2) = 2.33, p = ns$, RMSEA .01 90% CI [.00, .04] CFI 1.00 TLI .99 SRMR .01. The factor loadings for each indicator were all significant: problems falling asleep ($\beta = .88, SE = .03, p < .001$), problems staying asleep ($\beta = .58, SE = .02, p < .001$), problematic sleep duration ($\beta = .16, SE = .02, p < .001$), and primary caregivers' self-report of focal child's trouble sleeping ($\beta = .33, SE = .02, p < .001$). Fit indices – from a CFA with factor loadings and intercepts constrained to equality across ethnic-racial and gender groups – indicated that we met criteria for metric invariance, $\chi^2(26) = 82.63, p < .001$, RMSEA .05 90% CI [.04, .06] CFI .96 TLI .96 SRMR .04. High scores on the latent variable's sleep problems reflected that adolescents have more problematic sleep patterns.

Psychological distress. We measured psychological distress as a latent variable using adolescents' self-reported depression and anxiety as its indicators. To assess adolescents' depressive symptoms, the principal investigators of the FFCW drew five items from the Center for Epidemiological Studies Depression-Scale (CES-D) (Radloff, 1977), as used in the National Longitudinal Study of Adolescent Health. Perreira, Deeb-Sossa, Harris, and Bollen (2005) found that these five items to be an improvement over the full 20-item CES-D, because the five items were validated and applicable to adolescents of different ethnic-racial and immigrant-generation backgrounds. All five items (e.g., "I feel I cannot shake off the blues, even with help") used a four-point Likert scale (1 = *strongly disagree*, 4 = *strongly agree*). This measure demonstrated acceptable internal consistency, $\alpha = .76$. As for adolescents' anxiety, the principal investigators

drew six items from the Brief Symptom Inventory 18 (BSI 18), an assessment designated to measure psychological distress and psychiatric disorders in medical and community populations (Derogatis & Savitz, 2000). All six items (e.g., “I feel so restless I can’t sit still”) used a four-point Likert scale (1 = *strongly disagree*, 4 = *strongly agree*). This measure demonstrated acceptable internal consistency, $\alpha = .75$. The factor loadings for each indicator of psychological distress were all significant: depressive symptoms ($\beta = .80$, $SE = .02$, $p < .001$) and anxiety ($\beta = .81$, $SE = .02$, $p < .001$). Fit indices – from a CFA with factor loadings and intercepts constrained to equality across ethnic-racial and gender groups – indicated that we met criteria for scalar invariance, $\chi^2(6) = 10.62$, $p = ns$, RMSEA .04 90% CI [.00, .08] CFI .99 TLI .99 SRMR .02. High score on psychological distress indicated adolescents reported more problematic distress.

Self-rated health. Self-rated health status was assessed using one item (“In general, how is your health?”; 1 = *excellent*, 5 = *poor*). Self-rated health has previously been used in a number large-scale surveys including the National Longitudinal Survey of Youth (United States Department of Labor, 1997) and has been found to be highly correlated with objective indicators of health status, such as mortality rate (Idler & Benyamini, 1997). High scores on adolescents’ self-rated health indicated more favorable perceived health status.

Academic performance. We assessed academic performance using adolescents’ self-reported grades across multiple subjects, including English or language arts, math, history or social studies, and science (1 = *D or lower*, 4 = *A*). The data did not allow the authors to differentiate between a D and an F (Gottlieb & Wilson, 2019). These items provided adequate internal consistency ($\alpha = .69$) for this measure of adolescents’ academic performance. One meta-analysis encompassing 60,926 individuals found that the average correlation between self-reported and actual grades was .84 (Kuncel, Credé, & Thomas, 2005), indicating individuals’

self-reported grades are strongly accurate. High scores adolescents' grades indicated positive academic performance.

Covariates. Covariates were added in the model to account for relevant demographic information and prior adolescents' reports pertaining to the key study variables. Demographic variables included highest education degree attained by primary caregiver (1 = *less than high school*, 4 = *bachelor's degree or more advanced*), and adolescents' current school enrollment type. School type was represented as two binary variables: one variable for adolescents who attended private schools and another variable for students who attended a parochial/religious schools (with students in public high schools as the reference group). In order to account for the likelihood that pre-existing conditions may have accounted for possible disparities between adolescents who were ever (directly or vicariously) stopped by police, I adjusted for adolescents' performance in the Woodcock-Johnson achievement test, their self-reported health status, and their problematic sleep duration at Wave 5 (M -age = 9). At Wave 5, participants completed the Woodcock-Johnson's Tests 9 and 10. Test 9 assessed youths' symbolic learning whereas Test 10 measured youths' ability to solve math problems. Using adolescents' results on these two tests, we standardized them and then took the average of the two scores, since they were strongly correlated ($r = .66, p < .001$), as a proxy for Wave 5 academic achievement. Additionally, primary caregivers reported on the number of hours their focal children usually get during the week. We then recoded their responses to a three-point scale, with higher scores indicating more duration problems (1 = *recommended nine to 11 hours*, 2 = *may be appropriate seven/eight or 11/12 hours*, 3 = *not recommended less than 7 or more than 12 hours*) following the National Sleep Foundation's recommendations for school aged children (Hirshkowitz et al., 2015). Lastly, youth also completed a self-rated assessment of their own health (one item). Unfortunately,

youth did not complete self-reports of depression and anxiety at Wave 5, so we could not account for pre-existing depression and anxiety prior to Wave 6.

Setting-level covariates. Unfortunately, neither adolescents' city of residence nor school enrollment were publicly available to account for the possible nested nature of the data. Nonetheless, setting-level factors, including the ethnic-racial and socioeconomic composition of adolescents' neighborhoods may contribute to disparities in police surveillance and in quality of public schools among adolescents in the present study that ultimately may influence their performance in school. Additionally, we drew from the American Community Survey to include percent of census tract that is Latino, Black, Asian, and White. Additionally, as a proxy of the socioeconomic affluence of adolescents' neighborhoods, we use the American Community Survey to include percent of adults ages 25 or older who have a high school degree or some higher education and those with a bachelor's degree or higher in adolescents' census tracts.

Analytic Plan

All analyses were conducted in Mplus Version 8.3 (Muthén & Muthén, 1998-2019). We first explored possible ethnic-racial and gender group differences in key study variables. We estimated two-way analyses of variances (ANOVAs) with each key study variable as the dependent variable and adolescents' ethnicity-race and gender as two fixed independent variables. Additionally, we estimated zero-order bivariate relations among the key study variables. We used results from these descriptive analyses to inform the advanced inferential statistics.

To answer our first two research questions, we first estimated a baseline structural equation model for the full sample. Figure 1 depicts our baseline model, in which we regressed grades, sleep problems, psychological distress, and health status onto direct and vicarious police

stops, controlling for our covariates. Next, we sought to determine whether psychological distress, sleep, and health status mediated the relation between direct and vicarious police stops, separately, and adolescents' grades. To accomplish this, we tested indirect paths between direct and vicarious police stops and grades by way of sleep problems, psychological distress, and health status using the MODEL=INDIRECT in Mplus.

To answer our third research question, we tested whether the observed correlates varied at the intersection of adolescents' ethnicity-race and gender. To do so, we tested whether adolescents' ethnic-race and gender moderated the pathways in Figure 1 by using multi-group comparisons, with adolescents' ethnicity-race-gender as the grouping variable. In other words, we compared the observed pathways across eight groups: White boys, White girls, Black boys, Black girls, Latino boys, Latino girls, Other boys, and Other girls. First, we determined whether the model in which all pathways constrained to be equal across all eight groups resulted in a significant decrement to model fit in comparison to a baseline model with freely estimated pathways across groups. If the former model resulted in worse fit indices, we then sought to investigate which specific parameter estimates caused significant decrements in model fit. To do this, we assessed whether constraining parameters that were the most similar to one another to be equal across groups resulted in decrements in model fit and subsequently tested whether parameters that were the least similar across groups can be constrained to be equal to one another without resulting significant decrement in model fit. We performed this latter step in a sequential fashion beginning pathways between (1) direct police stops and sleep problems, (2) vicarious police stops and sleep problems, (3) direct police stops and psychological distress, (4) vicarious police stops and psychological distress, (5) direct police stops and health status, (6) vicarious police stops and health status, (7) psychological distress and grades, (8) health status and grades,

(9) direct police stops and grades, and (10) vicarious police stops and grades. We reported results from each chi-square test that led to a significant decrement in model fit.

We took several approaches to evaluate model fit indices. During multi-group comparisons, we performed Satorra-Bentler chi-square tests to compare nested models. When doing so, our results utilized maximum likelihood with robust standard errors as the estimator (ESTIMATOR=MLR). This estimator provides robust standard errors in the context of non-normally distributed data, which is the case for adolescents' self-reported police stops (as a dichotomous variable), their sleep problems, and psychological distress indicators. After these chi-square tests, we reported fit indices for both models and evaluate these models using conventional criteria. We used Hu and Bentler (1999) standard criteria to evaluate model fit to the data, including a root mean square error of approximation (RMSEA) value of less than .08, a comparative fit index (CFI) value of greater than .95, a Tucker Lewis index (TLI) value of greater than .95, and a standardized root mean square residual (SRMR) value of less than .08.

Results

Descriptive Statistics

Table 2 shows percentage rate and means (standard deviations) for the study variables for each ethnic-racial and gender group. Across ethnic-racial groups, approximately 30% of boys were directly stopped by police whereas this was the case for 10 to 20% of girls. Relative to direct police stops, vicarious police stops were more prevalent. More than 70% of adolescents, across ethnic-racial groups, either witnessed or knew someone was stopped by police. Table 2 provides the prevalence rates for these instances of police intrusion by ethnic-racial and gender groups, which have been described elsewhere (Geller, 2017; Geller & Fagan, 2019).

Additionally, although these instances were described elsewhere (Geller, 2017; Geller & Fagan, 2019), we re-describe them briefly in the present study to understand why they may predict unfavorable adolescent adjustment outcomes. Adolescents who were directly stopped by police reported that most of these stops occurred on the street, in relation to stops that occurred when adolescents were in a car, on a bicycle, at school, or another place. Moreover, approximately half of adolescents who vicariously experienced police stops have either witnessed police stops in their neighborhoods or schools. Adolescents who knew someone else who was stopped by police were more likely to report that it was a friend, followed by an unidentified person, parent, neighbor, and/or sibling. Importantly, the nature of direct and/or vicarious contacts was primarily comprised of stops-and-frisks and stops-and-searches. Yet, other instances of an officer using harsh language, saying racial slurs, threatening physical force, and using physical force still occurred.

Table 2 shows means and standard deviations by ethnic-racial and gender for the adjustment outcomes. For adolescents' self-reported problems falling asleep, there was a significant main effect of ethnicity-race [$F(3, 3256) = 3.19, p < .05$], a main effect of gender [$F(1, 3256) = 41.56, p < .001$], but no significant interaction [$F(3, 3256) = 1.05, p = ns$]. The main effect of ethnicity-race indicated that White adolescents reported more problems falling asleep than their Black peers; there were no other reliable ethnic-racial group differences. The main effect of gender illustrated that girls reported more problems falling asleep than boys. For adolescents' self-reported problems staying asleep, there was a non-significant main effect of ethnicity-race [$F(3, 3256) = 1.28, p = ns$], a significant main effect of gender [$F(1, 3256) = 30.79, p < .001$], and a non-significant interaction [$F(3, 3256) = .95, p = ns$]. The main effect of gender implied that girls reported more problems staying asleep than boys. For adolescents'

problematic sleep duration, there was a significant main effect of ethnicity-race [$F(3, 3241) = 7.54, p < .001$], a non-significant main effect of gender [$F(1, 3241) = 2.67, p = ns$], and no significant interaction [$F(3, 3241) = .88, p = ns$]. The main effect of ethnicity-race indicated that Black youth reported more problematic sleep duration than their White and Latino peers, whom did not differ between each other; Other youth did not reliably differ from anyone. For caregivers' self-reports of their focal child's trouble sleeping, there was a main effect of ethnicity-race [$F(3, 3271) = 8.46, p < .001$], a non-significant main effect of gender [$F(1, 3271) = .01, p = ns$], and a non-significant interaction [$F(3, 3271) = 1.64, p = ns$]. The main effect of ethnicity-race indicated that Black youths' caregivers reported that they had less trouble sleeping than their White and Latino peers, whom did not differ between each other; Other youth did not differ from anyone. For depressive symptoms, there was no main effect of ethnicity-race [$F(3, 3270) = 1.91, p = ns$], there was a significant main effect of gender [$F(1, 3270) = 34.99, p < .001$], and no significant interaction emerged [$F(3, 3270) = 1.83, p = ns$]. The main effect of gender on depressive symptoms indicated that girls reported significantly more depressive symptoms than boys. Turning to anxiety, there was no main effect of ethnicity-race, [$F(3, 3270) = 2.53, p = ns$], a significant main effect of gender [$F(1, 3270) = 13.57, p < .001$], and no significant interaction emerged [$F(3, 3270) = 1.21, p = ns$]. The ANOVA results for anxiety indicated that girls reported significantly more anxiety than boys. With regard to self-rated health, there was no main effect of ethnicity-race [$F(3, 3270) = .49, p = ns$], a significant main effect of gender: $F(1, 3270) = 38.16, p < .001$, and no significant interaction [$F(3, 3270) = 1.12, p = ns$]. Girls self-rated their health lower than did boys. Lastly, for grades there was a main effect of ethnicity-race [$F(3, 3270) = 36.40, p < .001$], a main effect of gender [$F(1, 3270) = 26.08, p < .001$], but no significant interaction emerged [$F(3, 3270) = .52, p = ns$]. This last

ANOVA indicated that girls reported better grades than boys, White youth reported better grades than Latino, Other, and Black youth. Latinos and Others did not reliably differ between each other on grades, and both Latino and Other youths reported better grades than their Black peers.

Table 3 shows zero-order bivariate correlations among the key constructs. Both direct and vicarious police stops were associated with more problems falling/staying asleep, more unfavorable sleep duration, more trouble sleeping, greater depressive symptoms, greater anxiety, more negative self-rated health, and lower grades. Problems falling/staying asleep, trouble sleeping, as well as greater depressive and anxiety symptoms were associated with lower grades. Positive self-rated health was associated with better grades.

Tests of Primary Hypotheses

The baseline model, shown in Figure 1, with parameters freely estimated across ethnic-racial and gender groups, fit the data well, $\chi^2(736) = 1028.36, p < .001$, RMSEA .03 90% CI [.02, .04] CFI .95 TLI .89 SRMR .04. Constraining parameter estimates to be equivalent across ethnic-racial and gender groups resulted in a significant decrement in model fit compared to the baseline model in which these parameters were freely estimated, $\Delta\chi^2(77) = 141.43, p < .001$. In our Appendix, we present freely estimated parameter estimates across ethnic-racial and gender groups in Tables SI1 and SI2. In Tables 4 and 5, we present results of the final structural equation models for the eight ethnic-racial and gender groups of adolescents, following constraining paths to be equal across groups without causing significant decrement in model fit. Both Tables 4 and 5 are estimated in a single model, as depicted in Figure 1, but convey distinct information. Table 4 presents results when a direct police stop is the predictor whereas Table 5 presents results when a vicarious police stop is the predictor for adolescents' health and academic outcomes.

Police Stops and Grades

Table 4 presents regression estimates for the relation between direct police stops and adolescents' grades whereas Table 5 presents them for the relation between vicarious police stops and adolescents' grades. According to Table 4, adolescents who reported at least one direct police stop also reported lower grades; this association was equivalent across groups, $\Delta\chi^2(7) = 5.74, p = ns$. For Black boys, Latinos (boys and girls), and Others (boys and girls), adolescents who reported at least one vicarious police stop also reported lower grades, yet this association was non-significant for their White peers (boys and girls) and for Black girls, $\Delta\chi^2(1) = 11.30, p < .001$. This non-significant association was equivalent between the White adolescents and Black girls, $\Delta\chi^2(1) = .29, p = ns$.

Sleep, Distress, and Health as Possible Underlying Mechanisms

The top panel of Table 4 presents results when examining sleep problems as a possible mediator for the relation between direct police stops and grades. Across all groups, adolescents who were stopped directly at least once also reported greater sleep problems. This association was stronger for Latino girls than for everyone else, $\Delta\chi^2(1) = 4.63, p < .05$. For White (boys and girls) and Other (boys and girls) adolescents, sleep problems predicted lower grades; for Black (boys and girls) and Latino (boys and girls), sleep problems did not predict grades, $\Delta\chi^2(1) = 12.25, p < .01$. For White and Other adolescents, regardless of their gender, a direct police stop had a significant and negative indirect effect on adolescents' grades through sleep problems; no significant indirect effect emerged for Black and Latino adolescents, regardless of gender.

The mid- panel of Table 4 presents results when examining psychological distress as a possible mediator for the relation between direct police stops and grades. According to Table 4, across all groups, adolescents who reported at least one direct police stop also reported greater

psychological distress. This association was weaker for the boys of color (Black boys, Latino boys, and Other boys) than for the girls of color (Black girls, Latina girls, and Other girls) and White adolescents (White boys and White girls), $\Delta\chi^2(1) = 10.36, p < .01$. This association for the girls of color did not reliably differ from that for the White adolescents, $\Delta\chi^2(1) = .34, p = ns$. Psychological distress predicted lower grades, and the strength of this association did not vary across groups, $\Delta\chi^2(7) = 12.16, p = ns$. Across groups, direct police stop had a significant and negative indirect effect on grades through psychological distress. This effect was weaker for boys of color than for girls of color and White adolescents, who did not differ from each other.

The bottom panel of Table 4 presents results when examining self-rated health status as a possible mediator for the relation between direct police stops and grades. According to Table 4, adolescents who reported at least one direct police stop also reported less favorable health statuses, an association that was equivalent across groups, $\Delta\chi^2(7) = 9.59, p = ns$. Adolescents who self-rated their health more positively also reported better grades, which was also equivalent across groups, $\Delta\chi^2(7) = 11.58, p = ns$. A direct police stop had a significant and negative indirect effect on grades via self-rated health, which was equivalent across groups.

The top panel of Table 5 presents results when examining sleep problems as a possible mediator for the relation between vicarious police stops and grades. Adolescents who reported at least one vicarious police stop reported greater sleep problems for all groups, except for White girls, $\Delta\chi^2(1) = 4.80, p < .05$. A vicarious police stop had a significant and negative effect on grades through sleep problems for White boys, Other boys, and Other girls, but this indirect effect was non-significant for the other groups.

The mid- panel of Table 5 presents results when examining psychological distress as a possible mediator for the relation between vicarious police stops and grades. For Blacks (girls

and boys) and Others (girls and boys), adolescents who experienced a vicarious police stop also reported greater psychological distress, but this association was non-significant for both their White and Latino peers (girls and boys), $\Delta\chi^2(1) = 27.11, p < .001$. A vicarious police stop had a significant and negative indirect effect on grades through psychological distress only for Black girls, Black boys, Other girls, and Other boys, but this effect was non-significant for White girls, White boys, Latino boys, and Latino girls.

The bottom panel of Table 5 presents results when examining self-rated health as a possible mediator for the relation between vicarious police stops and grades. For Black boys, Black girls, Latino boys, Latino girls, and Other girls, adolescents who reported a vicarious police stop also reported lower grades, but this relation was non-significant for White boys, White girls, and Other boys, $\Delta\chi^2(7) = 21.05, p < .01$. This association between a vicarious police stop and grades was more negative for Other girls relative to their peers, $\Delta\chi^2(1) = 4.62, p < .05$. Vicarious police stops had a significant and negative indirect effect on grades through self-rated health only for Black boys, Black girls, Latino boys, Latino girls, and Other girls, but this effect was non-significant for White girls, White boys, and Other boys.

Sensitivity Analyses

Using the two waves of data, we investigated whether students who reported being stopped by police were already poorly adjusted or underperforming academically prior to being stopped by police. To do so, we examined whether adolescents' sleep duration, self-rated health, and performance on the Woodcock Johnson achievement tests (a proxy for academic performance) at age 9 predicted their self-reported police stops at age 15. These outcome measures at age 9 were the only adjustment outcomes – related to the present study – that were available; adolescents did not complete survey measures of depression and anxiety at age 9.

Neither self-rated health or sleep duration predicted adolescents' likelihood of getting stopped directly or vicariously by police. Adolescents who scored higher on the Woodcock Johnson tests at age 9 were more likely to experience a direct and vicarious police stop at age 15.

To further understand the negative consequences of direct and vicarious police stops, we investigated adolescents' rating of their stops by police. Adolescents self-reported whether they felt satisfied, safe, scared, and angry at the time of incident with police. Approximately 2,200 adolescents provided ratings (range- $n = 2188 - 2257$). From these 2,200 adolescents, we found that 63.4% of them felt unsatisfied, 26.9% felt unsafe, 32.2% felt scared, and 29.3% felt angry at the time of incident with police. If we transformed the data to communicate the percent of adolescents who felt at least one of these negative emotions following a police incident, we found that 76.7% report a negative emotion following a police stop.

Discussion

In line with a recent call for changes in public and policing policies, the present study explored whether adolescents' ethnicity-race and gender shaped the health and academic consequences of their self-reported stops by police. The American Public Health Association (2018) released a statement that named police interaction with communities of color a public health concern, labelling it as "physical and psychological violence that is structurally mediated by the system of law enforcement results in deaths, injuries, trauma, and stress that disproportionately affect marginalized populations . . ." (American Public Health Association, 2018). Although the literature has begun to examine the negative consequences of policing on adolescent development, the present study sought to understand the health-related pathways through which police stops work to undermine a key task of adolescent development, in this case academic performance. We used data from the FFCW study to examine adolescents' possible

health-related consequences associated with direct and vicarious police stops and how these health-related factors mediated the relation between police stops and adolescents' academic performance. Given the specific national concern about police contact with communities of color and the missive from the American Public Health Association, we also examined whether the observed patterns varied across adolescents' ethnicity-race and gender.

Although ethnic-racial and gender differences in the prevalence of direct and vicarious police stops were described elsewhere (Geller, 2017; Geller & Fagan, 2019), we re-describe them briefly. Overall, across ethnic-racial groups, more boys experienced at least one police stop directly than girls. Among the boys, approximately 40% of Black boys were stopped by police at least once whereas approximately one-third of White, Latino, and Other boys were stopped by police. Among the girls, approximately 20% of Black and Other girls were stopped by police whereas the rates for White and Latina girls were 15% and 10%, respectively. Across groups, the majority of these stops occurred while youth were walking on the street. Across ethnic-racial and gender groups, there were little ethnic-racial and gender disparities as over 70% across groups have perceived someone they knew or witnessed a police stop in their neighborhood or school.

Consistent with (Geller, 2017; Geller & Fagan, 2019), the nature of adolescents' most memorable direct or vicarious police stop varied across ethnic-racial and gender groups. Across groups, the most common shared experiences were frisks and searches with observed rates that were higher for Black, Latino, and Other adolescents than their White peers, regardless of gender. Black, Latino, and Other adolescents were more likely to be subjected to much harsher police treatment including harsh language, threats of force, and use of force than their White peers. The observed rates for harsh language, threats of force, and use of force at the hand of the police were noticeably higher for Black adolescents, especially Black boys.

Consistent with our hypotheses, direct police stops predicted all adjustment outcomes in the present study more frequently than did vicarious police stops across all ethnic-racial and gender groups. Specifically, adolescents who reported at least one direct police stops also reported unfavorable sleep problems, psychological distress, health, and grades. These correlates were observed after we adjusted for adolescents' sleep problems, self-rated health, and cognitive performance one wave prior, ruling out the possibility that youth who were previously maladjusted were biasing the observed associations. Furthermore, with cognitive performance as the exception, neither of the adjustment outcomes in one wave prior predicted adolescents' likelihood of getting stopped by police, directly or vicariously, which partially supported the ordering of our hypotheses that policing predicted lower adjustment outcomes and not the reverse. To our surprise, adolescents who scored higher on the Woodcock Johnson tests at age 9 were more likely report both a direct and a vicarious police stop at age 15. These results likely represent findings in prior qualitative work that found urban youth who are more engaged and less truant in school are also youth who experience pedestrian stops on their way to and from school (Vera Sanchez & Adams, 2011; D. Wallace, 2018). However, because of the self-reported nature of the study, it is also likely that youth who scored higher on the Woodcock Johnson test at age 9 are also better able to recall a police incident that occurred between ages 9 and 15.

Not all of our proposed health related consequences were significant pathways through which direct instances of policing undermined adolescents' academic performance. Specifically, partially in line with our hypotheses, adolescents' psychological distress and self-rated health partially mediated the relation between a direct police stops and adolescents' grades, but adolescents' sleep problems did not. Specifically, adolescents who were stopped by police at least once also reported greater psychological distress and lower self-rated health, which in turn

predicted lower and better grades, respectively. Although sleep problems did not partially mediate the relation between direct police stops and grades for all groups (with White and Other adolescents as the exception), all adolescents who reported a direct police stop also exhibited greater sleep problems. Sleep problems, as indexed by sleep duration and quality of sleep, is associated with negative outcomes in mood, executive function, memory, suicide, diabetes, and obesity (to name a few) (Hirshkowitz et al., 2015). Because sleep problems is a risk to health (diabetes, obesity, and mortality) and academic functioning (performance, executive function, cognition, memory, attention, and learning) alike, then our finding that sleep problems did not serve as a significant mediator for all groups may be attributed to the possibility that sleep is a sub-dimension of academic functioning for some groups. Furthermore, in the case for sleep problems, we partially accounted for possible self-reporter bias as we utilized an index from the National Sleep Foundation and caregivers' reports of their children's sleep quality. However, future research can build on the present study through objective measures of health, such as cortisol stress reactivity and digital sleep trackers.

Inconsistent with our hypotheses, some of the observed consequences of direct police stops varied according to adolescents' ethnicity-race and gender. First, the association between direct police stops and psychological distress was weaker – yet still significant – for Black boys, Latino boys, and Other boys than for their female peers and White counterparts. Additionally, the association between direct police stops and sleep problems was stronger for Latina girls than that of their peers. These associations may be regression artifacts, because there was a higher mean and variation around the mean in measures of depression, anxiety, and sleep problems for girls than for boys, which is likely a function gender socialization as girls are more likely to report these symptoms than boys. However, because the means for depression and anxiety were

identical between the White boys and the boys of color, then the weak association between direct police stops and psychological distress may be a function of socialization; boys of color may be more equipped to cope with instances of police harassment than their female peers and White counterparts who receive less socialization message to cope with instances of police harassment (Berkel et al., 2009).

Consistent with our hypotheses, the consequences of vicarious police stop instances varied according to adolescents' ethnicity-race and gender with Black boys and Latinos showing the most unfavorable consequences whereas White adolescents – regardless of gender – showing the least unfavorable consequences. Contrary to Gottlieb and Wilson (2019), who found no relation between a vicarious police stop and adolescents' grades, we found evidence consistent with our hypotheses that there would be a significant and negative association for specific ethnic-racial and gender groups. For Black boys, Latinos (girls and boy), and Others (girls and boys), adolescents who have experienced at least one vicarious police stop also reported lower grades. For Whites (boys and girls) and Black girls, there was no significant relation between vicarious police stops and grades. Regarding our health outcomes, vicarious police stop predicted all three outcomes for Black (boys and girls), Latino (girls and boys), and Other girls. Vicarious predicted two of the three health outcomes for Other boys, one of the three health outcomes for White boys, and none of the health outcomes for White girls. Many of these ethnic-racial and gender differences may be driven by the common shared narrative that Black boys and Latinos perceive from political injustices in policing regimes, such as police officers' shootings of unarmed Black boys as well as the Immigration and Customs Enforcement officers' perceptions of Latinos as undocumented citizens (K. Wallace & LaMotte, 2016). Overall, these findings support the spillover effects and collateral damages that policing has on communities of color even when

individuals in these communities are not being stopped by police directly (Bor et al., 2018; Gershenson & Hayes, 2017; Kirk & Wakefield, 2018; Stuart, 2016).

Strengths and Limitations

Relative to existing literature, the current study was characterized by several strengths. First, the large sample size permitted us to include all adjustment outcomes in a single model, allowing us to account for overlapping relations across the health-related outcomes. Second, the sample size also allowed us to compare the rates and observed correlates of police contact among sub-groups at the intersection of ethnicity-race and gender. To our knowledge, prior studies have not formally tested whether these observed correlates might be reliably equal. Third, by including controls for other demographic variables, such as the ethnic-racial and poverty level composition of neighborhoods, we were able to test whether our findings were robust to inclusion of these concepts; they were. Finally, because we used two waves of longitudinal data, we were partially able to address some concerns with the temporal ordering of our proposed hypotheses.

There were also some limitations to our findings. First, although the data in the present study permitted us to explore relations among the key study variables by adolescents' ethnicity-race and gender, we could not explore and account for the variations of adolescents' experiences associated with their ethnicity-race and gender. For example, Brunson and Miller (2006) found that young Black men reported frequent stops by police, and police violence whereas young Black women reported being stopped for curfew-related violations, and police sexual misconduct. While we could not explore or account for the qualitative experiences of police stops among the groups in the present study, we call on future research to extend the research in this area. Second, our data relied on adolescents' responses to self-report surveys. Studies have

found divergent results between self-reported police contact and police contact recorded in official administrative records (Geller, Jaeger, & Pace, 2016; Kirk, 2006), let alone the possible influence from recollection error and social desirability bias. Third, although we controlled for prior adjustment outcomes during one wave prior, we could not fully address concerns with causal inference. Lastly, because the FFCW study purposively sampled from disadvantaged families in urban settings, our sample was not representative of the greater national context as it excluded advantaged families and families in rural settings.

Conclusion

Our findings confirm that police contact has a significant negative influence on adolescent physical and mental health. Direct and indirect exposure to this environmental risk compromises the sleep, psychological well-being, and the self-rated health of adolescents, with a heightened risk for youth of color who either witness or know someone get stopped by police. Although policing in general can reduce the incidence of crime (Legewie & Fagan, 2018; National Academies of Sciences & Medicine, 2017), the quality and differential kinds of policing may have counterproductive consequences for adolescents of color. The identification and assessment of these symptoms in adolescents who have had recently experienced a police stop could serve to avert and intervene in negative academic functioning. School policies that address these risk possibilities, especially in urban contexts could help support positive student development. An understanding that police stops, both direct and vicarious, could have serious implications for both the health and social development of youth supports the declaration of police stops in communities of color as a major public health concern by the American Public Health Association (2018). These findings suggest that policing policies must be revisited to

cooperatively include communities into policing efforts, and to not unnecessarily intervene in adolescents' lives.

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Table 1.
Demographic information by adolescents' ethnicity-race and gender.

	White Boys (n=277)	White Girls (n=273)	Black Boys (n=767)	Black Girls (n=769)	Latino Boys (n=409)	Latino Girls (n=375)	Other Boys (n=231)	Other Girls (n = 183)
Age: Mean (SD)	15.43 (.69)	15.46 (.73)	15.63 (.72)	15.57 (.72)	15.61 (.82)	15.64 (.84)	15.59 (.79)	15.61 (.84)
Primary Caregivers' Education Attained								
%Less than high school	4.7	8.4	13.6	16.3	32.3	32.0	14.7	18
%High school	16.2	17.6	19.7	20.3	22.7	21.1	18.6	18
%Some college	35.7	35.2	52.4	49.7	34.2	37.1	42.4	45.4
%College or beyond	43.3	38.8	14.3	13.8	10.8	9.9	24.2	18.6
School Type								
%Public	87.3	87.9	93.2	89.5	92.2	92.8	92.6	89.6
%Private	7.6	6.6	4.3	6.6	5.6	4.5	5.2	7.7
%Parochial/Religious	5.1	5.5	2.5	3.9	2.2	2.7	2.2	2.7
Census tract Racial composition Mean (SD)								
%Latino	.12 (.17)	.13 (.16)	.13 (.18)	.12 (.16)	.47 (.28)	.48 (.26)	.17 (.22)	.21 (.26)
%White	.73 (.22)	.73 (.24)	.27 (.26)	.25 (.25)	.31 (.26)	.29 (.24)	.44 (.32)	.40 (.32)
%Black	.09 (.13)	.08 (.12)	.54 (.33)	.57 (.32)	.13 (.18)	.12 (.17)	.28 (.32)	.27 (.31)
%Asian	.04 (.05)	.04 (.07)	.04 (.07)	.04 (.07)	.07 (.11)	.08 (.12)	.08 (.14)	.08 (.13)
Census tract Adults ages 25 and up Mean (SD)								
%High school+	.90 (.08)	.90 (.08)	.81 (.10)	.82 (.09)	.78 (.13)	.77 (.14)	.85 (.11)	.81 (.13)
%College +	.35 (.20)	.37 (.22)	.20 (.14)	.20 (.14)	.22 (.15)	.22 (.15)	.29 (.20)	.24 (.17)

Note: PCG = Primary Caregiver.

Table 2.

Key study variables organized by adolescents' ethnicity-race and gender.

	White Boys	White Girls	Black Boys	Black Girls	Latino Boys	Latino Girls	Other Boys	Other Girls
Direct police stops (%)								
At least once ever	27.9	14.7	42.1	19.7	30.8	11.5	34.8	18.7
Locale of police stop (%)								
Street	20.9	10.3	37.0	16.0	24.7	7.2	24.2	11.5
Car	8.3	5.5	9.8	7.5	7.3	5.9	9.5	6.0
Bicycle	3.6	1.8	9.1	.1	4.2	0	6.5	1.1
School	6.5	1.1	8.7	5.2	7.9	2.9	12.6	5.5
Other	9.0	2.6	11.6	5.7	9.9	4.8	11.2	5.5
Vicarious police stops (i.e., witnessed/knew someone stopped by police) (%)	76.8	73.5	80.1	79.0	79.1	70.4	74.0	74.7
Witnessed in neighborhood	41.7	35.2	59.3	53.0	51.6	41.4	50.7	47.8
Witnessed in school	50.0	46.7	51.4	47.8	49.3	44.0	44.1	47.8
Knew Someone	57.2	53.1	60.8	56.6	57.0	45.9	51.5	50.5
Knew parent	16.1	20.4	13.6	17.4	11.1	15.1	20.9	15.2
Knew sibling	5.8	4.2	9.9	10.9	10.6	11.6	8.7	12.0
Knew Friend	49.7	45.1	70.8	52.8	64.2	53.5	61.7	56.5
Knew Neighbor	11.0	6.3	7.5	4.9	8.8	4.7	2.6	5.4
New Other	38.1	39.4	26.1	36.7	32.3	32.6	40.0	42.4
Direct or vicarious police intrusion (%)								
Frisked	20.6	17.9	39.4	34.7	32.5	25.1	29.4	28.4
Searched	26.4	26.7	42.9	37.3	39.4	32.0	32.5	35.5
Harsh language	6.1	5.5	18.0	12.1	13.2	9.3	13.0	9.3
Racial slur	1.1	1.5	7.4	5.9	2.4	3.5	6.1	7.1
Threatened force	5.1	2.9	14.6	11.6	9.3	5.9	12.6	12.6
Used force	5.8	5.5	14.9	13.5	12.5	10.7	9.5	14.8
Adjustment outcomes; Mean (SD)								
Problem falling sleep	1.62 (1.95)	2.33 (2.15)	1.48 (1.94)	1.87 (2.07)	1.41 (1.86)	1.99 (2.07)	1.60 (2.00)	1.99 (2.22)
Problem staying asleep	1.04 (1.74)	1.59 (2.14)	1.18 (1.90)	1.43 (2.05)	.95 (1.73)	1.35 (1.99)	1.04 (1.81)	1.54 (2.11)
Problematic sleep duration	1.52 (.69)	1.53 (.71)	1.63 (.76)	1.63 (.77)	1.45 (.68)	1.53 (.71)	1.51 (.71)	1.61 (.73)
Trouble sleeping	1.37 (.63)	1.37 (.58)	1.26 (.54)	1.23 (.50)	1.34 (.55)	1.29 (.53)	1.26 (.51)	1.35 (.62)

Depression	1.45 (.54)	1.67 (.67)	1.54 (.56)	1.64 (.60)	1.54 (.56)	1.69 (.65)	1.60 (.58)	1.69 (.62)
Anxiety	1.72 (.61)	1.90 (.73)	1.75 (.62)	1.81 (.66)	1.81 (.60)	1.89 (.68)	1.81 (.62)	1.86 (.65)
Health status	4.09 (.89)	3.91 (.92)	4.11 (.91)	3.79 (.98)	4.08 (.93)	3.85 (.95)	4.10 (.96)	3.89 (1.03)
Grades	3.04 (.70)	3.17 (.71)	2.68 (.63)	2.85 (.62)	2.82 (.68)	2.97 (.65)	2.84 (.71)	2.92 (.68)

Table 3.
Zero-order bivariate correlations among study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Direct Stop	-									
2. Vicarious stop	.25**	-								
3. Falling asleep problems	.09**	.12**	-							
4. Staying asleep problems	.06**	.10**	.51**	-						
5. Problematic sleep duration	.10**	.08**	.14**	.09**	-					
6. Trouble sleeping	.06**	.07**	.29**	.20**	.03	-				
7. Depressive symptoms	.10**	.12**	.34**	.27**	.09**	.16**	-			
8. Anxiety	.08**	.11**	.35**	.28**	.05**	.15**	.65**	-		
9. Self-rated health	-.05**	-.11**	-.20**	-.16**	-.09**	-.12**	-.27**	-.21**	-	
10. Grades	-.16**	-.10**	-.05**	-.06**	-.02	-.07**	-.13**	-.12**	.15**	-

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

Table 4.

Unstandardized parameter estimates (standard errors) for pathways between adolescents' direct police stops, sleep problems, psychological distress, self-rated health, and grades, after we controlled for our wide set of covariates.

	A-path	B-path	C'-path direct	C-path total	Indirect Effect
	Direct police stop → Mediator	Mediator → Grades	Direct police stop → Grades	Direct police stop → Grades	Direct police stop → Mediator → Grades
Mediator: Sleep problems					
White boys	.35 (.08)***	-.05 (.02)**	-.14 (.03)***	-.19 (.03)***	-.02 (.01)*
White girls	.35 (.08)***	-.05 (.02)**	-.14 (.03)***	-.19 (.03)***	-.02 (.01)*
Black boys	.35 (.08)***	.02 (.02)	-.14 (.03)***	-.15 (.03)***	.01 (.01)
Black girls	.35 (.08)***	.02 (.02)	-.14 (.03)***	-.16 (.03)***	.01 (.01)
Latino boys	.35 (.08)***	.02 (.02)	-.14 (.03)***	-.15 (.03)***	.01 (.01)
Latino girls	1.14 (.36)**	.02 (.02)	-.14 (.03)***	-.14 (.03)***	.02 (.02)
Other boys	.35 (.08)***	-.05 (.02)**	-.14 (.03)***	-.17 (.03)***	-.02 (.01)*
Other girls	.35 (.08)***	-.05 (.02)**	-.14 (.03)***	-.19 (.03)***	-.02 (.01)*
Mediator: Psychological distress					
White boys	.21 (.03)***	-.10 (.03)***	-.14 (.03)***	-.19 (.03)***	-.02 (.01)**
White girls	.21 (.03)***	-.10 (.03)***	-.14 (.03)***	-.19 (.03)***	-.02 (.01)**
Black boys	.07 (.03)*	-.10 (.03)***	-.14 (.03)***	-.15 (.03)***	-.01 (.00)*
Black girls	.21 (.03)***	-.10 (.03)***	-.14 (.03)***	-.16 (.03)***	-.02 (.01)**
Latino boys	.07 (.03)*	-.10 (.03)***	-.14 (.03)***	-.15 (.03)***	-.01 (.00)*
Latino girls	.21 (.03)***	-.10 (.03)***	-.14 (.03)***	-.14 (.03)***	-.02 (.01)**
Other boys	.07 (.03)*	-.10 (.03)***	-.14 (.03)***	-.17 (.03)***	-.01 (.00)*
Other girls	.21 (.03)***	-.10 (.03)***	-.14 (.03)***	-.19 (.03)***	-.02 (.01)**
Mediator: Self-rated health					
White boys	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.19 (.03)***	-.01 (.00)**
White girls	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.19 (.03)***	-.01 (.00)**
Black boys	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.15 (.03)***	-.01 (.00)**
Black girls	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.16 (.03)***	-.01 (.00)**
Latino boys	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.15 (.03)***	-.01 (.00)**
Latino girls	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.14 (.03)***	-.01 (.00)**
Other boys	-.12 (.04)**	.08 (.01)***	-.14 (.03)***	-.17 (.03)***	-.01 (.00)**
Other girls	-.12 (.04)***	.08 (.01)***	-.14 (.03)***	-.19 (.03)***	-.01 (.00)**

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5.

Unstandardized parameter estimates (standard errors) for pathways between adolescents' vicarious police stops, sleep problems, psychological distress, self-rated health, and grades, after we controlled for our wide set of covariates.

	A-path Vicarious stop → Mediator	B-Path Mediator → Grades	C'-path Vicarious stop → Grades	C-path Vicarious stop → Grades	Indirect Effect Vicarious stop → Mediator → Grades
Mediator: Sleep problems					
White boys	.57 (.08)***	-.05 (.02)**	.05 (.04)	.02 (.04)	-.03 (.01)**
White girls	.05 (.28)	-.05 (.02)**	.05 (.04)	.05 (.05)	.00 (.01)
Black boys	.57 (.08)***	.02 (.02)	-.12 (.04)**	-.15 (.04)***	.01 (.01)
Black girls	.57 (.08)***	.02 (.02)	.05 (.04)	.02 (.04)	.01 (.01)
Latino boys	.57 (.08)***	.02 (.02)	-.12 (.04)**	-.13 (.04)***	.01 (.01)
Latino girls	.57 (.08)***	.02 (.02)	-.12 (.04)**	-.13 (.04)***	.01 (.01)
Other boys	.57 (.08)***	-.05 (.02)**	-.12 (.04)**	-.17 (.04)***	-.03 (.01)**
Other girls	.57 (.08)***	-.05 (.02)**	-.12 (.04)**	-.21 (.04)***	-.03 (.01)**
Mediator: Psychological distress					
White boys	.05 (.04)	-.10 (.03)***	.05 (.04)	.02 (.04)	.00 (.00)
White girls	.05 (.04)	-.10 (.03)***	.05 (.04)	.05 (.05)	.00 (.00)
Black boys	.21 (.03)***	-.10 (.03)***	-.12 (.04)**	-.15 (.04)***	-.02 (.01)**
Black girls	.21 (.03)***	-.10 (.03)***	.05 (.04)	.02 (.04)	-.02 (.01)**
Latino boys	.05 (.04)	-.10 (.03)***	-.12 (.04)**	-.13 (.04)***	.00 (.00)
Latino girls	.05 (.04)	-.10 (.03)***	-.12 (.04)**	-.13 (.04)***	.00 (.00)
Other boys	.21 (.03)***	-.10 (.03)***	-.12 (.04)**	-.17 (.04)***	-.02 (.01)**
Other girls	.21 (.03)***	-.10 (.03)***	-.12 (.04)**	-.21 (.04)***	-.02 (.01)**
Mediator: Self-rated health					
White boys	-.02 (.07)	.08 (.01)***	.05 (.04)	.02 (.04)	.00 (.01)
White girls	-.02 (.07)	.08 (.01)***	.05 (.04)	.05 (.05)	.00 (.01)
Black boys	-.27 (.05)***	.08 (.01)***	-.12 (.04)**	-.15 (.04)***	-.02 (.01)***
Black girls	-.27 (.05)***	.08 (.01)***	.05 (.04)	.02 (.04)	-.02 (.01)***
Latino boys	-.27 (.05)***	.08 (.01)***	-.12 (.04)**	-.13 (.04)***	-.02 (.01)***
Latino girls	-.27 (.05)***	.08 (.01)***	-.12 (.04)**	-.13 (.04)***	-.02 (.01)***
Other boys	-.02 (.07)	.08 (.01)***	-.12 (.04)**	-.17 (.04)***	.00 (.01)
Other girls	-.60 (.15)***	.08 (.01)***	-.12 (.04)**	-.21 (.04)***	-.05 (.02)**

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

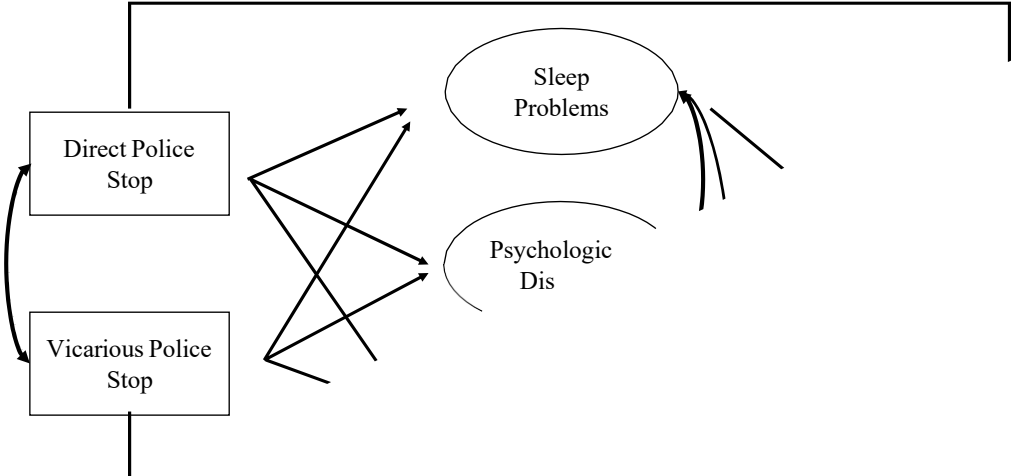


Figure 1.
A visual depiction of the structural equation model in the present study.

Supplemental Information

Table S11.

Unstandardized parameter estimates (standard errors) for freely estimated pathways between adolescents' direct police stops, sleep problems, psychological distress, self-rated health, and grades, after we controlled for our wide set of covariates.

	A-path Direct police stop → Mediator	B-path Mediator → Grades	C'-path (direct) Direct police stop → Grades	C-path (total) Direct police stop → Grades	Indirect Effect Direct police stop → Mediator → Grades
Mediator: Sleep problems					
White boys	.68 (.22)**	-.07 (.03)*	-.29 (.09)**	-.33 (.09)***	-.01 (.04)
White girls	.37 (.29)	-.07 (.03)*	.21 (.11)	-.28 (.11)*	-.02 (.02)
Black boys	.27 (.14)*	.05 (.02)*	-.09 (.05)	-.11 (.05)*	.01 (.01)
Black girls	.41 (.17)*	-.01 (.02)	-.11 (.06)	-.14 (.06)*	.00 (.01)
Latino boys	.15 (.18)	-.01 (.03)	-.07 (.08)	-.13 (.07)	.01 (.01)
Latino girls	1.19 (.35)	.01 (.02)	-.05 (.10)	-.15 (.09)	.01 (.04)
Other boys	.37 (.27)	-.06 (.06)	.21 (.15)	-.25 (.10)*	-.02 (.02)
Other girls	.90 (.46)	-.02 (.03)	-.15 (.15)	-.24 (.13)	-.03 (.04)
Mediator: Psychological distress					
White boys	.24 (.08)***	-.15 (.11)	-.29 (.09)**	-.33 (.09)***	-.15 (.11)
White girls	.26 (.12)*	-.23 (.08)**	.21 (.11)	-.28 (.11)*	-.23 (.08)**
Black boys	.04 (.04)	-.01 (.06)	-.09 (.05)	-.11 (.05)*	-.01 (.06)
Black girls	.16 (.06)**	-.09 (.05)	-.11 (.06)	-.14 (.06)*	-.09 (.05)
Latino boys	.13 (.06)*	-.17 (.09)	-.07 (.08)	-.13 (.07)	-.17 (.09)
Latino girls	.35 (.12)**	-.04 (.07)	-.05 (.10)	-.15 (.09)	-.04 (.07)
Other boys	.08 (.08)	.14 (.12)	.21 (.15)	-.25 (.10)*	.14 (.12)
Other girls	.23 (.13)	-.15 (.11)	-.15 (.15)	-.24 (.13)	-.15 (.11)
Mediator: Self-rated health					
White boys	.01 (.12)	.20 (.05)**	-.29 (.09)**	-.33 (.09)***	.20 (.05)**
White girls	.01 (.16)	.05 (.06)	.21 (.11)	-.28 (.11)*	.05 (.06)
Black boys	.01 (.07)	.09 (.03)***	-.09 (.05)	-.11 (.05)*	.09 (.03)***
Black girls	-.12 (.10)	.07 (.02)**	-.11 (.06)	-.14 (.06)*	.07 (.02)**
Latino boys	-.26 (.11)*	.06 (.04)	-.07 (.08)	-.13 (.07)	.06 (.04)
Latino girls	-.35 (.16)*	.02 (.04)	-.05 (.10)	-.15 (.09)	.02 (.04)
Other boys	-.16 (.15)	.18 (.06)**	.21 (.15)	-.25 (.10)*	.18 (.06)**
Other girls	-.37 (.21)	.06 (.06)	-.15 (.15)	-.24 (.13)	.06 (.06)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.

Table SI2.

Unstandardized parameter estimates (standard errors) for freely estimated pathways between adolescents' vicarious police stops, sleep problems, psychological distress, self-rated health, and grades, after we controlled for our wide set of covariates.

	A-path Vicarious stop → Mediator	B-Path Mediator → Grades	C'-path Vicarious stop → Grades	C-path Vicarious stop → Grades	Indirect Effect Vicarious stop → Mediator → Grades
Mediator: Sleep problems					
White boys	.62 (.21)**	-.07 (.03)*	.02 (.09)	.04 (.10)	-.01 (.03)
White girls	.04 (.28)	-.07 (.03)*	.00 (.11)	.01 (.10)	-.01 (.02)
Black boys	.48 (.15)**	.05 (.02)*	-.04 (.06)	-.07 (.06)	.03 (.02)
Black girls	.70 (.16)***	-.01 (.02)	.07 (.05)	.04 (.05)	-.01 (.02)
Latino boys	.41 (.20)*	-.01 (.03)	-.19 (.08)*	-.22 (.08)**	.01 (.02)
Latino girls	.49 (.20)*	.01 (.02)	-.20 (.08)*	-.22 (.07)**	.00 (.02)
Other boys	.48 (.26)	-.06 (.06)	-.27 (.11)*	-.21 (.11)	-.02 (.02)
Other girls	1.05 (.31)**	-.02 (.03)	-.07 (.11)	-.12 (.11)	-.03 (.03)
Mediator: Psychological distress					
White boys	-.04 (.07)	-.15 (.11)	.02 (.09)	-.04 (.07)	-.15 (.11)
White girls	.07 (.09)	-.23 (.08)**	.00 (.11)	.07 (.09)	-.23 (.08)**
Black boys	.23 (.05)***	-.01 (.06)	-.04 (.06)	.23 (.05)***	-.01 (.06)
Black girls	.21 (.05)***	-.09 (.05)	.07 (.05)	.21 (.05)***	-.09 (.05)
Latino boys	.02 (.07)	-.17 (.09)	-.19 (.08)*	.02 (.07)	-.17 (.09)
Latino girls	.10 (.07)	-.04 (.07)	-.20 (.08)*	.10 (.07)	-.04 (.07)
Other boys	.18 (.08)*	.14 (.12)	-.27 (.11)*	.18 (.08)*	.14 (.12)
Other girls	.17 (.09)	-.15 (.11)	-.07 (.11)	.17 (.09)	-.15 (.11)
Mediator: Self-rated health					
White boys	.00 (.12)	.20 (.05)**	.02 (.09)	.00 (.12)	.20 (.05)**
White girls	-.23 (.13)	.05 (.06)	.00 (.11)	-.23 (.13)	.05 (.06)
Black boys	.28 (.08)**	.09 (.03)***	-.04 (.06)	.28 (.08)**	.09 (.03)***
Black girls	-.36 (.08)***	.07 (.02)**	.07 (.05)	-.36 (.08)***	.07 (.02)**
Latino boys	-.23 (.11)*	.06 (.04)	-.19 (.08)*	-.23 (.11)*	.06 (.04)
Latino girls	-.20 (.11)	.02 (.04)	-.20 (.08)*	-.20 (.11)	.02 (.04)
Other boys	.21 (.16)	.18 (.06)**	-.27 (.11)*	.21 (.16)	.18 (.06)**
Other girls	-.51 (.15)**	.06 (.06)	-.07 (.11)	-.51 (.15)**	.06 (.06)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$.