

**Influence of perceived discriminatory experiences on mental health and function among early  
adolescent children**

Cecilia P. Margret

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Committee:

Wayne Katon

Joan Russo

Carolyn A. McCarty

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[Cecilia P. Margret]

## University of Washington

### Abstract

**Background:** Studies suggest that Perceived Discrimination (PD) is a stressor that is associated with mental health problems and risky health behaviors among both adolescents and adults. Little is known about the prevalence of PD and its relationship with mental health during early adolescence, a critical phase of development.

**Objectives:** In this cross sectional study, we first determined the prevalence of PD among early adolescent children drawn from an urban multicultural school-based population. Secondly, we examined the relationship of PD with mental health problems including depression, anxiety and substance use, after controlling for socio-demographic factors (gender, age race and family nativity status) and children's sense of school and family connectivity.

**Methods:** A sample of 1185 early adolescent children (11 to 15 years), from four public schools in Seattle was screened for a randomized clinical trial, testing a depression intervention. Cross sectional analyses of children's responses from an initial screening process were completed for the purpose of this study. Perceived discrimination was the primary exposure of interest. After controlling for socio-demographic (age, gender, race and family nativity) variables we examined the association between PD and mental health problems (depression, anxiety, substance use) in multivariable analyses. We also examined if children's functioning (sense of belonging in school as well as their perceptions of parent-child communication and parent-child conflicts) had a potential mediating effect on the association between PD and mental health problems.

**Results:** PD was endorsed in slightly more than half of the sample (57%), irrespective of age or gender. Early adolescents who experienced perceived discrimination had a higher risk of mental health problems including depression (OR 5.0;  $p < 0.001$ ), anxiety (OR 2.3;  $p < 0.001$ ) and substance use (OR 2.8;  $p <$

0.001) after adjusting for socio-demographic factors. Girls had a higher prevalence of anxiety (OR 2.1;  $p < 0.001$ ) and depression (OR 1.6;  $p < 0.05$ ), but were less likely to report substance use (OR 0.8;  $p < 0.01$ ), when compared to boys. Native American and Hispanic/Latino children showed higher risks for substance use ( $p < 0.01$ ) and depression ( $p < 0.05$ ) compared to Caucasian peers. School connectivity and parent child conflicts had only partial mediating influences on the association between PD and mental health problems.

**Conclusions:** Perceived discrimination was prevalent during early adolescence, a sensitive developmental period, and was a risk factor for mental health problems (depression, anxiety, and/or substance use). School and family connectedness had a partial mediating role in the association between PD and mental health.

### **Influence of perceived discriminatory experiences on mental health and function among early adolescent children.**

Cecilia P. Margret

#### **Chair of the Supervisory Committee:**

Wayne Katon MD.,

Professor, Vice-Chair, Director of Division of Health  
Services and Psychiatric Epidemiology,

Department of Psychiatry and Behavioral Sciences, University of Washington Medical School.

## INTRODUCTION

Perceived discrimination, defined as a subjective experience of racial bias (Williams DR, 2008), is a palpable stressor in the increasing multicultural societies in United States that may adversely impact both physical and mental health (Paradies.Y, 2006 ; Williams DR, 2008) across all ages. Studies suggest that experiences of discrimination commonly affect young adults, especially youth from minority communities, elevating their risk for psychological distress (Elizabeth A. Pascoe, 2009), internalizing symptoms (Tobler AL, 2013), externalizing behaviors (Adriana J. Umaña-Taylor, 2007 August; Coker TR, 2009), hostility (Kathy Sanders-Phillips, 2009), and tobacco, alcohol/ drug use(Guthrie BJ, 2002; Terrell F, 2006; Whitbeck LB, 2001). Early onset of psychological distress and health risks related to perceived discrimination, especially during critical periods of development such as adolescence, may lead to enduring mental health problems and functional impairments into adulthood (Pine DS, 1999; Tobler AL, 2013).

In this study, we examined the effect of PD during early adolescence, a critical period of development (Erikson, 1956), a transitional phase notable for pubertal changes(Sun SS, 2002) and the increasing importance of acceptance and inclusion (Dodge KA, 2006). Because of the numerous changes and transitions in the social environments in early adolescence, especially as youth strive for peer acceptance, it is not surprising that perceived discrimination tends to be a significant stressor influencing this critical time period (Birmaher, 1996; Coker TR, 2009; Georgiades, 2006). Emotional distress related to perceived discrimination may lead to depression, ADHD, conduct disorders and adverse health behaviors (Amanda B. Brodish, 2011; Mark A. Schuster, 2012) including obesity, violence, limited exercise and drug use. In this study, we explore the early adolescent's perceptions of peer related discriminatory experiences and its relationship to their mental health and behavior. To our knowledge, our study is one of the few (Coker TR, 2009; Kathy Sanders-Phillips, 2009; Mark A. Schuster, 2012; Pachter LM, 2009) that aims to study the prevalence of perceived discrimination among early adolescent children, and the first to examine the relationship between perceived discrimination and depression, anxiety, and substance use and the potential mediating factors that could mitigate risks for PD and related mental health burden during early adolescence.

Identifying risk factors that mediate the distress of perceived dissemination and its impact on mental health and youth functioning is pertinent for development of interventions that promote natural resilience and support within the child's natural environment (Fisher CB, 2000; Jennifer Kam, 2011). We posited that among early adolescent children, their sense of belonging at school and perception of the parent – child relationship would mediate the effect of PD on psychological distress and externalizing behaviors (Ackard DM, 2006; Fosco GM, 2012; Langille D, 2012; Logan JE, 2011; Maddox SJ, 2003; Pokhrel P, 2008). We examined whether perception of school and home connectedness have potential mediating effects on perceived discrimination and its impact on mental health and if types of discrimination (personal versus observed experience) influence mental health differentially.

Our main objectives were to study the (i) prevalence of PD, (ii) characteristics of early adolescent children who report PD, (iii) associations of PD with mental health problems (depression anxiety and substance use), and (iv) examination of the sense of belonging at school and parent-child communication, and parent-child conflicts as potential mediators of the relationship between PD and mental health problems. Implications of findings will be discussed in the context of developing primary and secondary prevention interventions in natural environments during development to reduce the perceived discrimination related mental health burden among early adolescents.

## **METHODS**

The data were collected from a randomized clinical interventional study testing an intervention to prevent depression among early adolescents drawn from a school-based population (McCarty CA, 2011). The sample (N= 1185) consisted of early adolescent children (7<sup>th</sup> and 8<sup>th</sup> grade) recruited from four public schools in the city of Seattle. From a total population of 2,650 children, a subset of 1190 was screened following parental consent. The present study is a cross-sectional analysis of the student responses gathered via initial screening, administered by trained staff at each school campus, between November 2010 to January 2011. Socio-demographic characteristics included gender, age, race and nativity status.

### **Independent variable**

Perceived discrimination (PD) was measured by the use of an abbreviated version of the Multicultural Events Schedule for Adolescents (MESA) (Roxana Y. Samaniego & Gonzales, 1999) which is originally, a 70-item measure. The subscale used in this study had 5 items, with four personal - experience events: (i) getting accused, (ii) feeling excluded, (iii) experiencing negative remarks or jokes and (iv) called by a racial name, and (v) one item of observed experience such as witnessing another student being discriminated against. For analyses, the responses were dichotomized as “Happened” (endorsed one or more of the five items) versus “Did not happen”. For secondary analyses, all the “Happened” PD items were further classified as either self/personal PD versus observed PD only.

### **Dependent variables**

#### **Depression**

To identify children with depressive symptoms, we used the Mood and Feelings Questionnaire (MFQ) designed for children ranging in age from 8 to 18 years (Angold A, 2002; Costello EJ, 1992). This is a 32 item measure and we used a cut-off of 26 and above that has been shown to be  $\geq 90^{\text{th}}$  percentile (Peter Yates, 2004). This cut-off is highly correlated with sub-threshold depression, i.e. symptoms which have been shown to be associated with substantial impairment and the development of major depression or substance use (Costello EJ, 1992).

## Anxiety

To identify children with anxiety symptoms, we used the Revised Child and Adolescent Anxiety and Depression scale (RCADS), a 47 item self-report measure developed from the original Spence Child's anxiety scale ((Chorpita BF, 2005) that correlates with DSM IV anxiety disorders (Separation Anxiety, Social Phobia, Generalized Anxiety Disorder, Panic Disorder, Obsessive Compulsive disorder and Major Depressive Disorder). In this study, we used a subscale of 6 items for optimal identification of anxiety. The responses were on a 4 item scale (Never=1, Sometimes=2, Often=3, Always = 4) with scores ranging from 6 to 24. We used this measure as a categorical variable, with a cut-off of 16, similar to the depression measure, to correlate with  $\geq 90^{\text{th}}$  percentile for symptom frequency, in order to identify children with significant sub-threshold anxiety (Costello EJ, 1992) who can be identified for early interventions to avoid development of significant illness or functional impairment.

## Substance use

We measured substance using the Drug Use Frequency questionnaire, a 3 item screening measure for screening use of alcohol, cigarettes and marijuana among multicultural school based youth (Bachman JG, 1981) sample (e.g. *Have you ever had a drink of beer, wine, or alcohol (more than a sip or taste)?*). The responses were "yes" or "no". We utilized this measure as a dichotomous variable (zero versus one or more).

## Functional measure(s):

We measured functional measures of early adolescent children, in terms of their sense of school connectedness/belonging, quality of parent communication, child communication and parent-child conflicts, obtained from their self reports measures, described below.

To assess the child's perception of school connectedness we examined their self-report about school belonging, a subset of 5 items (e.g. "I feel like a part of this school") from the 18 item questionnaire, Psychological Sense of School Membership (PSSM) that gathers perceptions of belonging, acceptance, inclusion, respect and encouragement (Goodenow 1993, Anderman

1999(Shochet IM, 2006). The questions were rated on a scale of 1 -5, based on responses: (1) not at all true, (2, 3, 4) somewhat true and (5) completely true. The responses were measured as a continuous variable, with high scores indicating a strong sense of school belonging.

To measure the child's sense of familial connectedness, we used two self report scales describing the following: (1) parent's communicative ability, (2) child's communicative ability and (3) parent – child conflicts. Parent Child Communication – PCC scale (Loeber & B., 1998; Smith, 1995) includes 4 items for assessing student's perception of the parent's openness to communication (e.g. *"Is this person a good listener?"*), and 4 items for child's openness to communication ( e.g. *"Do you think you can tell this person how you really feel about some things?"*) The Network of Relationships Inventory conflict - NRI scale (Furman W, 1985; Seeley JR, 2009; Sheeber LB, 2007), has 3 items for assessing frequency of parent - child conflicts (e.g. *"How much do you and this person argue with each other?"*). For both the PCC and the NRI, responses were self-rated from 1-6, based on the answers (i) Almost Never, (ii) Once in a while, (iii) Sometimes, (iv) Often and (v) Almost Always and the sum of items was taken as total. In this study we used these measures as continuous variables, and high scores indicated good communicative parent-child relationship and highly conflicting parent-child relationship, respectively.

### **Statistical analysis**

All data analyses, both descriptive and regression modeling analyses for associations and odds ratio calculations, were performed using IBM SPSS Statistics 19 package.

We used descriptive statistics to compare the demographic characteristics, mental health problems and functional measures for those who reported perceived discrimination versus those who did not report perceived discrimination. Inferential statistics including Chi-square tests and independent group t-tests were used to compare the groups with and without PD, across categorical and continuous variables, respectively (Table1).

In order to examine the association between children who report PD and mental health problems such as depression, anxiety and substance use, we used binary logistic regression models (Table 2) with

each of the above mentioned dichotomous mental health problems as dependent variables. We fit 3 models: the first model (Model 1; Table 2) contained only the PD variable and was used to determine the unadjusted odds ratio; the second model (Model 2; Table 2) estimated the adjusted odds ratio for PD after adjusting for socio-demographic factors (gender, age, race, family nativity status) . The demographic factors were chosen *a priori*, based on the evidence in the literature of their association with PD and mental health problems (Coker TR, 2009; Kathy Sanders-Phillips, 2009; Pokhrel P, 2008; Roxana Y. Samaniego & Gonzales, 1999).

In order to determine if children's sense of school and home connectedness mediated the association between PD and mental health problems, we fit logistic regression models with each mental health problem as the dependent variable (Model 3; Table3). The models included PD, the socio-demographic variables and the four functional measures (sense of belonging, parent communication, child communication and parent-child conflicts). Adjusted odds ratios and their statistical significance for PD were examined to determine if the functional measures potentially mediated the relationship between mental health and PD, that is, if the odds ratios for PD were reduced when the functional variables were in the models.

As secondary analyses, we examined the type of perceived discrimination experienced: personally experienced versus observed experience (as happening to other), to determine if they demonstrated salient associations with mental health problems. Logistic regression analyses evaluating the association between both types of PD and mental health problems were performed, controlling for demographic variables (not shown).

## RESULTS

The study sample was comprised of 1185 student responses, with a slightly higher proportion of girls (55.7%) compared to boys (44.3%). Half of the study sample were Caucasians (51.5%) while the rest were from various minority communities: 22.2 % were Asian, 10.9% were Hispanic/Latinos, 8.2% African/African-American, 4.6% were Native Americans and 2.7% were Pacific Islanders/Hawaiians. Children were categorized across three different age categories: 12 years and younger (38.4%), 13 years (46.3%) and 14 years and older (15.3%) to examine for any differences in perception of discriminatory experiences by age. Twelve percent of the children were born outside of United States, and 26.1% were born to parents, neither of whom was born in the United States.

### Perceived discrimination (Table 1)

On examining the prevalence of perceived discrimination across the study sample, one out of every two students reported experiencing perceived discrimination (55%), across all ages and genders. Native American (72.2%), African/African-American (70.1%), Hispanic/Latino (65.1%), Asian (61.2%), and Pacific Islander/Hawaiian (59.4%) children reported significantly more experiences of perceived discrimination compared to Caucasians (45.4%;  $p < 0.001$ ). Children who were not born in the United States (62 %;  $p < 0.1$ ) and/or having both parents neither of whom was born in the United States (63.1 %;  $p < 0.001$ ) reported slightly higher rates of perceived discrimination compared to those who were first generation or whose families were native of US or even had one parent native of United States (53.5%;  $p < 0.001$ ).

The percentage of youth with significant levels of depression, anxiety symptoms and substance use was higher among the early adolescent children who endorsed perceived discrimination. Further, children who reported perceived discrimination had a decreased sense of belonging at school, were less likely to be communicative with family, perceived their family to be less communicative and endorsed increased conflicts with caregivers/parents at home.

### Mental Health Problems

Children who endorsed perceived discrimination had a higher risk for mental health problems (Model 1; Table 2), with the risks remaining significant even after controlling for socio-demographic factors (Model 2; Table 2). The risk was highest for depression (OR = 5.0; 95%CI = 3.0, 8.5,  $p < 0.001$ ) followed by substance use (OR = 2.9; 95%CI = 2.0, 4.2,  $p < 0.001$ ) and anxiety (OR = 2.4; 95%CI = 1.6, 3.7,  $p < 0.001$ ).

In Model 2; Table 2, when we examined the relationship between PD and mental health measures, after adjusting for socio-demographic factors, we noted girls were twice as likely to report anxiety (OR = 2.1; 95%CI = 1.4, 3.1,  $p < 0.001$ ), 1.6 times more likely to report depression (OR = 1.6; 95%CI = 1.0, 2.4,  $p < 0.01$ ) and less likely to report substance use (OR = 0.6; 95%CI = 0.4, 0.8,  $p < 0.05$ ) compared to boys. Similarly, Native -American (NA) and Latino/Hispanic (LH) children were at higher risk for depression (NA: OR = 2.8; 95%CI = 1.3, 5.9,  $p < 0.05$ ; LH: OR = 2.3; 95%CI = 1.2, 4.5,  $p < 0.05$ ) and substance use (NA: OR = 2.7; 95%CI = 1.4, 5.2,  $p < 0.01$ ; LH: OR = 2.1; 95%CI = 1.2, 3.7,  $p < 0.01$ ). Children not born within the United States trended to have a higher risk for substance use and children having both parent(s) non-native of United States were more likely to endorse anxiety (not statistically significant).

### **Functional Measures**

We examined whether functional measures were potential mediators of the association of PD with mental health problems (Model 2; Table 3). The logistic regression models that included the functional measures (sense of belonging at school, parent communicative styles, child communicative styles and parent-child conflicts), decreased the observed odds ratio for perceived discrimination after adjusting for socio-demographic factors. This suggests that the four functional measures partially mediated the effects of PD and the mental health measures, but there was still a significant association between PD and these mental health measures.

As seen in Model 2; Table 3, after adjusting for socio-demographic factors and functional measures we observed that the risks of reporting depression (OR 0.8; 95%CI = 0.7, 0.8,  $p < 0.001$ ), and anxiety (OR 0.8; 95%CI = 0.8, 0.9,  $p < 0.001$ ), were less in those with an increased sense of belonging at

school. Children who reported increased conflict at home had a higher risk for all three mental health problems [Depression (OR 1.1; 95%CI = 1, 1.2,  $p < 0.05$ ), Anxiety (OR 1.1; 95%CI = 1, 1.2,  $p < 0.05$ ) and Substance Use (OR 1.1; 95%CI = 1, 1.2,  $p < 0.001$ ).

### **Types of Perceived Discrimination**

As a secondary analysis, we examined the influence of the two types of PD, personally experienced and observed experience, on mental health problems. Irrespective of the type of PD, children who reported both types of PD experiences (39%), or personally experienced only (23%) or only as observed experience (38%) had higher odds for depression, anxiety and substance use ( $p < 0.001$ ) when we used binary logistic regression analyses for each type of PD after adjusting for socio-demographic factors and functional measures (not shown in tables). Thus, perceived discrimination experienced as personal or observed experiences, were independently associated with poor mental health outcomes.

**Table 1. Comparison of early adolescents with and without exposure to perceived discrimination.**

<b>Characteristics</b>	<b>N(%) / Mean(SD)</b>	<b>No perceived discrimination (n= 535) %/ Mean (SD)</b>	<b>Any perceived discrimination (n= 650) %/ Mean (SD)</b>	<b>Chi- square (df = 1) / t tests (df = 1182)</b>
<b>Gender</b>				
Male	523 (44.3)	43.8	56.2	0.88
Female	662 (55.7)	46.5	53.5	
<b>Age</b>				
≤ 12 years	457 (38.4)	41.8	58.2	8.1 **
13 years	551 (46.3)	49.7	50.3	
≥ 14 years	182 (15.3)	40.9	59.1	
<b>Race</b>				
Caucasian	612 (51.5)	54.6	45.4	47.7 **** \$
African /Afro-American	97(8.2)	29.9	70.1	
Asian	264(22.2)	38.8	61.2	
Native American	55 (4.6)	27.8	72.2	
Hispanic/Latino	129 (10.9)	34.9	65.1	
Pacific Isl./ Hawaiian	33 (2.7)	40.6	59.4	
<b>Family nativity statuses</b>				
Student not born in US	142 (12)	38	62	3.5*
Both parents born US	717 (60.5)	48.7	51.3	12.2 ****
One parent born in US	159 (13.4)	46.5	53.5	
Neither parent(s) born in US	309 (26.1)	36.9	63.1	
<b>Mental health problems</b>				
Depression (MFQ ≥ 26 )	117 (9.8)	15.4	84.6	47.05 ****
Anxiety (RCADS ≥ 16)	133(11.2)	27.1	72.9	20.13 ****
Substance use	174 (14.6)	23.7	76.3	38.61****
<b>Functional measures</b>				
Sense of belonging at school	16.83 (4.2)	17.7 (3.9)	16.1(4.4)	6.6 ****
Parent's communicative ability	20.0 (3.5)	20.8 (3.5)	19.4 (4.3)	6.0 ****
Child's communicative ability	10.8 (2.7)	11.3 (3.2)	10.3 (3.8)	4.6 ****
Parent child conflicts	7.0 (4.0)	6.6 (2.6)	7.3 (3.0)	-4.8 ****

MFQ: Moods feeling questionnaire; RCADS: Revised Child Anxiety and Depression Scale; Substance use of one or more of the following substances: alcohol, cigarettes ,marijuana.

\* $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\* $p < 0.01$ , \*\*\*\* $p < 0.001$ . \$ =  $df = 5$ .

All of the above covariates are expressed as the sample (percentages), while functional measures (4 variables) are expressed as mean scores with corresponding standard deviations (SD).

**Table 2. Odds ratios with 95% Confidence Intervals for risk of Depression, Anxiety, and Substance Use among early adolescent school-based sample population, who reported Perceived Discrimination (unadjusted and after adjusting for socio-demographic variables and functional measures).**

	<b>Depression</b>	<b>Anxiety</b>	<b>Substance Use</b>
	OR (95%CI) <i>p</i> value	OR (95%CI) <i>p</i> value	OR (95%CI) <i>p</i> value
Model 1: PD - Unadjusted	5.2 ****(3.1, 8.7)	2.4****(1.6, 3.6)	3.1****(2.1, 4.5)
Model 2: PD - Adjusted gender, age, race and nativity statuses	5.0**** (3.0, 8.5)	2.4****(1.6, 3.7)	2.9**** (2.0, 4.2)
<b>Gender</b>			
Female	1.6** (1.0, 2.4)	2.1 **** (1.4, 3.1)	0.6*** (0.4, 0.8)
<b>Age</b>			
≤ 12 y (ref)	1.0	1.0	1.0
13 y	1.5* (1.0,2.4)	1.0 (0.7, 1.6)	1.2 (0.8,1.7)
≥14 y	1.4 (0.6, 1.9)	1.1 (0.6,1.9)	1.9*** (1.2,3.1)
<b>Race</b>			
Caucasian (ref)	1.0	1.0	1.0
African/Afro-American	1.7 (0.9, 3.5)	1.4 (0.7, 2.7)	1.5 (0.8, 2.7)
Asian	1.5 (0.8, 2.8)	1.1 (0.6, 1.9)	0.7 (0.4, 1.2)
Native American	2.8** (1.3, 5.9)	1.8(0.8, 3.8)	2.7*** (1.4, 5.2)
Latino/Hispanic	2.3** (1.2, 4.5)	1.3(0.7, 2.5)	2.1***(1.2, 3.7)
Pacific Isld. /Hawaiian	2.6 (0.9, 7.8)	1.9 (0.7, 5.2)	0.2 (0.3, 1.7)
<b>Family Nativity statuses</b>			
Both parents born in US(ref)	1.0	1.0	1.0
Student not born in US	0.8 (0.4, 1.7)	0.7 (0.4, 1.8)	1.1 (0.6, 2.0)
One parent born in US	0.7 (0.4, 1.4)	0.9 (0.5, 1.7)	0.9 (0.5, 1.6)
Both parents not born in US	0.7 (0.4,1.3)	1.2(0.7, 2.2)	1.0 (0.6, 1.8)

PD: Perceived discrimination, SE: Standard Error, CI: Confidence Interval

\**p* < 0.1 \*\**p* < 0.05 \*\*\* *p* < 0.01 \*\*\*\**p* < 0.001

Model 1 is unadjusted odds ratio for those who report PD

Model 2 is adjusted odds ratio for those who report PD, after controlling for socio-demographic factors.

**Table 3. Odds ratios with 95% Confidence Intervals for risk of Depression, Anxiety, and Substance Use among early adolescent school-based sample population, who reported Perceived Discrimination (unadjusted and after adjusting for socio-demographic variables and functional measures).**

	<b>Depression</b>	<b>Anxiety</b>	<b>Substance Use</b>
	OR (95%CI) <i>p</i> value	OR (95%CI) <i>p</i> value	OR (95%CI) <i>p</i> value
Model 1: PD - Unadjusted	5.2 ****(3.1, 8.7)	2.4****(1.6, 3.6)	3.1****(2.1, 4.5)
Model 2: PD - Adjusted for functional measures and socio-demographic factors	3.5 ****(2.0,6.1)	1.6** (1.1,2.6)	2.4****(1.6,3.6)
<b>Functional measures</b>			
Sense of belonging at school	0.8****(0.7,0.8)	0.8****(0.8,0.9)	1.0(1.0,1.05)
Parent's communicative ability	0.9 (0.8,1.0)	0.96 (0.9,1.0)	0.96 (0.9,1.0)
Child's communicative ability	0.9 (0.9, 1.0)	0.96 (0.9,1.0)	0.96 (0.9,1.0)
Parent – child conflicts at home	1.1**(1.0,1.2)	1.09** (1.0,1.2)	1.1****(1.0,1.2)

PD: Perceived discrimination, SE: Standard Error, CI: Confidence Interval

\**p* < 0.1 \*\**p* < 0.05 \*\*\* *p* < 0.01 \*\*\*\**p* < 0.001

Model 1 is unadjusted odds ratio for those who report PD

Model 2 is adjusted odds ratio for those who report PD, after controlling for socio-demographic factors and functional measures.

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## **DISCUSSION**

We observed that one in two early adolescent children within our sample drawn from urban schools across Seattle, irrespective of gender or age, experienced perceived discrimination. This is consistent with prior observations that PD is a common stressor in the multicultural society our children live in. Our major finding suggests that early adolescent children who reported experiencing perceived discrimination had a higher risk for mental health problems, including depression, anxiety and substance use, after adjusting for socio-demographic and functional measures. School and family connectivity were partial mediators of the effect of PD on risk of mental health disorder. Other significant findings we report from the multi-variable analyses that examined the association between perceived discrimination and mental health included that: girls had high risks for depression and anxiety and less risk for substance use than boys; Native-American and Latino/Hispanic children showed higher risks for substance use and depression compared to White adolescent peers; a higher sense of school belonging was associated with lower risk for internalizing symptoms; and greater parent-child conflicts predict higher risk for both internalizing symptoms and substance use problems.

### **Mental health problems**

Concurrent with prior literature, we found in our sample that children of racial minority groups who reported perceived discriminatory experiences had higher rates of both internalizing problems and substance use when compared to their Caucasian peers during early adolescence (Coker TR, 2009; Kathy Sanders-Phillips, 2009; Nyborg VM, 2003 ; Okamoto J, 2009; Pachter LM, 2009; Whitbeck LB, 2001). Native American and Latino/Hispanic children had higher risks for depression and substance use than their white and nonwhite peers in our study sample. This finding is consistent with literature that emphasized that Native American and Hispanic/Latino adolescents are at risk for psychological distress when reporting victimization and perceived discrimination (Saluja G, 2004; Smokowski PR, 2007; Whitbeck LB, 2001). Based on our findings we urge further study of culture specific risks as well as implementation of preventive interventions to reduce overall mental health burden among these high risk populations.

We noted that early adolescent girls have a higher likelihood of experiencing anxiety and/or depression and lower odds for substance use than boys, which is consistent with the literature describing gender risk for internalizing disorders (Hankin, 1998) in early adolescents. A limitation of our data is not measuring co-occurring externalizing behaviors. However, many studies have reported a strong association between externalizing symptoms and initiation of substance use, when compared to internalizing symptoms which may be protective for initiating substance use (Colder CR, 2012 Dec 15.). This may explain the lower odds for substance use among girls who experienced perceived discrimination in our sample.

We observed a higher prevalence of substance use among several minority subgroups of middle school children who endorsed perceived discrimination, including a 2.7 fold higher risk for Native Americans, a 2.1 fold higher risk for Latino and a 1.5 times higher risk for African American communities when compared to Caucasians,. This finding is consistent with studies on the association of discrimination and substance use among minority adolescent populations (Guthrie BJ, 2002; Okamoto J, 2009; Whitbeck LB, 2001).

The increased prevalence of substance use among early adolescents in ethnic/minority populations who endorsed perceived discrimination, is an important issue that needs to be addressed. Studies have shown that early experiences of PD is associated with increased likelihood for aggression, delinquency and high risk behaviors (Tobler AL, 2013) and PD associated externalizing behaviors such as substance use can persist for up to 5 years (Gibbons FX, 2007). Substance use is associated with poor stress tolerance (Guthrie BJ, 2002), anger and delinquent behaviors (Whitbeck LB, 2001) potentially impacting overall health outcomes (Pachter LM, 2009), which we plan to study in a longitudinal follow up.

### **Functionality at home and school**

School belonging or connectedness is an important factor that has been found to potentially mitigate emotional distress and protect against mental health problems during adolescence (Langille D, 2012; Resnick MD, 1993; Shochet IM, 2006; Wilkinson-Lee AM, 2011). We found children with stronger school connectivity had relatively less risk for depression and anxiety when faced with PD. This is

consistent with studies that reported inverse relationships between school connectedness and mental health (Logan JE, 2011; Maddox SJ, 2003; Shochet IM, 2006). A recent study that focused on school bonding as a life skill helped reduce drug use among school based populations (Wenzel V, 2009 ). Thus promoting school connectedness could be incorporated into prevention planning to reduce the psychological ill effects related to PD during the formative years of early adolescence.

We found children who reported parent-child conflicts and/or perceived discrimination had a higher risk for all three mental health problems, depression anxiety and substance use, consistent with studies (Juang LP, 2010; Roberts ME, 2012; Smokowski PR, 2007) that have conceptualized the importance of the parental relationship as a protective factor that helps buffer risks in early adolescence years of development.

Based on our knowledge this study is first of its kind to use a 5 item scale to assess comprehensively PD, and divided PD into both personal and observed experiences to examine the impact on mental health outcomes. We hypothesized that the context of PD may affect the mental health problems differentially, analogous to trauma experiences wherein observing trauma to others elicited a milder response as opposed to direct self experience (Vanderploeg RD, 2012). However, we found that in early adolescence PD experienced as personal or observed was independently associated with poor mental health.

## **LIMITATIONS**

Limitations include that the cross sectional analyses limits understanding causal mechanisms. Secondly, the sample is restricted geographically to one urban site, and even though it is representative of a typical urban multicultural public school based population of Seattle, the data may not be generalizable across the country. We did not have socioeconomic details of families (Kathy Sanders-Phillips, 2009) or composition of the schools(Coker TR, 2009; Mark A. Schuster, 2012) which tend to influence individual and ethnicity related PD experiences. Lastly, we do not account explicitly for externalizing tendencies among early adolescent children who report PD, a major pathway underlying early adolescent substance use and delinquent behaviors specifically among vulnerable ethnic groups.

## **CONCLUSIONS**

Our findings show that ethnic/racial perceived discrimination is a common stress among the early adolescent children from school-based sample population and has a strong association with mental health problems. These findings have critical implications for development of policy and prevention of mental health problems among adolescents. Development of preventive interventions are important given our expanding multicultural society and growing mental health burden and related disability during early formative years that potentially persist into adulthood. Given the significant impact of PD-related stress on emotional health and risky behaviors in middle school years, it is critical to introduce diversity awareness, training in schools to screen and provide reparative processes to modify risks pertaining to gender, race and non-native status, and promote school and familial connectivity, to improve child and adolescent mental health.

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