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Discrimination and health: A dyadic approach

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Abstract

This study examined how discrimination changes over time, how discrimination is related to health and substance use, and whether discrimination spills over to affect the health of family members. Parent–adolescent dyads (N = 341) completed measures of discrimination, physical health, mental health, and substance use over 5 years. Actor–Partner Interdependence Models indicated that individuals' experiences of discrimination can spill over to some aspects of the family context, depending on who is experiencing discrimination (i.e. parent, adolescent) and the outcome (i.e. mental health, substance use). Results suggest that parent-reported discrimination may affect adolescent depression, and adolescent-reported discrimination can spill over to parents' substance use.

Keywords

adolescence, blood pressure, BMI, distress, family, stigma

In a 2015 survey, (Pew Research Center, 2015), 50 percent of Americans consider racism to be a big problem in society today, and this number is higher among African American (73%) and Hispanic (58%) respondents. More than half of White Americans believe there is discrimination against Whites today; however, 84 percent of White Americans also believe there is discrimination against racial and ethnic minorities (National Public Radio et al., 2017c). Furthermore, 68 percent of women believe that there is discrimination against women in America today, and 57 percent of lesbian, gay, bisexual, transgendered, and queer Americans reported experiencing discrimination (National Public Radio et al., 2017a; National Public Radio et al., 2017b). Clearly, perceptions of discrimination are prevalent among Americans.

The limited research on how families are affected by and process discrimination primarily focuses on the association between parent discrimination and child outcomes (Bécares et al., 2015; Hou et al., 2017; Kelly et al., 2013; Tran, 2014). Several studies have reported associations of parents' discrimination experiences with their adolescents' well-being (Espinoza

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et al., 2016; Hou et al., 2017; Park et al., 2018), and that associations with their children's cognitive and socio-emotional development can emerge in early childhood (Caughy et al., 2004; Kelly et al., 2013). Parents may directly talk to adolescents about discrimination because of their own or their child's personal experiences, or adolescents can be aware of their family's derogation without explicit conversations (e.g. witness parents being disrespected). Research suggests that the negative consequences of parents' discrimination may spillover to children indirectly through ethnic-racial socialization (Benner and Kim, 2009), paternal depressive symptoms and maternal hostility (Hou et al., 2017), or less effective parenting strategies (Brody et al., 2008).

Existing research has primarily focused on intergenerational transmission of discrimination (e.g. the effect of parents' discrimination experiences on children). Yet, there is likely a dyadic influence such that youths' experiences with discrimination may spillover to influence parents' health. Children are an important part of a parent's own social context, and parents' concern about how their children are mistreated may have consequences for parents' well-being. Indeed, one study of African American families found concurrent associations between children's discrimination and parents' distress; furthermore, discrimination was associated with substance use among parents, and this relationship was mediated by distress (Gibbons et al., 2004). Thus, it is possible that adolescents' discrimination experiences may spillover to parents' health and substance use through distress.

In the current study, we applied Bronfenbrenner's (1977, 1986) ecological systems theory—which argues that development is affected by direct and indirect environmental factors consisting of interacting contexts across time—to examine how discrimination in parents' and adolescents' lives can spillover and be associated with each other's health and well-being. Similarly, we built upon Park et al. (2018) work by drawing from Elder's (1998) "linked lives" principle of the life course theory, which asserts that individual experiences are linked to the family and that the adversity of one member is shared with other family members. This study extended the well-documented associations between discrimination and mental health in individuals (Pascoe and Smart Richman, 2009) by including physical health and substance use in parent–adolescent dyads. The racial discrimination literature indicates that blood pressure (BP), obesity, and cardiovascular reactivity are important health outcomes to examine (Williams and Mohammed, 2009). Therefore, we measured BP, body mass index, and C-reactive protein, a stable measure of inflammation that is linked to cardiovascular disease (Koenig et al., 1999).

We focused on late adolescence and the transition to adulthood, as this developmental period is characterized by increased stress and risky behaviors (Arnett, 2000). Research suggests youth's perceptions of discrimination may change during this key transition. Specifically, adolescents report increases in overt racial and ethnic discrimination across high school (Benner and Graham, 2011; Greene et al., 2006), which may be partly tied to increases in independent exposure to the social world and gains in social-cognitive development in regards to intergroup dynamics (Brown and Bigler, 2005). The pattern may be different, however, after high school. One study found decreases in reports of overt discrimination but increases in perceptions of social stigma across the transition to college among ethnic minority youth, suggesting that whereas interpersonal discrimination may be less frequent, ethnic minority youth are more aware of how group membership is undervalued (Huynh and Fuligni, 2012).

Longitudinal change in discrimination among adults is similarly unclear. For example, two studies examined change over time using the same measure and in the same city: whereas Schulz et al. (2006) found decreases in everyday discrimination among African American women, LeBrón et al. (2020) found increases in discrimination among African American and Latin American adults, but not White Americans. Both studies found that increases in discrimination were associated with worse outcomes (e.g.

greater depressive symptoms, worse self-rated health, higher BP). It is unclear whether the different findings are based on time period or population, as Shultz and colleagues (2006) examined discrimination among African American women from 1996 to 2001 and LeBron and colleagues (2020) examined discrimination in both men and women from 2002 to 2008.

This current study was driven by the following key questions: (a) To what extent does discrimination change over time for adolescents and their parents? (b) Is discrimination related to mental health, physical health, and substance use?; and (c) Does discrimination spillover to affect the health of family members? We used Actor–Partner Interdependence Models (APIM; Kenny et al., 2006) to examine whether adolescents' and parents' experiences of discrimination influenced indices of health for oneself and for the family member. We expected greater discrimination in parents' and adolescents' lives would spillover and be associated with poorer health and well-being for both themselves and for one another (Bronfenbrenner, 1977, 1986; Elder, 1998; Park et al., 2018).

Methods

Participants

Data for the current study were collected from a three-wave longitudinal study of the transition from adolescence to early adulthood. A total of 350 participants completed at least one wave of data collection. During the first wave of data collection (2011–2012), 316 participants were recruited from 10th- and 11th-grade classrooms. Of these participants, 205 adolescents (64.87%) completed data collection 2 years later (second wave, 2013–2014) and 160 adolescents completed data collection again 4 years later (third wave, 2015–2016). One caretaker, generally the mother (89.87%), also participated at each wave of data collection. An additional 34 new families enrolled in the second wave of data collection, and 20 (58.82%) of these continued to the third wave of data collection. For the conducted analyses, participants were excluded if they were missing time invariant variables of interest (i.e. gender, parental education). This resulted in nine participants being excluded, leaving 341 participants in the analytic sample.

Adolescents and their parents reported demographic information in a psychosocial survey. Youth primarily identified as being from Latin (n = 144, 42.23%), Asian (n = 75, 21.99%), or European American (n = 102, 29.91%) backgrounds, with 20 identifying other ethnicities (5.86%). Roughly half of the adolescents identified as being either first-generation (n = 48, 14.24%) or second-generation immigrants (n = 137, 40.65%). The majority of European American youth did not identify as immigrants (n = 90, 90.00%), whereas the majority of Asian Americans (n = 64, 98.67%), and Latinos (n = 90, 62.50%) identified as either first- or second-generation immigrants. There were slightly more 11th graders (n = 163, 52.08%) than 10th graders in the first wave of data collection and slightly more females (n = 192, 56.30%) than males in the sample. At study entry, parents' average age was 45.74 years (*SD* = 6.94). Most parents reported an average family size of four individuals, including themselves and their children (*M* = 4.13, *SD* = 1.23), and 67.74 percent were married at study entry. Parental education was scored on an 11-point scale (1 = *some elementary school*, 11 = *graduated from medical, law, or graduate school*) and averaged for both parents when possible. Most parents completed either vocational school (23.46%) or college (33.72%) as their highest education degree.

Procedures

This study was approved by the Institutional Review Board at the senior author's institution. Adolescents were initially recruited from classrooms via in-class presentations, flyers, and postal mailings. Participants included adolescents who provided informed assent and caregiver consent as well as primary caregivers who provided their own consent. Adolescents and primary caregivers each earned $50, $75, and $120 at each respective wave of data collection, as well as two movie theater passes at

all waves. Members of the research team visited participants' homes to collect anthropometric measures. Adolescents and caregivers then completed online psychometric questionnaires.

Measures

Discrimination. Participants completed the Everyday Discrimination Scale (Williams et al., 1997). They recalled whether over the past year they had experienced various forms of discrimination and mistreatment (e.g. "You have been treated with less respect than other people"; "People have acted as if they're better than you are") on a 4-point scale: 1 (*never*), 2 (*once*), 3 (*2 or 3 times*), and 4 (*4 or more times*). A mean was taken across the 10 items, and the scale had good reliability across all waves (adolescent αs = .85–.88, parent αs = .83–.87).

Depressive symptoms. Participants completed the 20-item Center for Epidemiologic Studies–Depression Scale (CES-D; Radloff, 1977). They rated the extent to which they experienced symptoms over the previous week on a scale from 1 (*rarely or none of the time*) to 4 (*most or all of the time*). This scale had good reliability across waves for adolescents (αs = .90–91) and parents (αs = .88–.90).

Anxiety. Participants completed the Trait subscale of the Trait-State Anxiety Inventory (Spielberger et al., 1983). They rated the extent to which they experienced various symptoms of anxiety (e.g. "I feel nervous and restless," "I feel like a failure") on a scale from 1 (*not at all*) to 4 (*very much so*). Anxiety was only measured at the final wave of data collection and had good reliability for adolescents (α = .92) and parents (α = .89).

BP. Research personnel collected three measures of resting systolic and diastolic BP for each participant, and the average of each was used for analyses, in line with previous work (Goosby et al., 2015; Oikonen et al., 2016).

Body mass index. Height and weight were measured during the home visit. Weight was measured to the nearest tenth of a pound using a scale, rounded to the nearest quarter pound, and then converted to kilograms. Height was measured to the nearest tenth of a centimeter using a stadiometer. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared and used as a continuous measure.

C-Reactive protein. Trained staff collected dried blood spots from participants via a finger prick. Staff cleaned each participant's finger with alcohol, punctured it with a microlancet, and collected five drops of blood onto filter paper. Samples dried overnight and were then stored at −80°C. Two blood spots per participant were assayed for levels of C-reactive protein (CRP) using high-sensitivity enzyme-linked immunosorbent assay, with a lower detection limit of .030 mg/L at the Laboratory for Human Biology Research at Northwestern University. The natural log of values was used for analyses to normalize the distribution.

Substance use. Alcohol and marijuana use were studied because American adolescents endorsed greater use of these substances relative to any other illicit substances in 2016 (Johnston et al., 2017). Participants reported whether they drank alcohol or smoked marijuana and, if so, how often they had used that substance over the past year on a scale from 1 (*0 days*) to 10 (*every day*; Centers for Disease Control and Prevention, 2001). Participants who reported never using alcohol (52.19% of adolescents, 23.16% parents at study entry) or marijuana (71.55% of adolescents, 59.82% parents at study entry) were given a value of 1.

Data analysis plan

Maximum likelihood estimation was used to handle missing data in the current analyses (Allison, 2009), such that participants who provided data for at least one time point were included in the analysis.

To examine whether levels of discrimination changed across 5 years, two individual multilevel growth models were estimated for

adolescents and parents, with time nested within subjects using SAS software (V9.2, SAS Institute Inc., Cary, NC). Multi-level modeling is appropriate for nested data and accounts for the variance shared by data points collected from the same individual (Moerbeek, 2004). In these growth models, adolescent grade was used as the measure of time and was centered at 10th grade. Models adjusted for ethnicity, parent's education level, and gender.

To examine whether adolescents' and parents' experiences of discrimination influenced indices of health for oneself as well as another family member, we specified APIMs, which account for the dependency between members of a dyad (Kenny et al., 2006). APIM models were estimated for each health outcome separately (eight models total) using a multi-level modeling framework with SAS software (V9.2, SAS Institute Inc., Cary, NC). In APIM models, each member of the dyad has their own predictor and outcome variable. Thus, a person's own predictor (e.g. discrimination) may affect their own outcome (e.g. depression), referred to as an actor effect, and a person's own predictor may also affect his or her partner's outcome, which is referred to as a partner effect. For the current analyses, all dyads were distinguishable (parents and adolescents), and therefore only two actor (an actor effect for parent and adolescent) and two partner effects (parent IV to adolescent DV and vice versa) were estimated. All models controlled for adolescent gender and grade, adolescent and parent ethnicity, and parents' education.

Results

The means and standard deviations of study variables for adolescents and parents for each year (grade 10 through 3 years post-high school) can be found in Table 1.

Participation analyses

On average, adolescents and parents participated in 72.55 percent ($SD = 28.62\%$) of their possible waves. Participation was not associated with initial grade or adolescent gender, although parents with lower education ($r = .15$, $p = .006$) and dyads with Asian adolescents (F_{parents} (3, 337) = 8.61, $p < .001$; $F_{\text{adolescents}}$ (3, 337) = 5.01, $p = .002$) participated in fewer waves. In addition, adolescents with lower systolic and diastolic BP participated in more waves of data collection ($b = -4.11$, $SE = 1.38$, $p = .003$; $b = -5.11$, $SE = 2.14$, $p = .02$, respectively). Otherwise, after accounting for adolescent grade, neither parents' nor adolescents' health outcomes were associated with participation ($ps > .05$).

Changes in discrimination over time

The intercept for adolescents ($b = 1.76$, $SE = 0.08$, $p < .001$) suggests adolescents in 10th grade averaged a little less than a single incident of each form of discrimination in the past year. There was no linear change in the level of discrimination reported across grades ($b = 0.02$, $SE = 0.01$, $p = .15$). However, there was significant variability between subjects in both average levels and linear change across time as indicated by the significant random variance for both the intercept ($\tau_{00} = .20$, $SE = .04$, $p < .001$) and the association of time with discrimination ($\tau_{11} = .009$, $SE = .004$, $p < .05$).

The intercept for parents ($b = 1.46$ $SE = 0.06$, $p < .001$) suggests parents of 10th graders averaged between none and a single incident of each form of discrimination in the past year. There was no linear change in the level of discrimination parents experienced across adolescent grades ($b = 0.02$, $SE = 0.01$, $p = .06$). There was significant between-person variability in parents' average levels of discrimination ($\tau_{00} = .09$, $SE = .02$, $p < .01$) and no variability in association of time with discrimination ($\tau_{11} = .002$, $SE = .002$, $p = .22$).

Dyadic models examining associations between discrimination and health indices

Actor effects. Associations between an individual's experiences of discrimination and their

Table 1. Means and Standard Deviations of Adolescent and Parent Variables by Year.

Data collection wave	Wave 1				Wave 2				Wave 3			
Adolescent grade	10th grade		11th grade		12th grade		1 year post-HS		2 years post-HS		3 years post-HS	
N range	134–143		155–162		130–134		95–105		81–97		65–78	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Adolescent variables												
Discrimination	1.70	0.61	1.76	0.59	1.74	0.64	1.81	0.63	1.71	0.62	1.89	0.71
BMI	22.64	5.02	23.58	5.01	23.67	4.82	24.29	5.71	24.34	5.10	24.36	5.11
Systolic BP	105.66	11.32	105.79	12.81	101.42	11.51	100.93	10.40	103.88	11.89	103.13	11.36
Diastolic BP	66.04	7.53	67.75	8.00	64.34	7.80	65.39	7.40	66.85	8.07	67.51	7.51
CRP	−1.51	1.80	−0.99	1.22	−1.24	1.82	−1.04	2.06	−0.34	1.37	−0.45	1.36
Depressive symptoms	1.77	0.51	1.81	0.55	1.80	0.49	1.76	0.52	1.76	0.50	1.74	0.54
Trait anxiety	–	–	–	–	–	–	–	–	2.09	0.53	2.05	0.54
Alcohol use	1.55	1.16	1.72	1.36	1.92	1.31	2.98	2.02	3.01	1.84	3.55	2.21
Marijuana use	1.47	1.38	1.75	1.84	1.88	1.98	2.24	2.22	2.44	2.48	2.40	2.37
Parent variables												
Discrimination	1.38	0.44	1.36	0.47	1.39	0.42	1.43	0.53	1.46	0.49	1.48	0.57
BMI	27.08	6.59	28.18	7.17	26.57	5.57	28.54	6.87	27.11	5.50	28.74	6.21
Systolic BP	115.59	17.40	117.11	17.31	109.38	15.33	112.91	15.02	110.21	16.92	111.02	15.77
Diastolic BP	77.74	11.69	78.52	11.66	74.44	11.25	75.28	9.50	73.84	10.44	74.95	10.66
CRP	−0.05	1.27	−0.13	1.27	−0.18	1.38	−0.21	1.70	−0.04	1.31	0.14	1.24
Depressive symptoms	1.59	0.50	1.55	0.45	1.57	0.48	1.49	0.38	1.70	0.50	1.51	0.39
Trait anxiety	–	–	–	–	–	–	–	–	1.94	0.50	1.75	0.41
Alcohol use	3.20	2.33	3.28	2.51	3.47	2.53	3.48	2.52	3.38	2.40	4.22	2.78
Marijuana use	1.11	0.88	1.28	1.29	1.11	0.75	1.35	1.37	1.17	0.94	1.20	1.02

Note: *$p < .05$; **$p < .01$; ***$p < .001$; BMI = body mass index, BP = blood pressure, CRP = C-reactive protein. The phrase "years post-HS" refers to the number of years after the 12th grade. The natural log of CRP was used. Only participants 2 and 3 years post-high school could complete the measure of trait anxiety because it was administered during the third wave of data collection. *N* = number of observations for each year. The accelerated longitudinal design and 2-year data collection intervals resulted in participants being able to complete up to three waves of data collection (i.e. three different time points from primarily tenth grade to 3 years post-high school) and not all participants providing data for each year (i.e. participants contributed to between one and three different time.

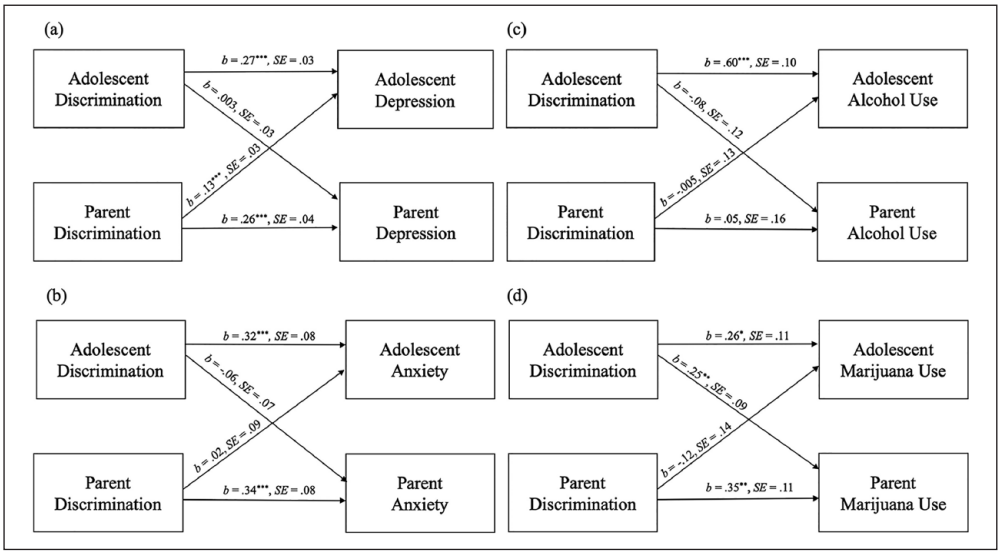

Figure 1. Actor–Partner Interdependence Models (APIM) for mental health and health behavior outcomes are depicted in four panels: (a–d) Parent and adolescent actor and partner effects of discrimination on (a) depression, (b) anxiety, (c) alcohol use in the previous year, and (d) marijuana use in the previous year are reported. All models controlled for adolescent gender, ethnicity, and parent education.
*$p < .05$; **$p < .01$; ***$p < .001$.

health (i.e. actor effects) were examined for mental health (i.e. depressive symptoms, anxiety), physical health (i.e. BMI, systolic BP, diastolic BP, CRP), and substance use (i.e. alcohol, marijuana). Anxiety was only measured at one time point; therefore, APIM models examined anxiety levels at wave 3 predicted by the average level of discrimination across all three waves.

Discrimination was associated with indices of mental health (Figure 1, Panel (a)). Discrimination was significantly related to depressive symptoms for both adolescents and their parents. Experiences of discrimination were also related to greater anxiety symptoms for adolescents and parents (Figure 1, Panel (b)).

In contrast, physical health indicators were not related to discrimination among adolescents or parents (all $ps > .05$). Specifically, there was no association between adolescent discrimination and their BMI ($b = -0.16$, $SE = 0.19$, $p = .41$), systolic BP ($b = -1.08$, $SE = 0.64$, $p = .09$), diastolic BP ($b = -0.49$, $SE = 0.48$, $p = .31$), or CRP ($b = -0.07$, $SE = 0.09$, $p = .44$). The same was true for parents: parents' own discrimination was not associated with their BMI ($b = 0.36$, $SE = 0.27$, $p = .18$), systolic BP ($b = 0.66$, $SE = 1.08$, $p = .54$), diastolic BP ($b = 0.73$, $SE = 0.76$, $p = .34$), or CRP ($b = 0.17$, $SE = 0.12$, $p = .16$).

For substance use, adolescents' experiences of discrimination were associated with their alcohol consumption and marijuana use in the previous year (Figure 1, Panels (c) and (d)). For parents, experiences of discrimination were not related to alcohol consumption in the previous year but were positively associated with their report of marijuana use in the previous year.

Partner effects. Associations between an individual's experiences of discrimination and their family member's health (i.e. partner effects: adolescent or parent effect) were examined for mental health, physical health, and substance use.

For mental health indicators, there was a significant parent effect for depressive symptoms (Figure 1, Panel (a)). Specifically, increases in parents' reports of discrimination were related to increases in adolescents' levels of depressive symptoms. There was no adolescent effect for parents, suggesting adolescents' experiences of discrimination were not associated with parents' depressive symptoms. There were no significant adolescent or parent effects on anxiety symptoms.

For all indices of physical health (i.e. BMI, systolic BP, diastolic BP, and CRP), there were no parent or adolescent effects, suggesting experiences of discrimination for either parent or adolescent had no effect on the other's physical health. Parents' experiences of discrimination were not related to adolescent's BMI ($b=-0.29$, $SE=0.27$, $p=.28$), systolic BP ($b=1.07$, $SE=0.86$, $p=.21$), diastolic BP ($b=-0.27$, $SE=0.65$, $p=.67$), or CRP ($b=-0.22$, $SE=0.13$, $p=.09$). Similarly, adolescent's experiences of discrimination were not significantly related to parent's BMI ($b=-0.19$, $SE=0.19$, $p=.35$), systolic BP ($b=-0.002$, $SE=0.79$, $p=.99$), diastolic BP ($b=0.53$, $SE=0.56$, $p=.34$), or CRP ($b=0.06$, $SE=0.09$, $p=.48$).

For substance use, there was a significant adolescent effect for marijuana use but no adolescent or parent effects for alcohol use. Parents' experiences of discrimination were not related to adolescents' marijuana use in the previous year; however, adolescents' report of discrimination was positively associated with parents' marijuana use (Figure 1, Panel (d)). Parent's experiences of discrimination were not related to adolescent's use of alcohol in the previous year, and adolescent's experiences of discrimination were not related to parent's alcohol use in the previous year (Figure 1, Panel (c)).

Post hoc power analyses

To determine whether the present study was sufficiently powered to detect the hypothesized effects, a series of Monte Carlo simlations were conducted using Mplus software (Mplus 7.4, 1998–2015). The Monte Carlo simulations used coefficients from the APIM models as inputs to conduct 1,000 simulated studies with the current sample size (n=341); this allowed us to obtain estimates of statistical power for each hypothesized effect (Lane and Hennes, 2018). Overall, the simulations suggest the study was adequately powered (i.e. over 80% of simulations detected a significant effect given the present sample size) to test most of the hypothesized effects (e.g. actor and partner effects of discrimination on depression). Furthermore, despite being sufficiently powered to detect the actor effect of parent discrimination on CRP (87% of simulations found a significant effect), the effect without covariates in the model was only marginally significant ($p=.06$); this was also the case for the actor effect of adolescent discrimination on systolic BP. Associations with other physical health indicators (i.e. BMI; BP) were underpowered based on the sample size suggesting further studies should recruit a larger sample size to detect an effect at greater than chance probability.

Discussion

This current study examined whether discrimination experienced by one member of a family was associated with the health and well-being of another family member. Our findings suggest that an individual's experiences of discrimination spill over to some aspects of the family context, largely relating to select mental health features and substance use. Specifically, adolescents' reports of discrimination were associated with their parents' marijuana use, and parents' reports of discrimination were associated with their children's depressive symptoms. Taken together, our findings provide some support for the linked-lives hypothesis as applied to discrimination by providing further evidence that discrimination can be experienced vicariously and differentially affect a family's health and well-being (Elder, 1998; Park et al., 2018). This spillover among parent–adolescent dyads suggests that instead of only focusing on the impact of discrimination on individuals, greater attention is needed on how discrimination may affect the broader family.

To what extent does discrimination change over time for adolescents and their parents?

Discrimination in general appears to be a low-frequency stressor that does not consistently change across the transition from high school for adolescents or across a 5-year period for parents. This low frequency may be due to the measure used, which asked participants about general discrimination over the course of a year; participants may only be able to recall major moments of discrimination or recent events rather than all incidents of mistreatment. Yet, prior work suggests that fewer than 13 percent of adolescents reported discrimination on at least 1 day over the course of 2 weeks (Huynh and Fuligni, 2010). Furthermore, attention to historical context and societal changes may be instructive, as our data were collected prior to the 2016 presidential election. Indeed, a study conducted shortly after the inauguration of US President Donald Trump in early 2017 found that adolescents from Latin American backgrounds experienced marginalization and expressed negative emotions in response to the executive branch's immigration policies and rhetoric (Wray-Lake et al., 2018).

Is discrimination related to mental health, physical health, and substance use?

The finding that discrimination is associated with marijuana use among both adolescents and parents, and with alcohol use among adolescents, is consistent with previous research that documented the discrimination–substance use link (Gibbons et al., 2004). Recent reviews found that perceived discrimination was positively associated with participation in unhealthy behaviors, including alcohol and substance use (Benner et al., 2018; Pascoe and Smart Richman, 2009). Alcohol or marijuana use to cope with the pain and frustration of discrimination is particularly problematic among youth, as both marijuana and alcohol are illegal for adolescents and have long-term consequences for their developing brains and bodies (Brown et al., 2009; Terry-McElrath et al., 2017).

Notably, discrimination was not associated with physical health indices (i.e. BP, CRP, BMI) among either parents or adolescents. Extant research has found mixed results: one meta-analysis of discrimination found a negative association between discrimination and physical health in general (Pascoe and Smart Richman, 2009), whereas another meta-analysis of racial discrimination found that the only significant effect sizes were with overweight-related outcomes (Paradies et al., 2015). The mixed results regarding BP specifically could be due to a threshold effect (e.g. requiring a minimal amount of discrimination to impact cardiovascular outcomes; Brondolo et al., 2003) or a potential curvilinear association between discrimination and BP (Krieger and Sidney, 1996; Peters, 2004). Another consideration is that previous research on the associations between discrimination and health has focused largely on African American populations—a group that has higher cardiovascular disease risk (e.g. BP, metabolic risk) compared with other groups (Crimmins et al., 2007)—whereas our study focused on families from European, Latin American, and Asian backgrounds. Clearly, more research is needed to unpack if and when associations between discrimination and various health outcomes emerge among families across the life course.

Does discrimination spillover to affect the health of family members?

The results suggest that addressing discrimination as experienced by individuals is insufficient: adolescents may be sensitive to parents' experiences of discrimination and exhibit increases in depressive symptoms, and parents may be sensitive to adolescents' experience of discrimination. Although less than one half of parents reported using marijuana in the past year, parents' marijuana use was associated with adolescents' reports of discrimination. Previous research has found that parents' own experiences of discrimination were associated with greater substance use (e.g.

alcohol, smoking, marijuana), and this relationship was mediated by distress (Gibbons et al., 2004). Although the current study did not examine mediating mechanisms, we suspect parents' knowledge of their adolescents' discrimination experiences is distressing; parents who feel like they are unable to protect their children from negative experiences may use marijuana to cope with their feelings of helplessness. Additional research is needed to empirically test whether adolescents' experiences of discrimination are associated with parents' distress, which in turn is associated with parents' marijuana use.

Our study—in which the majority of caretakers were mothers—found direct associations between parental discrimination and youth's depressive symptoms. A previous study of Mexican-origin families, where the majority of caretakers were also mothers, found a similar finding with parent reports of ethnic-racial discrimination being associated with an increase in their adolescents' internalizing problems over time (Espinoza et al., 2016). Other studies have reported fathers' experiences with discrimination to be associated with their children's mental health, and that this association may be indirect (e.g. through paternal depressive symptoms, maternal hostility; Hou et al., 2017) or may depend on family contexts (e.g. level of acculturation in immigrant families; Crouter et al., 2006). Most recently, Park et al. (2018) found that fathers,' but not mothers,' discrimination experiences exacerbated the association between adolescents' own experiences with discrimination and depression, but not with anxiety. Similarly, our study did not find evidence for spillover of parents' discrimination to adolescents' anxiety. Associations between parental discrimination and adolescent depressive symptoms suggest that when adolescents are aware of their parents' discrimination experiences, adolescents may be resigned to the belief that discrimination is a reality and will not change, instead of anticipating discrimination with fear and worry that is characteristic of anxiety (Beck and Clark, 1988). Collectively, studies suggest that the pathway by which parents' experiences of discrimination affect their child's well-being (e.g. spillover, moderation, mediation) may depend on the parent (e.g. mother, father) and the outcome (e.g. depression, anxiety). Practitioners may consider taking a family systems approach when addressing issues related to discrimination; however, more research is needed to identify consistencies in the partner effects across samples and domains (e.g. mental health, substance use).

Limitations and future directions

Despite this study's strengths in using a novel approach to examine whether adolescents' and parents' experiences of discrimination influenced other family members' health over time, there are limitations to this study. Our study focused on discrimination frequency, yet others have suggested that stress appraisals may also impact adjustment (Park et al., 2018). In addition, discrimination measure used in this study assessed general discrimination, not racial/ethnic discrimination specifically, and thus it is unclear if one type of discrimination is driving the associations with mental health and substance use. Indeed, Halim et al. (2017) found that ethnic discrimination was associated with psychological distress and poorer physical health above and beyond language-based discrimination among Mexican and Dominican immigrant women. It has also been argued that people may identify with multiple groups (e.g. gender, race, etc.), making it difficult to attribute discrimination to a particular identity (LeBrón et al., 2020; Lewis et al., 2015). Although more research is needed to untangle the independent effects of specific types of discrimination on health, our results are consistent with other studies that also examined general and unspecified discrimination and found associations with worse health outcomes (Lewis et al., 2015; Pascoe and Smart Richman, 2009).

One strength of our study was including Asian and Latin American families—two of the fastest growing ethnic groups in the United States (Colby and Ortman, 2015). However, our findings may not be generalizable to families outside of southern California where Asian and Latin

American families may be the numerical minority. As noted by the post hoc power analyses, the current study was underpowered to detect effects of discrimination on some of the physical health markers of interest (e.g. BMI, BP), suggesting future studies should aim to recruit a larger sample size. Future work should also include the use of other substances, especially tobacco use. We were also unable to test for differences by parent gender, as the majority of the participating parents were mothers. It would be instructive for future longitudinal studies to include both parents, as emerging evidence suggest that fathers' experiences of discrimination may affect their children's health (Crouter et al., 2006; Hou et al., 2017; Park et al., 2018). Finally, while the present findings support the spillover of discrimination on mental health and substance use within family relationships, the mechanisms by which discrimination spills over to affect another family member's life is unclear. Greater attention to mediating pathways would benefit practitioners and policy makers interested in addressing the health implications of discrimination.

Conclusion

Discrimination experiences may affect the well-being of family members as well as one's own mental health and substance use. Our findings provide additional support for the "linked lives" principle (Elder, 1998) as events in a child's life can spillover to others in their social environment. These findings suggest families, rather than just individuals, may require resources to help them effectively cope with discrimination.

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